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ENERGY LAW AND THE ENVIRONMENT

Rosemary Lyster
Adrian Bradbrook

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Energy Law and the Environment

Unsustainable practices worldwide in energy production and consumption have led to a plethora of environmental problems. For a long time environmental law largely overlooked the relevance of energy production and consumption, and energy was not seen to be of much significance to the advancement of sustainable development. This has changed in recent years, with increasing global concern about climate change, and in particular with the publication by the United Nations of the *World Energy Assessment* report followed by the detailed consideration of this issue at the World Summit on Sustainable Development in Johannesburg in 2002. Australia has been seen to be lagging behind the other major industrialised nations in addressing sustainable energy issues.

Energy Law and the Environment shows the relevance of energy production and consumption to climate change and sustainable development. It discusses current national and international legal regimes and offers creative legal solutions for enhancing the role of the law in advancing sustainable development in the future.

This is compulsory reading for legal practitioners and academics interested in energy law and climate change, as well as for professionals in environmental consultancies and relevant government agencies across Australia. Students of environment law, energy law, environmental management and environmental science will find this book an invaluable resource, as will anyone with an interest in energy and sustainable development.

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Energy Law and the Environment

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To my parents, who gave me every opportunity, and to my partner Mark and children Kathryn and Matthew, to whom I am devoted. With thanks also to my environmental law colleagues around the world for their support and encouragement.
RL

To Richard L Ottinger, in appreciation and admiration for his lifelong commitment to furthering the cause of sustainable energy development.
AB

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Preface

The current unsustainable practices worldwide in energy production and consumption have led to a plethora of environmental problems. Among the most important are the following:

- Climate change, for which energy production is 57% responsible;
- Acid rain, caused primarily by coal burning;
- Increased desertification, caused by unsustainable use of firewood for heating and cooking in developing countries;
- Ozone depletion, caused by the use of hydrofluorocarbons in refrigerators and air-conditioning units;
- Nuclear radiation;
- Soil pollution, caused by oil and geothermal exploration and production;
- Loss of habitat, caused by large-scale hydropower plants;
- Pollution of the sea, caused by oil spills from large ocean-going tankers; and
- Urban air pollution, caused by fossil-fuel burning.

All developed countries have conducted unsustainable policies in the past. Australia, with its large reserves of coal, has been one of the worst offenders, with its per capita greenhouse gas emissions being the highest in the world.

The modern watchword of environmental management is sustainable development. The origin of this principle is the 1986 *Report of the World Commission on Environment and Development* (the Brundtland Report). While this principle has been adopted with enthusiasm in later reports and international conventions in a variety of different environmental contexts, the one area where it has received little attention until recently is energy.

This omission is surprising in light of the importance attached by Chapter 7 of the Brundtland Report to energy issues. The report considered energy to be a major feature of sustainability, and identified the key elements as follows:

- Sufficient growth of energy supplies to meet the needs of humanity;
- Energy efficiency and conservation measures;
- Public health, recognising the safety risks posed by energy use and production; and
- Protection of the biosphere and elimination of local pollution problems.

The most important issues were considered to be the increase and improvement of energy efficiency, which the Report stated should be at the cutting edge of

national energy policies for sustainable development, and the need to shift the current energy mix towards renewable energy resources.

Despite this boost give to energy issues, for the remainder of the 1980s and the 1990s energy featured only marginally in environmental law. It became mired in intractable political issues, with too many vested interests at stake to allow for radical change. For example, the need to reduce the heavy reliance on fossil fuels was thwarted by many powerful oil-producing and oil-dependent nations, which feared economic detriment from any change to the status quo, and by powerful multinational oil corporations. These political factors led to the virtual exclusion of energy issues from the final text of Agenda 21. Chapter 9, which was originally designed to contain a variety of energy-related measures, was emasculated during the discussions leading to the drafting of the final text. The range of energy reforms and developments proposed in paragraph 9.11 of Agenda 21 are insignificant and wholly inadequate as a basis for promoting sustainable development in the energy sector.

Since the year 2000 the situation has changed dramatically. The catalyst has been the World Summit on Sustainable Development (WSSD), held in Johannesburg, South Africa, in 2002, which chose energy as one of its five key areas of focus. The preparations leading up to this summit spawned a range of research reports and documents emphasising the link between energy and sustainable development and showing how many political, legal and economic changes need to be adopted at both national and international level before energy policies can realistically be claimed to be sustainable. The most comprehensive and influential of these documents was the *World Energy Assessment*, a comprehensive report into all aspects of energy production and consumption undertaken jointly by the United Nations Development Programme (UNDP), the United Nations Department of Economic and Social Affairs (UN–DESA) and the World Energy Council.

While energy still proved controversial amongst the delegates to the WSSD, and targets for the adoption of renewable energy proposed by the European Union and others could not be agreed to, the Johannesburg Plan of Implementation contains a range of measures on energy which mark a significant step forward in the drive towards the adoption worldwide of sustainable development policies. The impetus has since been maintained by the decision of the Commission on Sustainable Development to focus on energy as one of its major themes during 2006 and 2007 and the publication of an update to the *World Energy Assessment* in 2004.

These and other developments are discussed in detail in this book. The book considers issues involving energy and sustainable development both from an international perspective and from an Australian perspective. Consequently the book treats energy both as an aspect of international law, particularly the rapidly evolving area of international environmental law, and domestic law. It discusses the current state of both areas of law and adopts a critical approach, particularly in the domestic context. As will be shown, although a number of initiatives

promoting sustainable development in the energy sector have emanated from the Commonwealth government and from some States and Territories in recent years, Australia has dragged its heels in this area in comparison with many other developed countries.

After an overview of energy production and use in Australia (Chapter 1) and a consideration of the available alternative renewable energy and energy conservation technologies (Chapter 2), the book examines systematically the relevant international law (Chapter 3), the role of the recently restructured electricity and gas industries in Australia (Chapter 4), and Commonwealth and State laws and policies (Chapters 5 and 6). It concludes in Chapter 7 with a consideration of future developments in domestic and international law that would be needed to make energy policies truly consistent with sustainable development. Even a cursory reading of this book should be enough to show that much remains to be done in the legal and policy area. The authors wish to make the point forcefully that energy is one of the most important sectors demanding legislative attention in environmental matters, for without reforms in this sector sustainable development cannot be achieved.

We would like to thank a number of people who have supported us in the writing of this book. Every book depends on thorough and detailed research. Rosemary would like to acknowledge at the outset the expert research assistance of Alison Davidian, her research assistant at the Faculty of Law, University of Sydney, in 2002 and 2003. Over the past 10 years, Rosemary has worked closely with the environmental lawyers at the Australian Centre for Environmental Law (Sydney), Faculty of Law, University of Sydney. She is grateful to them, and her other colleagues, for their ongoing collegiality and support. Much of the research for this book occurred in the context of preparing, as a consultant, the PricewaterhouseCoopers Legal publication *eNNA* – The Environmental News Network. Consequently, Rosemary would like to acknowledge Andrew Petersen, Sustainability Leader, Legal Practice, PricewaterhouseCoopers, for allowing her to access the *eNNA* archive while writing the book. Her researcher at PWC Legal, Jane Wild, also deserves special mention.

Adrian would like to thank warmly the scholars who have encouraged and inspired him over the years to pursue further research into environmental aspects of energy law, in particular Ralph Wahnschafft, of the United Nations Department of Economic and Social Affaris, and Nick Robinson and Dick Ottinger, both from the Pace Legal Center for Environmental Studies at New York. Research is a lonely exercise and their ongoing support is priceless. He would also like to thank those colleagues at Adelaide Law School with a particular interest in this area of law – Judith Gardam, Alex Wawryk and Chacrit Sidthiwej – who have provided encouragement and advice from time to time.

Rosemary Lyster
Adrian Bradbrook
9 November 2005

1

Overview of energy production and use in Australia

In this chapter, a brief overview of current energy production and use in Australia is provided, including projections of future energy needs and the likely future mix of energy sources. This is done to establish the context within which to discuss, in later chapters, how the law is responding to the environmental problems created by Australia's energy profile. What emerges is that Australia is, and will likely remain, a country heavily dependent on fossil fuels. Under current regulatory arrangements, renewable sources of energy are likely to make an insignificant contribution to the overall energy mix in future. Although a debate on the role of nuclear energy in Australia has begun, it is too soon to speculate where that debate might lead. The emissions of carbon dioxide from the burning of fossil fuels contribute significantly to the threat of global climate change. Consequently, this book is devoted, in the main, to analysing Australia's regulatory framework for controlling these emissions, and provides a comparative analysis of developments in other jurisdictions against which to compare the efforts of governments in Australia.

1.1 Energy production and trade in Australia

In 2003, the Australian Bureau of Statistics conducted an Energy Survey 2001–02 to collect data on energy use across sectors of the Australian economy, excluding agriculture, forestry, fishery and residential sectors. This information has been used by the Australian Bureau of Agricultural and Resource Economics (ABARE) to undertake its own 2003–04 fuel and electricity survey. The outcome of ABARE's work is the report *Australian Energy Consumption and Production, 1973–74 to*

2001–02. The ABARE survey has reconciled consumption with production where the production data are sourced independently.

Total primary energy production is estimated to have declined in Australia between 2001–02 by 2%, with coal accounting for approximately 49% of total production. Australia remains overwhelmingly an energy exporter with exports in coal increasing by 2%. Coal exports account for 38% of total Australian energy production. However, Australia is a net importer of liquid fuels (including crude oil, natural gas liquids and other refined petroleum products such as gasoline, aviation turbine fuel and diesel). In 2001–02 exports of uranium declined by 24% although this is likely to be reversed given the recent announcement by the Australian government to reinvigorate the development of Australia's uranium resources.

In March 2005, the Federal Minister for Industry, Tourism and Resources established an inquiry into Australia's uranium resources. As a result of global climate change, the global demand for uranium resources has escalated as nuclear energy is a non-fossil fuel source of energy. The House of Representatives Standing Committee on Industry and Resources has been requested to inquire into the strategic importance of Australia's uranium resources. The terms of reference of the inquiry are: global demand for Australia's uranium resources and associated supply issues; any relevant industry developments associated with the strategic importance of Australia's uranium resources; prospects for the further development and export of Australia's uranium resources and their implications for greenhouse emissions reductions; and the current structure and regulatory environment of the uranium mining sector. In addition, on 5 August 2005, the Minister for Resources announced that the Federal government had taken control over the future of the Northern Territory's rich uranium deposits, declaring the Territory open for business on uranium. The Northern Territory government had promised to ban new uranium mines. About a dozen companies are currently exploring for uranium in the Northern Territory, which is home to some $12 billion worth of known uranium deposits.

1.2 How Australia uses energy

One of the most recent analyses of Australia's energy use has been provided in ABARE's August 2004 report entitled *Australian energy: National and state projections to 2019–20*.[1] The report states that since 1973–74, total primary energy use in Australia grew by some 2.6% per annum, compared with an economic growth rate of 3.2% per annum. In 2000–01 Australia's total primary energy consumption was 5037 petajoules (PJ). Primary energy consumption is projected to grow at an average of 2.1% over the period to 2019–20, while gross domestic product is assumed by ABARE to grow by 3.4% per annum. This means that

[1] See M Akmal, S Thorpe, A Dickson, G Burg & N Klijn *Australian energy: National and state projections to 2019–20* (ABARE: 2004) available at <http://abareonlineshop.com/product.asp?prodid=12776> (accessed 20 June 2005).

by 2019–2020 total primary energy consumption would grow by 50% reaching 7515 PJ. The report affirms that fossil fuels are Australia's major energy sources. Australia's energy needs are provided by oil (35%), black coal (28%), natural gas (19%) and brown coal (13%). Uranium is not used currently as an energy source in Australia.

The largest users of stationary energy are the manufacturing and construction sectors. ABARE forecasts an industry demand growth of 50% to 2020, attributed to growth in the iron and steel sector as well as non-ferrous metals such as alumina refining and aluminium smelting. Our focus on greenhouse gas emissions in the energy sector in this book is justified by the fact that energy production and use contributed 68% of Australia's greenhouse gas emissions in 2002, and is expected to be 72% by 2020. Greenhouse gas emissions from the energy sector are expected to grow by more than 30% to 2020. The biggest single source of energy emissions is electricity, accounting for two-thirds of stationary energy emissions. Coal is the major source of base load electricity generation and its combustion accounts for 92% of electricity emissions. However, it seems that electricity emissions will grow somewhat slower than electricity use, as there is a relative shift from brown coal to natural gas in electricity generation. Nevertheless, Australia's fuel mix will continue to be dominated by coal and oil with coal expected to account for more than 70% of the mix.

Growth in domestic use of natural gas is projected to remain strong with total consumption expected to be 1828 PJ by 2019–20. However, energy consumed per dollar of economic output is expected to decline so that 18% less energy will be required by 2019–2020. Australia's reliance on imported liquid fuel is expected to increase by 29% by 2019–20.

1.3 Uptake of renewable energy in Australia[2]

In Chapter 2, an in-depth analysis of sustainable energy technologies is provided. Here a simple analysis of the current uptake of renewable energy in Australia is offered. A mix of renewable energy technologies is expected to be developed to meet the Mandatory Renewable Energy Target of sourcing 2% more electricity from renewable sources by 2010 (the Mandatory Renewable Energy Target (MRET)), as prescribed by the *Renewable Energy (Electricity) Act 2000* (Cth).[3] Prior to the enactment of this legislation, Australia's renewable energy sector generated approximately 16,000GWh of electricity representing 10.5% of Australia's electricity market. This was largely electricity generated from hydroelectric sources from Tasmania and the Snowy Mountains scheme. In order to meet the MRET, renewable energy generation from minor sources of energy,

[2] Most of the information given in this section is sourced from *Renewable Opportunities – A Review of the Operation of the Renewable Energy (Electricity) Act 2000*, especially the section entitled 'Progress Towards MRET Objectives', available at <http://www.mretreview.gov.au/report/index.html< (accessed 23 August 2005).

[3] See Chapter 4.

other than hydro, will need to increase about 60% above 1997 levels to a point where 9500GWh of renewable energy is generated.

The mix of renewable energy technologies, as at 18 August 2003, is the following: hydro – 36%; solar hot water heaters – 26%; wind – 11%; bagasse cogeneration – 10%; landfill gas – 8%; wood waste – 4%; black liquor – 4%; and sewage gas – 1%. These figures demonstrate that a wide range of renewable energy technologies have entered the electricity market since the introduction of the MRET. For example, largely due to the MRET, the solar hot water system has grown by 30% per annum from 19 000 to 30 000 systems. The wind industry reported an annual growth rate of 118% between 1999 and 2002. Wind power is expected to grow 16% a year from a small base over the entire outlook period and to contribute around 36% to the additional renewable energy generated between 2001–02 and 2010–11. Electricity generated from biomass is expected to increase by 10% per year, accounting for 33% of the total growth over the same period.

Sales of renewable electricity, equipment and services for 2002–03 were approximately $1.8 billion, of which 14.5% are expected to be exports, amounting to $226.5 million. These sales are less than half of the Renewable Energy Action Agenda target (discussed below) of $4 billion sales in 2010. Projected employment is 6189 people. Installed capacity for this period was 7616.4MW which, when large hydro generation is removed, amounts to 680MW.

By September 2003, it was suggested that $900 million of investment in renewable energy projects had occurred with another $1 billion committed or planned. However, a number of investors are concerned that investment will cease after 2007 because the capacity to deliver the 2010 MRET target will have already been installed. Also there is no commitment on the part of the Australian government to continue the target beyond 2010. This reduces the payback period for investments, which is typically 15 years.

1.3.1 The Allen Consulting Group's *Sustainable Energy Jobs Report*

A report prepared by the Allen Consulting Group in 2003 gives an excellent overview of the sustainable energy industry (SEI) in Australia. The Group finds that unless there is government intervention in the energy market, the outlook to 2030 for SEI and renewables is limited. This is as a result of market failure and other difficulties that block the development of the industry. Governments around the world are taking action to address this problem, in particular to reduce greenhouse gas emissions and stimulate the renewable energy industry. Many governments are doing this for energy security and to ensure that their economies are familiar with a wide range of energy technology options. They regard support for emerging renewable technologies as an important strategy for ensuring long-term energy competitiveness. The potential for the technologies to grow jobs and export markets, as well as deliver environmental benefits, has also been recognised. In Australia, the SEI export market is likely to be in the Asia-Pacific region as it resumes its rapid development trajectory.

The role of renewables in the Australian energy market mirrors that in the rest of the world, except that the mandatory target (MRET) set by the *Renewable Energy (Electricity) Act 2000* (Cth) has seen a high growth rate in renewables. However, because of the low target set under the legislation, non-hydro renewables are only expected to supply 3.6% of Australia's electricity in 2020. The key message is that unless the negative externalities associated with fossil fuel generation are factored into the price of electricity, renewables will not significantly increase their share of domestic energy supplies.

Renewable energy technologies face considerable competitive challenges as a result of market failure, regulatory failure and the costs of development. This makes renewable energy more expensive than that generated by fossil fuels. In spite of this there is evidence to show that biomass and biogas are close to being competitive with fossil fuel technologies, and wind-powered electricity is moving closer to competitiveness.

While renewable energy technologies are likely to impose a financial cost on society, these can be mitigated through concerted policy action which involves a mixture of renewable energy and demand management approaches and other measures.

The report focuses on seven sustainable energy technologies and makes key observations about their development. They are: commercial–industrial energy efficiency; industry–small cogeneration; dry agricultural wastes; wind power; solar photovoltaic; waste coal mine gas and vent air technology; and biodiesel. The report emphasises the importance of supportive public policies, like the MRET scheme, in the development of these technologies.

The report recommends a combination of approaches to support the development of SEI. These include demand management measures; increasing the MRET scheme to 5%; and establishing a leveraged fund to achieve various SEI initiatives.

More specifically with respect to wind generation, the report notes that worldwide turnover for wind generation equipment is US$1.5 billion per year, while the total industry turnover is between US$5 billion and US$10 billion. It is clear that global growth in wind energy is supported by government policies and cost improvements in association with technology-led productivity gains. There is also a significant regional annual export market to China, the Philippines and New Zealand. Large areas of NSW have been shown to have top wind speeds that are comparable with those in Denmark and Germany, world leaders in wind generation. However, without sufficient policy support the wind market will not reach its potential.

1.4 Renewable Energy Action Agenda

In addition to the measures prescribed by law under the *Renewable Energy (Electricity) Act 2000* (Cth), the Australian government developed a Renewable Energy Action Agenda in 2000 as a joint initiative with industry. The Agenda is to be

implemented by the Renewable Energy Action Agenda Group. In October 2002, the Group released the *Renewable Energy Technology Roadmap* report[4] which reflects the views of industry, research and policy-makers, and participants to provide 'pathways' for the development of Australia's renewable energy industry. The report concluded that five key factors determine renewable energy innovation and technology development: international climate change commitments; government policies and programs; economic and social drivers; renewable energy resources; and research and development capability.

The report suggested that while Australia has acknowledged strength in renewable energy research, greater emphasis is required to complete the innovation cycle to capture commercial benefits from the resulting research breakthroughs. This observation was made in the context of rapid international growth in renewable energy technology following public and academic concern about the impact of global warming.

The report classified the Australian renewable energy sector into 10 technology sectors: biomass energy; cogeneration; enabling technologies; fuel costs and hydrogen fuels; geothermal energy; hydro-electricity, tidal energy and wave energy; photovoltaics (PV); remote area power supply (RAPS); solar thermal energy; and wind energy.

The analysis used in the report assumes that commercially successful technologies must be technically developed, appealing to the market, cost competitive and supported by a significant resource base. In order to promote the Australian renewable energy industry, five technology development strategies are proposed:

- Ongoing development – entails focusing on increasing the technology market uptake and reducing costs to become more competitive with fossil fuels, for example bagasse energy;
- Development and commercialisation – where activity in R&D and market development is required, but the focus is on addressing barriers to commercialisation, for example geothermal energy (hot dry rocks and geothermal heat pumps);
- Import foreign technologies – where for various reasons the best option is for Australia to purchase the necessary technology;
- Monitor international developments – entails monitoring international developments and focusing on ancillary technology and associated services, for example the emerging hydrogen economy; and
- Monitor commercial developments – where Australian resources are limited, the limited resources be adopted for development, for example hydrothermal technologies.

Regarding environment and planning legal issues, the report calls for the development of standards for each renewable energy technology. In particular, the

[4] Available at <http://www.industry.gov.au/assets/documents/itrinternet/RETRSplitVersion2ch4-lesspage.pdf> (accessed 15 August 2005).

report notes that Australia needs to participate in the development of international standards in order to minimise the non-tariff barriers to Australian exports. Further, the report calls for the establishment of a renewable energy technology and innovation network to promote a culture of market-driven innovation in the renewable energy industry.

The targets for the Group in 2005–06 are: to advise the Minister for Industry, Tourism and Resources on the development of the renewable energy industry; to assist with the implementation of the government's Energy White Paper,[5] particularly the Solar Cities and Wind Energy Forecasting initiatives; and to prepare a report to the Ministerial Council on Energy on rule changes that are required in the National Electricity Market[6] to get rid of barriers and maximise the benefits of renewable and distributed generation.

1.5 The role of biofuels

Biofuels, as discussed in Chapter 2, are regarded as environmentally friendly types of fuel. On a fuel cycle basis, greenhouse savings of up to 5% can be gained from the use of E10 (which is petrol blended with 10% ethanol). However, the use of 100% biodiesel made from waste oil can achieve 90% cuts in greenhouse gas emissions compared with diesel. Biofuels currently provide around 50 to 60 ML (or 0.3%) of road transport fuel. Most of this is manufactured from wheat starch produced in New South Wales, although about 5 ML of ethanol is produced from C molasses feedstock in Queensland. A biodiesel plant using waste oil was recently established in New South Wales with a capacity of 14–17 ML. In 2003, a 10% limit on the contribution of ethanol to petrol came into force, while an ethanol fuel labelling standard came into effect in 2004. The legislation, principally the *Fuel Quality Standards Act 2000* (Cth) which regulates the use of biofuels, and the *Energy Grants (Cleaner Fuels) Scheme Act 2003* (Cth) which provides funding to support the development of biofuels, is discussed in greater detail in Chapter 4.

It is interesting to note the September 2005 findings of the Biofuels Taskforce[7] established by the Prime Minister. The Taskforce has found that potentially there may be greater health benefits from ethanol use than previously envisaged; that previous research findings that ethanol may provide greenhouse and regional benefits should be supported; that there are considerable market barriers to the biofuels industry including low consumer confidence and high commercial risk; and that on a business as usual basis Australia is unlikely to meet a target of at least 350 ML of biofuel production by 2010. The Prime Minister has nevertheless reaffirmed the government's intention to reach this target.

[5] See Chapter 7. [6] See Chapter 5.
[7] Available at <http://www.dpmc.gov.au/biofuels/final_report.cfm> (accessed 16 October 2005).

1.6 Is there a place for nuclear energy in Australia's future energy mix?

As discussed in Chapter 2, the possibility of establishing a nuclear fuel industry in Australia has long been dismissed on environmental grounds. However, in March 2005 the Minister for Industry, Tourism and Resources established an inquiry into Australia's uranium resources. As a result of global climate change, the global demand for uranium resources has escalated because nuclear energy is a non-fossil fuel source of energy. It is regarded as being a 'greenhouse friendly' type of fuel, although critics state that the greenhouse intensity of building and operating nuclear power stations is often not factored into the overall calculation of intensity. The Federal Minister for Industry and Resources has indicated that he will be disappointed if uranium exports do not double or triple over the next 10 years, possibly creating a $2 billion export industry.

As mentioned earlier he has requested the Commonwealth House of Representatives Standing Committee on Industry and Resources to inquire into the strategic importance of Australia's uranium resources.

There seems to be considerable support within the current Australian government for reopening the debate about a future nuclear energy industry in Australia. The Prime Minister has welcomed the debate,[8] while Deputy Whip of the Liberal Party, Alan Eggleston, said Australia should consider using nuclear energy to reduce its reliance on coal for electricity. He has stated that with 40% of the world's uranium reserves, Australia could not continue to be so reliant on coal.[9] The Minister for Education, Science and Technology, Brendan Nelson, has meanwhile stated that Australia will need to use nuclear energy within the next 50 years to help drive down the growth in greenhouse gases.[10]

In spite of this support from the government, considerable concerns have been raised with regard to the use of nuclear energy in Australia.[11] First, nuclear power itself generates greenhouse gases because of the significant use of energy required to mine, mill and enrich the uranium for the fuel rods. Even where high-grade uranium ores are used, it takes 7 to 10 years to 'pay back' the energy used in the construction and fuelling of a typical reactor. Secondly, for a large-scale deployment of nuclear power to be sustainable in the long term, breeder reactors would have to be used, which create their own fuel in the form of plutonium. To date, these reactors have not generated sufficient new fuel. Ultimately, this would result in plutonium, a highly hazardous radioactive material, being transported around the world in increasing quantities. The risks associated with nuclear terrorism are clear. Thirdly, despite significant government support for the nuclear energy industry globally, it remains one of the most expensive ways

[8] See 'Howard Welcomes Debate on Nuclear Power', *The Age*, 10 June 2005.
[9] See *Sydney Morning Herald*, 17 August 2005, available at <http://smh.com.au/articles/2005/08/17/1123958110562.html?oneclick=true>.
[10] See *Sydney Morning Herald*, 11 August 2005.
[11] See article by Professor Stuart White in *Sydney Morning Herald*, 13 June 2005.

to reduce greenhouse gas emissions. At no time has the same level of support been forthcoming to support the development and commercialisation of energy efficiency and renewable energy technologies. Finally, with the well-known difficulties of disposing of the waste associated with nuclear energy, the technology may well exacerbate, rather than solve, environmental problems. Perhaps one of the greatest concerns is that a focus on a nuclear energy industry in Australia will detract support and funding for the nascent sustainable energy industry. As we describe in Chapter 2, energy efficiency and renewable energy technologies are proven technologies designed to significantly reduce greenhouse gas emissions.

Not surprisingly on 7 September 2005, Greenpeace, the Australian Conservation Foundation (ACF) and the Australian Greens called on the Australian government to rule out nuclear energy. They released a report challenging claims made by various senior Coalition leaders that nuclear power is clean and a potential solution for curbing greenhouse gas emissions. The report is entitled *Nuclear Power: No Solution to Climate Change*.[12] The report states that a doubling of the nuclear power industry by 2050 would only reduce greenhouse gas emissions by 5% while there is a significant danger that nuclear power plants could be used as nuclear bomb factories. Alternative approaches, such as a greater uptake of energy efficiency measures and renewable energy technologies, offer a clean energy future without the associated dangers. President of the ACF, Professor Ian Lowe, also claims that the real cost of nuclear energy is far higher than for renewable energy technologies. Meanwhile, the Australian Greens Senator for Tasmania, Christine Milne, called on the Prime Minister not to amend the *Australian Radiation Protection and Nuclear Safety Act 1998* (Cth), which currently prevents the licensing of a nuclear power plant, so as to allow such licensing.

[12] Available at <http://archive.greenpeace.org/comms/no.nukes/nenstcc.html> (accessed 16 October 2005).

2

Energy technologies and sustainable development

The Brundtland Report in 1987 described 'sustainable development' as development that 'meets the needs of the present without compromising the ability of future generations to meet their own needs'.[1] In a comprehensive joint study in 2000 of the link between energy use and production and sustainable development, the United Nations Development Programme, the United Nations Department of Economic and Social Affairs and the World Energy Council declared in their report, *World Energy Assessment: Energy and the Challenge of Sustainability* (hereafter referred to as *World Energy Assessment*) that there are two important features of the link between energy production and use and sustainable development:

> One is the importance of adequate energy services for satisfying basic human needs, improving social welfare, and achieving economic development – in short, energy as a source of prosperity. The other is that the production and use of energy should not endanger the quality of life of current and future generations and should not exceed the carrying capacity of ecosystems.[2]

In its chapter on energy resources and technological development, the *World Energy Assessment* went on to consider the appropriate options available for using energy in ways supportive of sustainable development consistent with addressing environmental concerns. The report identified three major options:

- Greater use of energy efficiency, in terms of energy use in buildings, electric appliances, motor vehicles and industrial production processes.
- Increased reliance on renewable energy resources.

[1] World Commission on Environment and Development, *Our Common Future*, OUP, Melbourne, 1987, at 8.
[2] United Nations Development Programme, United Nations Department of Economic and Social Affairs and World Energy Council, *World Energy Assessment: Energy and the Challenge of Sustainability*, United Nations, New York, 2000, at 31.

- Accelerated development of new energy technologies, in particular next-generation fossil fuel technologies. Nuclear technologies could also be included if the environmental problems associated with nuclear energy could be resolved.[3]

Gaining a brief understanding of the type of technologies available commercially at present under each of these three options provides an appreciation of the role that the law can play in promoting sustainable development in the energy context.

2.1 Energy efficiency technologies

2.1.1 Buildings[4]

A vast amount of energy is wasted in heating and cooling unnecessary space due to the energy inefficient design and construction of buildings. This has arisen because traditional building regulations have paid little, if any, attention to energy efficient design. Studies have shown that energy conservation potentials of between 40% and 50% can be achieved merely by modification of building regulations.[5] A variety of conservation measures, such as the installation of ceiling and wall insulation, weatherstripping, water heater blankets, low-flow showerheads, caulking, duct wrap and solar water heaters, can have a dramatic impact on the amount of energy consumed for heating and cooling purposes.

In the case of owner-occupied buildings, the cost of installing energy efficient measures is compensated by the economic benefit resulting from the energy saved. However, a particular problem arises where the buildings, whether residential or commercial, are rented.[6] In rental buildings, neither tenants nor landlords have any incentive to install energy efficiency measures. Tenants and landlords have different reasons for their reluctance to invest in energy conservation. From the landlord's perspective, the benefit of saved energy will accrue to the tenant and the landlord will receive no economic compensation for the cost of installing efficiency measures. From the tenant's perspective, as tenants do not own the premises they are extremely reluctant to make capital improvements on the landlord's property by installing energy conservation measures. Any such measures installed by the tenant in the rented premises will become fixtures

[3] UNDP et al, *World Energy Assessment*, at 12.
[4] For a general discussion of this issue, see J R Waters, *Energy Conservation in Buildings*, Blackwell Publishing, London, 2003; House of Commons, Select Committee on Energy, *Fifth Report from the Select Committee on Energy*, <www.bopcris.ac.uk/bopall/ref17667.html> (accessed 18 July 2005); UNDP et al, *World Energy Assessment*, at 54ff; Royal Institute of International Affairs, *Emerging Energy Technologies: Impacts and Policy Implications*, Dartmouth Publishing Co, Aldershot, 1992; Adrian J Bradbrook, *Energy Conservation Legislation for Building Construction and Design*, Canadian Institute of Resources Law, Calgary, 1992.
[5] G Bergmann, R Bruno and H Horster, 'Energy Conservation in Buildings', in J F Kreider and F Kreith (eds), *Solar Energy Handbook*, McGraw Hill, New York, 1981, ch 29.
[6] See Adrian J Bradbrook, 'The Development of Energy Conservation Legislation for Private Rental Housing' (1991) 8 *Environmental and Planning LJ* 91.

under traditional common law rules and legal title will vest in the landlord.[7] The landlord is under no legal obligation to compensate the tenant for the value of the improvements.[8]

2.1.2 Domestic appliances[9]

This issue has received considerable attention in the United States as early as the 1970s, where appliance efficiency standards and energy efficiency labelling requirements have been enacted at both the Federal and State levels.[10] In Australia, the issue was not considered in detail until the late 1980s. The scope for dramatic improvement in the efficiency of a range of appliances was discussed by the Commonwealth Department of Resources and Energy in 1986. A Department report published that year found, for example, that in a range of two-door refrigerators tested in 1984–85 the energy consumption ranged widely from 4.9 to 10.5 watt-hours a litre of storage space a day. The cost of electricity at that time to operate a refrigerator over a 14-year life span was estimated to be 160% of the purchase price for the least efficient unit tested, as opposed to 60% of the purchase price for the most efficient. Similar findings were reported in respect of a wide range of other electric appliances.[11]

Since then developments have occurred both in relation to the creation of energy efficiency appliance labelling requirements and for minimum energy performance standards for common specified domestic electrical appliances, such as refrigerators, dishwashers and air conditioners. Both types of measures can exist concurrently. Manufacturers are required to comply with minimum performance standards and are encouraged to achieve further improvements in energy efficiency standards by the product energy efficiency labelling requirements. This is an illustration of the 'carrot and stick' approach to reform.

2.1.3 Road transport[12]

Over the past 30 years, under pressure from diminishing reserves of indigenous oil and global concerns relating to ecologically sustainable development and climate change, Australia has taken giant steps towards substituting other sources of fuel

[7] For a discussion of the common law rules relating to fixtures, see A J Bradbrook, S V MacCallum and A P Moore, *Australian Real Property Law*, Thomson Lawbook Co, Sydney, 3rd edn 2001, ch 15.

[8] Note, however, that agricultural tenancies legislation in New South Wales, Queensland and South Australia allows the tenant of agricultural land a limited right to claim compensation from the landlord at the termination of the tenancy for certain specified types of improvements to the extent to which the improvement fairly represents the value of the improvement to an incoming tenant: *Agricultural Holdings Act 1941* (NSW), ss 7–12; *Property Law Act 1974* (Qld), ss 153–167; *Agricultural Holdings Act 1891* (SA), ss 6–22.

[9] See Royal Institute of International Affairs, *Emerging Energy Technologies*, ch 5.

[10] Federal legislation was enacted in the *Energy Policy and Conservation Act of 1975*, Pub L No 94–163, 89 Stat 871. See H Geller, *National Appliance Efficiency Standards: Cost-Effective Federal Regulations*, American Council for an Energy-Efficient Economy, Washington, DC, 1995. The most legislatively active of the States in this matter has been California, which has adopted appliance efficiency and labelling requirements in the *California Public Resources Code*, ss 25000–25986.

[11] See Dept of Resources and Energy, *Energy 2000: A National Energy Policy Review*, Paper No 9, 'Energy Conservation', Canberra, 1986, at 50–1.

[12] For a general discussion of this issue, see World Energy Council, *Energy for Tomorrow's World*, Kogan Page, London, 1993, ch 1; Royal Institute of International Affairs, *Emerging Energy Technologies*, ch 4.

in place of oil. Thus, for example, oil is seldom encountered today as a source of home or office heating, and has been largely phased out in most of its various commercial and industrial uses, including power generation. The most common replacement fuel has become natural gas, although a variety of other forms of fossil fuels and renewable sources of energy have been used.

The one major area where oil has not been effectively substituted has been in the transport sector. Various forms of fuel substitutes have been developed, but all vehicles designed to use these alternatives appear to suffer at present from various disadvantages or inconveniences.[13] Thus, for example, distribution problems exist in respect of methanol and ethanol, while the size of tanks and mechanical difficulties have retarded the widespread adoption of vehicles fuelled by liquefied petroleum gas (LPG) or compressed natural gas (CNG). In the very long term, hydrogen may prove to be the ideal substitute fuel, but even ardent proponents of the hydrogen economy concede that widespread replacement of oil by hydrogen in the transport sector will not occur in the current planning horizon.

Although air transportation represents a very significant use of oil, the crux of the transportation energy problem appears to lie in the road sector, particularly private passenger vehicles. The reduction of fuel consumption by motor vehicles is perhaps the most important of the various responses which will be required by the Commonwealth government in its move towards stabilising and reducing greenhouse gas emissions.

2.1.4 Industry[14]

In relation to industry, the potential scope for energy conservation is very significant as manufacturing industry in Australia constitutes 34% of all energy use.[15] The Victorian Department of Industry, Technology and Resources reported in the *Green Paper on Renewable Energy and Energy Conservation*:

> Substantial energy savings are available in the industrial sector. Gas and electricity efficiency gains are available in boilers and process heating applications, mainly through:
> - cogeneration;
> - better heating design; and
> - lower heat requirements for some processes.

[13] For an analysis of alternative fuel sources, see F Winteringham, *Energy Use and the Environment*, Lewis Publishers, London, 1992; US Department of Energy, *Assessment of Costs and Benefits of Flexible and Alternative Fuel Use in the US Transportation Sector*, Report DOE/PE-0085, Washington, 1988. See also the US Department of Energy, Alternative Fuels Data Center, available at <www.eere.energy.gov/afdc> (accessed 20 July 2005).

[14] For a general discussion of this issue, see United Nations Economic and Social Commission for Asia and the Pacific, *Promotion of Energy Efficiency in Industry and Financing of Investments*, United Nations, New York, 2001; A O Adegbulugbe, 'Energy Efficiency in Industry: A Regional Perspective', in S Karekezi and G A Mackenzie (eds), *Energy Options for Africa: Environmentally Sustainable Alternatives*, Zed Books, London, 1993; A Almeda, P Bertoldi and W Leonhard (eds), *Energy Efficiency Improvements in Electric Motors and Drives*, Berlin, Springer, 1997; E Gruber and M Brand, 'Promoting Energy Conservation in Small and Medium-Sized Companies' (1991) 19 *Energy Policy* 279; World Energy Council, *Energy for Tomorrow's World*, ch 4; UNDP et al, *World Energy Assessment*, ch 6.

[15] Commonwealth Department of Primary Industries and Energy, *Issues in Energy Policy: An Agenda for the 1990s*, AGPS, Canberra, 1991, at 6.

> Opportunities for electrical efficiency improvements are available in the use of motor drives, mainly through:
> - use of higher efficiency motors;
> - installation of variable speed drive systems;
> - correct sizing of motors to suit the task.
>
> Many of the opportunities for efficiency improvements are currently cost-effective. A private consultant study suggests that cost-effective energy savings in the order of 15% are possible.[16]

Expanding on this theme, an American commentator has written:

> Energy-intensive production processes often include specialized energy conversion equipment, such as heaters or electric motors, whose efficiency can be significantly raised, usually at the price of significant investment for upgrading or replacement. Process heaters are particularly important in this category, since such a large fraction of industrial energy is devoted to process heating. The actual devices may be electrical resistance heaters, direct gas flames, or steam boilers, but whatever the source of heat, there are opportunities for installing improved burners, timers for starting up or shutting down in ways that reduce waste energy, controls on fuel and air supply for most complete combustion, and insulation of furnace walls.[17]

Emphasis has been given recently to developing generator efficiency standards. The stated purpose of this is to achieve best practice in the efficiency of fossil-fuel fired electricity generation and to reduce the greenhouse gas intensity of energy supply.[18]

One of the major means of improving energy efficiency in industry is by the use of cogeneration plant and technology.[19] Cogeneration may be described as the simultaneous production of electrical or mechanical energy and thermal energy. The California Energy Commission (CEC) explains this technology as follows:

> A cogeneration system operates at an overall thermal efficiency as much as 2.5 to 3 times that of conventional utility electrical generating systems. The normally wasted exhaust heat is captured and partially used for thermal or electrical energy production. This thermal and electric energy can be recovered and used in cogeneration system operation in a 'topping' or 'bottoming' mode . . . In a topping system, thermal energy exhausted in the production of electrical or mechanical energy is used in industrial processes or for district heating or cooling. More recent applications include use of the rejected energy in residential/commercial energy systems.

[16] Department of Industry, Technology and Resources (Victoria), *Green Paper on Renewable Energy and Energy Conservation*, Melbourne, 1990, at 43.
[17] R H Knapp, 'Patterns of Energy Use and Conservation', in R L Pirog and S C Stamos (eds), *Energy Economics: Theory and Practice*, Prentice-Hall Inc, New Jersey, 1987, at 238.
[18] Australian Greenhouse Office, available at <www.greenhouse.gov.au/ges/index.html> (accessed 10 January 2005).
[19] Cogeneration is sometimes referred to as 'combined heat and power' or 'total energy plant'. For a discussion of cogeneration technology, see M Roarty, *Cogeneration – Combined Heat and Power (Electricity) Generation* <www.aph.gov.au/library/pubs/rn/1998–99/99rn21.htm> (accessed 20 July 2005); UNDP et al, *World Energy Assessment*, at 15–16, 198–9, 281–4; California Energy Commission, *Cogeneration Handbook*, Report P500-82-054, 1982.

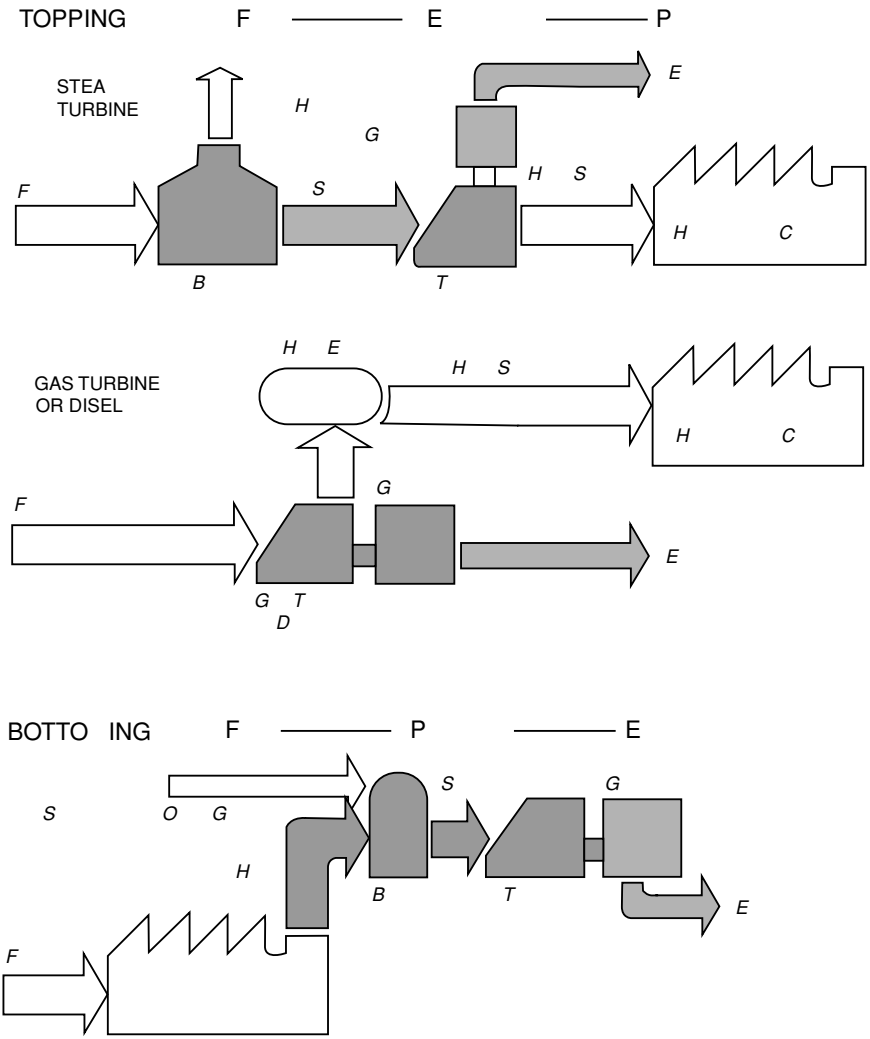

Figure 2.1 Cogeneration operating cycles

Bottoming-cycle cogeneration reverses this process. Fuel is consumed to produce the high-temperature steam needed in an industrial process such as paper production or aluminium remelting. Heat is extracted from a hot exhaust waste steam and, through a heat exchanger (usually a waste heat recovery boiler), used to drive a turbine and produce electrical or mechanical energy.[20]

The topping and bottoming-cycle cogeneration processes are explained diagrammatically in Figure 2.1.

[20] CEC, *Cogeneration Handbook*, at 3. See also T Hagler, 'Utility Purchases of Decentralized Power: The PURPA Scheme' (1983) 5 *Stanford Environmental L Ann* 154 at 155.

The effect of cogeneration is to dramatically increase the overall energy efficiency of typical industrial plant. The efficiency of industrial plant employing cogeneration technology is between 80% and 90%. In contrast, industrial plant which produces steam and purchases electricity is usually only 50% to 70% efficient.[21]

2.2 Renewable energy resources[22]

2.2.1 Solar energy[23]

Australia receives abundant quantities of direct insolation from the sun. Most of the country receives over 1600kWh per square metre per year of solar radiation, while in an area near the Western Australia–Northern Territory border over 2500kWh per square metre per year of solar radiation is received.[24] This is only 10% less than the amount of solar radiation received in the Sahara Desert, where the greatest incidence of solar insolation occurs.[25] The amount of solar radiation received by the earth is far in excess of the present and foreseeable needs of the human race. On a worldwide basis, it has been calculated that enough sunlight reaches earth every day to satisfy mankind's energy requirements for 15 years.[26] It also helps to put the projected shortage and depletion of non-renewable energy resources into context when it is realised that the earth's surface receives every year approximately 1000 times the amount of energy contained in the total known reserves of petroleum.[27]

The problem with solar energy is not the supply, but the means of harnessing the supply. As stated by Ewers:[28]

> Since the sun's rays are diffuse, utilizing solar energy [is] like trying to harness 100 million fleas and then teaching them all to jump in the same direction at the same time.

[21] C Flavin, *Electricity's Future: The Shift to Efficiency and Small-Scale Power*, Worldwatch Institute, Washington, DC, at 30.
[22] For a general discussion of renewable energy resources and their role in modern society, see Richard Ottinger and Rebecca Williams, 'Renewable Energy Sources for Development' (2002) 32 *Environmental Law* 331, available at <www.law.pace.edu/energy/documents.html> (accessed 26 January 2005); R Haas, W Eichhammer et al, 'How to Promote Renewable Energy Systems Successfully and Effectively' (2004) 32 *Energy Policy* 833.
[23] For a general discussion of solar energy technology, see the material available at <www.worldenergy.org/wec-geis/publications/reports/ser/solar/solar.asp> (accessed 18 January 2005); UNDP et al, *World Energy Assessment*, at 235ff; World Energy Council, *Energy for Tomorrow's World*, ch 2.
[24] National Energy Advisory Committee, *Renewable Energy Resources in Australia*, AGPS, Canberra, 1981, at 7.
[25] Australian Academy of Science, *Report of the Committee on Solar Energy Research in Australia*, Report No 17, Canberra, 1973, 25.
[26] Solar Energy Research Institute of Western Australia, *The Solar Prospect*, Perth, 1981, at 1; *Business Week*, 9 October 1978, 92; W Lawrence and J Minan, 'The Competitive Aspects of Utility Participation in Solar Development' (1979) 54 *Indiana LJ* 229 at 230.
[27] T West, 'Photovoltaics: A Quiet Revolution' (1982) 3 (No. 14) *Energy Detente* 1 at 1. See also D Halacy, *The Coming Age of Solar Energy*, Harper & Row, New York, 1973, at 24; H Lof, 'Solar Energy: An Infinite Source of Clean Energy' (1973) 410 *Annals* 52.
[28] W Ewers, *Solar Energy: A Biased Guide*, ANZ Book Co, Sydney, 1977, at 9.

One aspect of the problem is the relatively low energy intensity of direct sunlight. The worst aspect of the problem, however, is the variability of the energy supply at any given location on earth, due to cloud cover and seasonal effects.

Solar energy can be used for both space and water heating and cooling and for the generation of electricity. Solar heating and cooling systems can be divided into active systems and passive systems. An active system is that in which solar collectors are installed to capture solar energy that is conveyed by some mechanical means to the space or water to be heated or cooled. The mechanical means may consist of pumps, fans, valves and thermostats. Under this system the solar radiation is converted into thermal energy that is used to heat a working fluid (commonly air or water). This fluid is then transported to the area where it is applied to space or water heating or cooling.[29] In contrast to the active system, a passive system does not employ any solar collector panels or mechanical devices but seeks to control temperature by the architectural features of the building itself. Critical features in a passive solar home are the size and placement of windows, the type of materials of which the walls and ceiling are constructed and the orientation of the building towards the sun. The building should be oriented on an east-west axis with a long wall facing north; in this way the whole north wall acts as a built-in solar collector.[30]

Electricity can be generated by solar energy using the principles of thermal generation and by photovoltaic conversion. In a solar thermal conversion system, the solar radiation is used either directly or via a heat exchanger to generate steam, which drives a conventional steam turbo-generator plant and produces electricity.[31] There are two thermal methods of generating electricity by solar radiation, the 'power tower' concept and the dispersed power applications. The 'power tower' concept involves a central receiver located at the top of a tower receiving radiation from a collection of surrounding reflecting mirrors (heliostats) which track the sun. A heat transfer fluid circulates through the central receiver and transports the heat energy to an energy conversion system.[32] The dispersed power applications employ rows of parabolic reflectors to focus solar radiation onto pipes where gases or molten salts transfer the heat to storage tanks. From there the stored heat is used to generate steam to drive a conventional turbine.[33]

[29] See, e.g., J Riley, R Odland and H Barker, *Standards, Building Codes and Certification Programs for Solar Technology Applications*, Report No. SERI/TR-53-095, United States Department of Energy, Washington, D.C., 61; W Berryhill and W Parcell, 'Guaranteeing Solar Access in Virginia' (1979) 13 *U Richmond L Rev* 423, 428; CSIRO, Information Service, *Solar Heating and Cooling of Buildings*, Melbourne, 1978, at 1–2.

[30] See e.g., US Dept of Energy, *Passive Solar Heating, Cooling and Daylighting*, <www.eere.energy.gov/RE/solar_passive.html> (accessed 20 July 2005); 'Passive Solar Guidelines', in *A Sourcebook for Green and Sustainable Building*, <www.greenbuilder.com/Sourcebook/PassSolGuide1-2.html> (accessed 20 July 2005); National Renewable Energy Laboratory, *Introduction to Passive Solar Heating and Daylighting*, <www.nrel.gov/clean_energy/passivesolar.html> (accessed 20 July 2005); Note, 'The Right to Light: A Comparative Approach to Solar Access' (1978) 4 *Brooklyn J Int L* 221, at 221; Texas Energy and Natural Resources Advisory Council, *Citizens' Solar Guide*, Austin, Texas, 1982, at 6, 19.

[31] See Australian Academy of Science, *Report of the Committee on Solar Energy Research in Australia*, AGPS, Canberra, 1973, at 47.

[32] Riley, Odland and Barker, *Standards*, 109; A Skinrood, 'Recent Developments in Central Receiver Systems' (1982) 6 *Sunworld* 98; A Hunt, 'Small Particle Heat Exchange Receiver' (1982) 6 *Sunworld* 60.

[33] Law Reform Committee of South Australia, Solar Energy and the Law in South Australia, Discussion Paper, Adelaide, 1978, at 57–58.

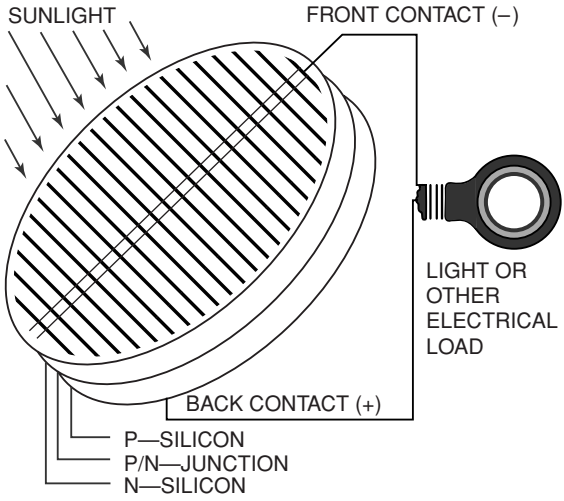

Figure 2.2 Operation of silicon solar cell
(*Source*: West, 'Photovoltaics: A Quiet Revolution' (1982) 3 (No. 14) *Energy Detente* 1, at 5.)[34]

The photovoltaic effect is the tendency of certain materials to generate electricity when exposed to direct solar radiation. What occurs is that the sunlight causes electrons to be released, resulting in an increase in the electrical conductivity of the material. If the material is constructed so as to have a built-in force that drives the electrons to the front or back, an electric current will flow through externally connected wires.[35]

The photovoltaic effect is created in photovoltaic cells. These cells can consist of any materials that are classed as 'semi-conductors', the most common type consisting of a thin wafer of crystalline silicon coated on each side with boron and phosphorus. When silicon is exposed to sunlight, electrons are released and a 'P/N' junction is created. This is where the electrons and the spaces where the electrons were originally are separated. The effect of this is to create a voltage across the thickness of the silicon wafer.[36] An electric current will flow if an external electrical circuit is connected to the front and back surfaces of the solar cell. This is shown in Figure 2.2. Groups of cells are usually mounted onto a module with a generating capacity of 100 watts. For increased power supplies, modules are connected into larger arrays. The electricity generated by the array is stored in a battery bank via a charge controller, which prevents overcharging during the day and discharge at night. Equipment operating on direct current electricity can

[34] See also 'How Do Photovoltaic Cells Work?' <www.sustainable.energy.sa.gov.au> (accessed 22 January 2005).
[35] D Nevin, 'Solar Technology', in J Minan and W Lawrence (eds), *Legal Aspects of Solar Energy*, Lexington Books, Massachusetts, 1981, at 22–3; Redfield, 'Photovoltaics: An Overview' (1981) 3 *Solar Law Reporter* 217 at 217; Chalmers, 'The Photovoltaic Generation of Electricity' (1976) 235 *Scientific American* 34.
[36] See West, 'Photovoltaics', at 5; D Fousel, 'New, Newer, Newest in Photovoltaics' (1982) 8 (No. 9) *Northern Cal Sun* 6, at 7.

obtain electricity directly from the battery bank. Equipment requiring alternating current must have an inverter inserted between the equipment and the battery bank.

The major advantages of solar cells are that they have no moving parts, require little maintenance, require no fuel and do not create any pollution. In addition, the material from which they are usually manufactured, silicon, is found in abundant quantities throughout the earth. Unfortunately, however, the cells have a low efficiency, and as a consequence large arrays of cells are required to produce useful quantities of electricity. The other closely allied disadvantage is that of cost. Although silicon is abundant in supply, solar cells require an extremely pure monocrystalline form, which is complex and expensive to manufacture. Despite this cost disadvantage, solar cells have already been put to a variety of different uses, mostly in remote areas where the reliability and low maintenance requirements of the cells compensate for their cost of construction.

Legal issues associated with the exploitation of solar energy include the need to guarantee access to the direct rays of the sun and the removal of building and planning controls that act as a barrier to resource development.[37]

2.2.2 Wind energy[38]

The wind energy capacity in the world has increased exponentially in the past decade, greater than any of the other renewable energy resources. It is more cost competitive in many countries than the other alternatives to fossil fuels. This has occurred as a result of rapid advances in wind turbine technology, particularly in relation to reducing maintenance and mechanical problems, by siting wind generators more accurately to maximise energy generation potential, and due to the increase in size of the turbines. Wind farms, sometimes consisting of hundreds of turbines, are now found in most developed countries and in some developing countries in suitable windy locations.

The wind resource potential in Australia is high by world standards, and this resource represents one of the most promising of the renewable options for this country. This has been known for some time. As long ago as 1981, the National Energy Advisory Committee reported that many coastal regions are well endowed with wind resources with annual energy productions of between 3000 and 4500kWh per kW of installed wind capacity possible. The Committee calculated that this is equivalent to between 35% and 50% annual utilisation of a typical modern wind device, although the utilisation for particularly favourable

[37] The literature is voluminous. See, for example, James Goudkamp, 'Securing Access to Sunlight: The Role of Planning Law in New South Wales' (2004) 9 *Australasian J Natural Resources L & Policy* 59; Adrian J Bradbrook, 'Australian and American Perspectives on the Protection of Solar and Wind Access' (1988) 28 *Natural Resources J* 229; Adrian J Bradbrook, 'The Development of an Easement of Solar Access' (1982) 5 *UNSWLJ* 299; M Eisenstadt and A Utton, 'Solar Resources and their Effect on Solar Heating and Cooling' (1976) 16 *Natural Resources J* 363.

[38] For a general discussion of wind energy, see <www.worldenergy.org/wec-geis/publications/reports/ser/wind/wind.asp> (accessed 18 January 2005); UNDP et al, *World Energy Assessment*, 230ff; World Energy Council, *New Renewable Energy Resources*, ch 3.

sites could range between 70% and 80%.[39] The most favourable sites are in Western Australia, from Cape Naturaliste to Albany, in South Australia, from Ceduna to the Koorong, the Bass Strait islands and the west coast of Tasmania. Installed wind energy capacity by the end of 2004 has reached 380MW country-wide, with an additional 1350MW of wind energy projects that are either approved or under construction.[40]

While wind energy is an environmentally benign resource in that it avoids atmospheric carbon emissions (except in the manufacture of the wind turbines) and causes no air pollution, its development has been restricted in some countries by concerns over safety, integration into supply networks, causing death to migratory birds, noise, television and radio interference and visual pollution.[41] Because of the need for wind turbines to be located in exposed locations, and because of the greater wind speeds nearer the coast, the proposal to build wind farms in coastal areas has provoked local opposition and run into difficulties in achieving development approval.[42]

One method of avoiding such local opposition is to construct offshore wind generators.[43] While the cost of such construction is much higher than for onshore facilities, the wind velocities are normally significantly higher offshore. A number of such installations have been constructed in Europe in recent years.[44] These are more expensive to build and operate, but have very few environmental impacts.[45]

[39] National Energy Advisory Committee, *Renewable Energy Resources in Australia*, Canberra, 1981, 6.1ff.
[40] Australian Wind Energy Association, 'Australian wind energy forges ahead', Media Release – 12 January 2005, <www.auswea.com.au> (accessed 24 January 2005). For further statistical information, see 'Wind power is not such a breeze', *The Advertiser* (Adelaide), 7 January 2005, at 26; Alexandra S Wawryk, 'The Development Process for Wind Farms in South Australia' (2002) 19 *Australasian J Natural Resources L & Policy* 333 at 335.
[41] S Tromans, 'Statutory Nuisance, Noise and Windfarms' (2004) 18 *Environmental Law* 7; Adrian J Bradbrook, 'Liability in Nuisance for the Operation of Wind Generators' (1984) 1 *Environmental and Planning Law Journal* 128; <www.worldenergy.org/wec-geis/publications/reports/ser/wind/wind.asp> (accessed 21 January 2005).
[42] For an interesting discussion of this problem in Victoria and South Australia, see Alexandra S Wawryk, 'Planning for Wind Energy: Controversy Over Wind Farms in Coastal Victoria' (2004) 9 *Australasian J Natural Resources L & Policy* 103; Alexandra S Wawryk, 'The Development Process for Wind Farms in South Australia' (2002) 19 *Environmental and Planning LJ* 333. See also K Coulston, 'Furore Sparks Call for State Moratorium' (2002) 18(5) *WindPower Monthly* 42; *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria 2002* (as amended in 2003), available at <www.seav.vic.gov.au> (accessed 21 January 2005).
[43] See G Plant, 'Offshore Renewable Energy: Smooth Permitting, Environmental Assessment and Fair Use Allocation' (2003) 14 *Water Law* 73; G Plant, 'Offshore Renewable Energy Development and the Energy Bill' (2004) 7 *J Planning and Environmental Law* 868; G Plant, 'Offshore Wind Energy Development: The Challenges for English Law' (2003) 8 *J Planning and Environmental Law* 939; M M Roggenkamp, 'The Regulation of Offshore Wind Parks in the Netherlands' (2003) 8 *International Energy Law and Taxation Rev* 225; A J Bradbrook and A S Wawryk, 'The Legal Regime Governing the Exploitation of Offshore Wind Energy in Australia' (2001) 18 *Environmental and Planning Law Journal* 30.
[44] Particularly in Denmark: see A Rønne, 'Renewable Energy on the Market' (2005) *23 J Energy & Natural Resources L* 156. In relation to the United States, see E Smith, 'US Legislative Incentives for Wind-Generated Electricity: State and Local Statutes' (2005) 23 *J Energy & Natural Resources L* 173. See also J N Lamaster, 'UK Offshore Wind Power: Progress and Challenges' OGEL at <www.gasandoil.com/ogel/> 2004, vol 2 no 2; Adrian J Bradbrook and Alexandra S Wawryk, 'The Legal Regime'; M Schulz, 'Questions Blowing in the Wind: The Development of Offshore Wind as a Renewable Source of Energy in the United States' (2004) 38 *New England L Rev* 415; R Russel, 'Neither Out Far Nor in Deep: The Prospects for Utility-Scale Wind Power in the Coastal Zone' (2004) 31 *Boston College Environmental Affairs L Rev* 221.
[45] For a discussion of environmental impacts and the associated legal issues, see Adrian J Bradbrook, 'Liability in Nuisance for the Operation of Wind Generators' (1984) 1 *EPLJ* 128; C Real de Azua, 'The Future of Wind

2.2.3 Geothermal energy[46]

The potential of geothermal energy[47] for satisfying the world's growing energy requirements is enormous. The amount of geothermal heat in the outer 10 km of the earth's crust has been calculated to be $3x10^{26}$ calories, which is more than 2000 times the heat output of the total coal resources in the world.[48] In the United States, for example, recoverable reserves of heat energy in the earth in the 90°C to 150°C range have been estimated at the equivalent of 900 billion barrels of oil.[49] On a worldwide basis, scientists have calculated that if means could be found to reduce the temperature of the earth's core by 0.6°C, sufficient energy could be generated to power all existing power plants for 20 million years.[50] In contrast, in the past Australia has largely ignored the possible exploitation of geothermal resources. Until recently it seems to have been assumed that as Australia is geologically stable and has no active volcanoes, geysers or fumaroles, geothermal energy is not commercially exploitable in this country. Government initiatives in the past have been directed at other forms of renewable energy resources (in particular, solar and wind energy) rather than geothermal energy.[51]

Scientifically, there are three fundamentally different types of geothermal energy:[52]

1 In areas of geological instability and volcanic activity, such as the Philippines, New Zealand, the United States, Iceland, Japan, Mexico, Italy and Indonesia, there are volcanic or magmatic reserves and vapour-dominated systems. These resources rely on natural systems where water is heated and comes to the surface as steam. This steam is used to generate electricity through the use of conventional turbines. This type of geothermal energy is not known to exist in Australia.

2 In many areas of the world, including Australia, substantial reserves of hot groundwater exist, which can be used for heating purposes, although not for the generation of electricity as no steam is generated.[53] These reserves exist primarily in the Great Artesian Basin in the southern half of South Australia and central Queensland, and in the Otway and Gippsland basins

Energy' (2001) 14 *Tulane Environmental LJ* 485; D Mercer, 'The Great Australian Wind Rush and the Devaluation of Landscape Amenity' (2003) 34 *Australian Geographer* 91; D W Bisbee, 'NEPA Review of Offshore Wind Farms: Ensuring Emission Reduction Benefits Outweigh Visual Impacts' (2004) 31 *Boston College Environmental Affairs L Rev* 349.

[46] For a general discussion of geothermal energy, see <www.worldenergy.org/wec-geis/publications/reports/ser/geo/geo.asp> (accessed 18 January 2005); UNDP et al, *World Energy Assessment*, at 255ff; World Energy Council, *New Renewable Energy Resources*, ch 4.

[47] 'Geothermal energy' may be described as the earth's heat energy, and heat flows from the earth's centre to the surface in all areas: S Sato and T Crocker, 'Property Rights to Geothermal Resources' (1977) 6 *Ecology LQ* 247.

[48] See G Vranesh and J D Musick, 'Geothermal Resources: Water and Other Conflicts Encountered by the Developer' (1977) 13 *Land and Water L Rev* 109. See also Adrian J Bradbrook, 'The Ownership of Geothermal Resources' [1987] *AMPLA Yearbook* 353 at 353.

[49] S D Naumann, 'Form Over Function: The Law of Hot Water' (1983) 4 *J Energy L and Policy* 205 at 209.

[50] Vranesh and Musick, 'Geothermal Resources', at 115.

[51] See Adrian J Bradbrook, 'Environmental Controls over Geothermal Energy Exploitation' (1987) 4 *EPLJ* 5.

[52] <www.nrm.qld.gov.au/factseets/pdf/mines/m7.pdf> (accessed 10 January 2005).

[53] <www.science.org.au/nova/046/046key.htm> (accessed 25 January 2005).

in southern Victoria.[54] Waters in the Great Artesian Basin can attain 99°C. In Birdsville (Queensland) a 150kW generating plant operates from the town bore.[55] A number of outback stations also rely on small-scale geothermal plants.

3 Recent research has shown the widespread existence of hot dry rocks (HDR) in large areas of central Australia. This resource can be exploited by the injection into the earth of cold water through drilled holes; the water becomes superheated on contact with underground heated rock and is discharged at the surface in the form of steam. HDR technology is still at the experimental stage, but is regarded as very promising. Various exploratory work is already being undertaken in Australia and around the world.[56] Two companies, Geodynamics and Petratherm, are actively involved and believe that commercial exploitation of the resources in northern South Australia is possible within 2 years.[57] Initial estimates suggest the hot dry rocks beneath the Eromanga Basin could meet the whole country's current energy needs for 800 years.[58]

2.2.4 Biomass[59]

Biomass fuel is a term used to define a range of energy products derived from photosynthesis. It includes plants, animal manure, crop residues, woodmill wastes, forestry residues and municipal solid wastes. Biomass represents stored solar energy, and is the only renewable source of carbon. Wood and grass produce heat by burning. In many developing countries this is the major fuel source for heating and cooking for those people without access to modern energy services.[60] Wheat and sugar cane can be fermented to produce ethanol (or ethyl alcohol). Ethanol involves the use of cultivated crops to produce alcohol by the

[54] Bradbrook, 'Ownership of Geothermal Resources', at 354.
[55] See <www.geodynamics.com.au/IRM/content/> (accessed 10 January 2005) for the development of a HDR project by Geodynamics Ltd in the Cooper Basin in northern South Australia.
[56] In Australia, the New South Wales State government has awarded Pacific Power the tender to explore for HDR in the Hunter Valley. A renewable energy company, Geodynamics Limited, which plans to produce power by HDR, has recently listed on the Australian Stock Exchange: see <www.aie.org.au/pubs/hotdry.htm>.
[57] 'Energy in hot rocks may power the future', *The Advertiser* (Adelaide), 6 January 2005, at 11.
[58] Ibid.
[59] For a general discussion of biomass, see the material available at the following sources: <www.reslab.com.au/resfiles/biomass.text.htm> (accessed 18 January 2005); <www.worldenergy.org/wec-geis/publications/reports/ser/biomass/biomass.asp> (accessed 18 January 2005); UNDP et al, *World Energy Assessment*, at 222ff; World Energy Council, *New Renewable Energy Resources*, ch 5; United Nations Environment Programme, *Green Energy: Biomass Fuels and the Environment*, United Nations, New York, 1991; W Patterson, *Power from Plants*, Earthscan Publications, London, 1994; California Energy Commission, *Methanol as a Motor Fuel*, Report P500-89-002 (1992); D Hall, F Rosillo-Calle, R Williams and J Woods, 'Biomass for Energy: Supply Prospects', in T Johansson, H Kelly et al (eds), *Renewable Energy*, Island Press, Washington D.C. (1993); N Smith, *Wood: An Ancient Fuel with a New Future*, Worldwatch Paper 42, Worldwatch Institute, Washington DC, 1981; D Hall, 'Biomass as an Energy Source' (1998) 29 *Tiempo* 17; F P W Winteringham, *Energy Use and the Environment*, Lewis Publishers, Chelsea MI, 1992, at 52ff; <www.science.org.au/nova/039/039key.htm> (accessed 25 January 2005). For a discussion of the legal issues associated with the promotion of biomass, see Adrian J Bradbrook and Alexandra S Wawryk, 'Energy, Sustainable Development and Motor Fuels: Legal Barriers to the Use of Ethanol' (1999) 16 *Environmental and Planning LJ* 196.
[60] UNDP et al, *World Energy Assessment*, at 45.

fermentation of plant material, such as sugar cane molasses or the starch from cassava plants.[61] Methanol can be produced by distillating biomass.

Methanol and ethanol are both used as a fuel for motor vehicles and machinery and can be blended with petroleum. In the United States, blending has been practised for many years, typically using 10% or 15% ethanol, although occasionally using ethanol content as high as 85%. The product is marketed as 'gasohol'.[62] In Australia, blending has met with consumer resistance out of fear that without professional adjustment the use of ethanol may weaken and corrode some traditional vehicle parts. It has recently been determined that a blend using 10% ethanol is not harmful.

The planting of crops to produce motor fuel rather than food may seem bizarre, but the technology is well proven. Other countries have taken a strong lead in introducing ethanol as a motor fuel. The most spectacular success has occurred in Brazil, which in 1976 commenced a large-scale program of planting sugar cane and cassava specifically for the production of ethanol. Seventy percent of all motor vehicles in Brazil now rely on ethanol rather than petrol.[63] Australia is similarly well placed to produce ethanol in light of its tropical climate in the north and its extensive sugar cane industry in Queensland.

Ethanol is particularly important because of its use as a motor fuel. While generally rich in mineral resources, Australia has only very modest oil reserves on a global scale. The use of oil has been greatly reduced or totally phased out in other sectors, such as electricity power stations and heating oil, but almost total reliance is still placed on oil in the transport sector. The other major oil substitutes that have been marketed in the past, compressed natural gas (CNG) and liquefied petroleum gas (LPG), are still based on hydrocarbons. From an environmental perspective, ethanol is much more acceptable than petrol, CNG or LPG. Its production and use releases no airborne particulates, it has no lead content and contributes no greenhouse gases such as CO_2 or NOx. At present, the main difficulty is economic: the production of ethanol is currently more expensive than petrol and is thus not competitive in the marketplace.[64]

2.2.5 Other renewable energy resources

A number of technologies exist for generating electricity from water. Of these, by far the most commonly found and most developed is that of hydro-electricity.[65]

[61] For a discussion of the industrial processes of producing ethanol, see e.g. Renewable Fuels Association, *Ethanol Production Process* <www.ethanolrfa.org/prod_process.html> (accessed 20 July 2005); G Foley, *The Energy Question*, Penguin Books, London, 2nd edn 1981, at 239ff.

[62] See B R Farrell, 'Fill 'Er Up With Corn: The Future of Ethanol Legislation in America' (1998) 23 *J Corporation Law* 373, at 376 and 391. In 1995, gasohol achieved a market share of 35% in Chicago and over 50% in Milwaukee.

[63] See J Goldemberg, T B Johansson, A K N Reddy and R H Williams, *Energy for a Sustainable World*, Wiley Eastern Ltd, New Delhi, 1988, at 239ff; A de Oliveira, 'Reassessing the Brazilian Alcohol Programme' (1991) 19 *Energy Policy* 47.

[64] See M Radetzki, 'The Economics of Biomass in Industrialised Countries: An Overview' (1997) 25 *Energy Policy* 545.

[65] See <www.reslab.com.au/resfiles/text.htm> (accessed 18 January 2005); <www.worldenergy.org/wec-geis/publications/reports/ser/hydro/hydro.asp> (accessed 18 January 2005); UNDP et al, *World Energy Assessment*, at 251ff.

In some countries, such as the Philippines, hydro-electricity is responsible for the majority of the country's electricity resources. In Australia, for climatic reasons the actual and potential use of hydro-electricity is limited to Tasmania, the coastal fringes of northern Queensland and the mountainous region in the country's south-east. In terms of exploitation, hydro-electricity is the oldest of all the renewable energy resources and constitutes the majority of the 9% of electricity generated from renewables in Australia. It is principally exploited in Tasmania and the Snowy Mountains, the latter under an ambitious scheme financed by the Commonwealth government in the 1950s and shared between New South Wales and Victoria.[66] The total hydropower capacity in Australia is 7.6GW, of which the Snowy Mountains Hydro-Electric Scheme constitutes 50% and Tasmania 30%.[67]

While hydro-electricity produces no conventional pollution or atmospheric carbon emissions its continued development has been a major source of controversy from an environmental perspective, both in Australia and overseas. Many major hydro developments have involved the displacement of indigenous people whose traditional lands become flooded.[68] This has occurred most recently in China, where many thousands of people had to be relocated due to the massive 18.2GW Three Gorges dam project. In Australia, the problem has been not so much the displacement of people but the environmental damage caused by the drowning of large tracts of forest land. This issue came to a head in Tasmania both in the drowning of Lake Pedder and in the proposal to divert the Franklin River. While the Lake Pedder project went ahead in controversial circumstances, the Franklin Dam project was eventually halted by a 4–3 majority decision of the High Court of Australia in *Commonwealth v Tasmania*.[69] Since then no further major hydro projects have been developed in Australia.

Other water-based renewable energy resources are ocean thermal energy conversion (OTEC), wave energy and tidal energy. All of these are still at the experimental stage in most countries, although tidal energy is exploited commercially at La Rance, France, and in the Bay of Fundy, Canada. OTEC involves the exploitation of the temperature differential between the warm water at the surface of the ocean in tropical latitudes and the cold water of the deep ocean. For effective operation of OTEC, the temperature difference between the warm surface water and the cold deep ocean water at a depth of 1000 metres must be approximately 20°C. This means that the surface temperature of the ocean near to the coastline must be a minimum of 27°C and the ocean bed must shelve deeply to the

[66] The Snowy Mountains hydro-electric power scheme is the largest in Australia. It has a generation capacity of almost 3800MW. The scheme consists of seven power stations, two of which are underground, with 16 large dams and 145 km of tunnels: see <www.worldenergy.org/wec-geis/publications/reports/ser/hydro/hydro.asp> at 6.

[67] Department of Primary Industries and Energy, *Renewable Energy Industry – Survey on Present and Future Contribution to the Australian Economy*, AGPS, Canberra, 1997.

[68] This problem does not occur in small-scale, 'run of the river' hydro projects. However, the scope for the exploitation of this resource in Australia is extremely limited. See <www.lowimpacthydro.org> (accessed 26 January 2005).

[69] (1983) 46 ALR 625.

ocean depths.[70] While a temperature of 27°C occurs in substantial coastal areas of Australia off Queensland, the Northern Territory and Western Australia, the coastline is too shallow to achieve the temperature differential required for the effective use of OTEC.[71]

Wave energy has been extensively trialled by the British government off the north coast of Scotland. The coastal area to the south of Australia offers a wave regime that is sufficiently strong to generate substantial quantities of electricity, but at present the costs of generation are hopelessly uneconomic. Substantial tidal resources exist off the north-west coast of Western Australia, particularly in the region of Derby. The problem here is the cost of the infrastructure that would be required to effectively exploit the resource as this area of the country is very remote from the main centres of human population in the south of Australia.[72]

2.2.6 Hydrogen and fuel cell vehicle technology[73]

From an environmental perspective the use of hydrogen as an energy source is highly desirable as no CO_2 or air pollutants are emitted when hydrogen is burned in fuel cells, and only NOx is emitted when hydrogen is burned in gas turbine-based power plants. When hydrogen is made electrolytically by decomposing water from renewable or nuclear energy sources, the CO_2 and air pollutants are close to zero; while when it is made from fossil fuels, air pollutants are also close to zero, although in this case CO_2 emissions are significant.[74]

The major potential use of hydrogen as a fuel source is for motor vehicles, as hydrogen fuel cell vehicles would be much more efficient than normal internal combustion engine vehicles and would generate far less air pollution.

The factor inhibiting the widespread use of hydrogen as an energy source is the prohibitive cost of producing hydrogen from fossil fuels, together with lingering

[70] For a discussion of OTEC and the legal issues associated with its introduction, see S Joseph, 'Legal Issues Confronting the Exploitation of Renewable Sources of Energy from the Oceans' (1981) 11 *California Western International L J* 387; K Keith, 'Laws Affecting the Development of Ocean Thermal Energy Conversion in the United States' (1982) 43 *U Pittsburg L Rev* 1; R Krueger and G Yarema, 'New Institutions for New Energy Technology: The Case of Ocean Thermal Energy Conversion' (1981) 54 *Southern California L Rev* 767; M Reisman, 'Key International Legal Issues with regard to Ocean Thermal Energy Conversion Systems' (1981) 11 *California Western International L J* 425. The United States has legislated in this area: *Ocean Energy Thermal Conversion Act*, US Code, Title 42, Chapter 99.

[71] See generally <www.reslab.com.au/resfiles/ocean.text.htm> (accessed 18 January 2005); <www.worldenergy.org/org/wec-geis/publications/reports/ser/ocean/ocean.asp> (accessed 18 January 2005); *World Energy Assessment*, at 260. Besides the generation of electricity, OTEC plants could be used for aquaculture, refrigeration, mineral extraction, and desalinated water crop irrigation and consumption.

[72] For a discussion of tidal resources, see <www.worldenergy.org/wec-geis/publications/reports/ser/marine/marine.asp> (accessed 18 January 2005); <www.worldenergy.org/wec-geis/ publications/reports/ser/tide/tide.asp> (accessed 18 January 2005); UNDP et al, *World Energy Assessment*, at 259ff; World Energy Council, *New Renewable Energy Resources*, at 324ff; Roger Charlier, *Tidal Energy*, Van Nostrand Reinhold Co, New York, 1982.

[73] For a discussion of hydrogen and fuel cell vehicle technology, see National Research Council Report, *The Hydrogen Economy: Opportunities, Cost, Barriers, and R & D Needs*, 4 February 2004, available at <http://national-academies.org>; UNDP et al, *World Energy Assessment*, at 299ff; <www. science.org. au/nova/039/039key.htm> (accessed 25 January 2005); <www.science.org. au/nova/ 023/ 023key.htm> (accessed 25 January 2005).

[74] <www.science.org.au/nova/046/046key.htm> (accessed 25 January 2005).

doubts as to its safety as hydrogen is highly combustible. Considerable efforts are currently being made in many developed countries to accelerate the development of fuel cell vehicles, and most vehicle manufacturers have produced test vehicles running on hydrogen. This is being driven in part by legislation in some countries (notably California) requiring the commercialisation of a specified number of zero-emission cars.

The legal issues associated with the possible large-scale use of hydrogen are in their infancy and have not yet been addressed in Australia.[75]

2.3 Advanced fossil fuel and nuclear technologies

An essential component of sustainable development in the energy context involves the development of new technologies to make the production and consumption of the principal fossil fuels, oil, natural gas and coal, more environmentally friendly in terms of greenhouse gas emissions and atmospheric pollution. In relation to coal, new advanced technologies such as direct coal liquefaction for synthetic fuels production, pressurised fluidised-bed combustion, and coal integrated gasifier combined cycle plants at high efficiencies have been developed. Significant improvements have occurred in industry in cogeneration plants based on gas turbines and combined cycles.[76] Synthetic fuels have been developed in recent times which are useful for alleviating concerns over oil supply security as well as combating atmospheric carbon emissions. Secondary and tertiary oil recovery techniques have ensured that existing oil fields are exploited much more productively than has occurred in the past.

Certain countries, especially those without significant indigenous reserves of oil and gas, have placed increasing reliance for their energy security on the use of nuclear energy.[77] Overall, nuclear energy counts for 17% of electricity generation worldwide, and 7% of all energy use.[78] The best examples are France and Belgium, which in recent years have produced almost 80% of their electricity from nuclear power plants. In the 1950s and early 1960s the nuclear option was generally seen as a panacea for the world's energy needs for the indefinite future, and it was even promised that energy from nuclear sources would be too cheap to meter. The reality, unfortunately, is otherwise, and many countries that were initially enthusiastic about adopting the nuclear option abandoned or curtailed the

[75] For a preliminary discussion of these issues in overseas jurisdictions, see W Vincent, 'Hydrogen and Tort Law: Liability Concerns Are Not a Bar to a Hydrogen Economy' (2004) 25 *Energy LJ* 385; R Moy, 'Tort Law Considerations for the Hydrogen Economy' (2003) 24 *Energy LJ* 249; *Hydrogen, Fuel Cells and Infrastructure Technologies – The Hydrogen Future*, available at <www.eere.energy.gov/hydrogenandfuelcells/future/benefits/html>.

[76] For a discussion of cogeneration technology, see note 19 above and accompanying text.

[77] For a discussion of the nuclear electricity industry, see e.g. Ian Hore-Lacy, *Nuclear Electricity*, Uranium Information Centre Inc and World Nuclear Association, 7th edn 2003, <www.uic.com.au/ne.htm> (accessed 20 July 2005); C Flavin, *Reassessing Nuclear Power: The Fallout from Chernobyl*, Worldwatch Paper 75, Worldwatch Institute, Washington DC, 1987; G Greenhaugh, *The Future of Nuclear Power* (1988).

[78] *World Energy Report 2004 Update*, at 53.

building of nuclear plants because of spiralling costs and licensing difficulties.[79] Other countries were later deterred by the safety and environmental problems associated with the generation of nuclear energy, which were highlighted by the well-publicised incidents at Three Mile Island in the United States, and Chernobyl in the former Soviet Union,[80] together with the discharges of heated water that can damage aquatic ecosystems and kill fish in large quantities.[81] Yet further problems have surfaced more recently because of the failure to find guaranteed safe means of disposal of nuclear wastes[82] and the colossal costs associated with the decommissioning of aging nuclear electricity plants.[83]

Serious security issues are also associated with the use of nuclear energy. Of increasing concern is the possibility of nuclear terrorism, whereby a radical group acquires plutonium and produces a crude nuclear device. The method of constructing a nuclear device is not complex, the major difficulty being the availability of plutonium, an essential component. Disturbingly, there have been several reports of theft or the mysterious disappearance of small quantities of plutonium and other components of nuclear devices.

Since the emergence of environmental concerns over global warming, there are signs of a re-emergence of nuclear energy in some countries as, unlike traditional fossil fuels, nuclear energy releases virtually no atmospheric carbon emissions or traditional air pollution. Safety concerns have been in part alleviated by the development of modern light water reactors with an excellent safety record, which are technologically far superior to the Chernobyl-type reactors.

Nuclear energy has never been used in Australia. Only one nuclear reactor exists, at Lucas Heights in New South Wales, which is used primarily for medical research. Nuclear energy is even banned legislatively in Victoria, pursuant to the *Nuclear Activities (Prohibitions) Act 1983*. This is despite the fact that Australia possesses large reserves of uranium, which it exports to other countries for nuclear purposes. It is also despite the very high per capita incidence of atmospheric carbon emissions in this country, which nuclear energy could significantly reduce. Part of the reason is the enormous cost of building nuclear plants and the fact that the population is too small to benefit from the economies of scale that a nuclear plant could offer. The other reason is political. Along with New Zealand, Australia has always been at the forefront of rejecting nuclear

[79] For a discussion of licensing schemes, see B Kunth, 'International Aspects of Nuclear Installations Licensing' (1987) 5 *JERL* 202; M Purdue, 'The Licensing of Nuclear Power Plants in the United States' (1988) 5 *EPLJ* 4.
[80] See United Nations Environment Programme, 'Energy, Renewable Energy and Nuclear Energy', in *Handbook for Legal Drafting*, United Nations, New York, 2005, chapter 22; Peter Cameron, Leigh Hancher and Wolfgang Kühn (eds), *Nuclear Energy Law After Chernobyl*, Graham & Trotman, London, 1988.
[81] K Kennedy, 'The Importance of Renewable Energy', in Adrian J Bradbrook and Richard L Ottinger (eds), *UNEP Handbook for Legal Draftsmen on Environmentally Sound Management of Energy Efficiency and Renewable Energy Resources*, United Nations, New York, 2005, at 101.
[82] See, for example, S R Helton, 'The Legal Problems of Spent Nuclear Fuel Disposal' (2002) 23 *Energy LJ* 179.
[83] For decommissioning issues, see C Beck-Dudley and J Malko, 'Decommissioning Nuclear Power Plants in the United States' (1990) 10 *J Energy L & Policy* 141; R Neufeld and G Paskuski, 'Legal and Regulatory Considerations in Plant Decommissioning and Rationalisation Plans' (1993) 31 *Alberta L Rev* 259; B Kunth, 'Decommissioning of Nuclear Power Plants' (1986) 4 *J Energy and Natural Resources L* 107.

energy out of environmental concerns.[84] This has surfaced most recently in the ongoing dispute about the establishment of a nuclear waste disposal plant. The *World Energy Assessment* concluded that nuclear energy could not be regarded as a sustainable energy option unless and until concerns regarding safety, waste disposal and nuclear proliferation and diversion are effectively addressed in ways that permit nuclear energy to compete on an economic basis.[85] This seems unlikely to change in the foreseeable future.

2.4 The role of the law

From the foregoing discussion, it can be seen that the achievement of sustainable development in the energy context will depend not simply on one energy source, but a combination of measures involving a range of different resources. In relation to energy efficiency, there is scope for considerable improvement in patterns of consumption in all sectors of the economy – motor fuels, appliances, buildings and industry. From an Australian perspective, the most promising of the alternative energy resources appear to be wind energy, solar energy and geothermal energy, together with ethanol production through the increased use of biomass. Hydro-electricity has proved a valuable source of energy in the past, but in light of the environmental disruption caused by large-scale projects, together with the decision of the High Court of Australia in *Commonwealth v Tasmania*[86] it appears unlikely that the use of this energy resource will be greatly expanded in the future.[87] The other technologies appear to be either marginal, in the sense that they are currently only experimental or are very uneconomic, or are unlikely to be developed or commercialised on anything other than the very long term. The use of fuel cell technology, clean coal technologies and various synthetic fuels is important, but does not raise the legal issues posed by the other resources. For this reason, the focus for the remainder of this book will be on the promotion of energy efficiency and the renewable energy resources referred to above.

The role of the law in furthering sustainable energy development can be considered from three separate perspectives.

2.4.1 Law in context

First, the extent to which sustainable energy technologies are adopted in Australia and elsewhere depends on a variety of largely unrelated factors. The most important of these are the degree of research activity conducted by private and public research institutions, the level of government assistance provided, the economics

[84] See *Nuclear Test Cases (Australia v France)* (1973) ICJ Rep 99; (1974) ICJ Rep 253; *(New Zealand v France)* (1973) ICJ Rep 135; (1974) ICJ Rep 457.
[85] UNDP et al, *World Energy Assessment*, at 318. [86] (1983) 46 ALR 625. [87] See Chapter 7.

of renewable energy and energy efficient technologies, the degree of social acceptance of alternative energy technologies and the level of public education in issues of sustainable development. Another important, and sometimes overlooked, factor is the role of the law. The problem posed by the state of the law has been aptly summarised by Miller in the context of solar energy:

> The extent to which legal problems will impede the introduction of solar energy technologies is uncertain . . . The attention of lawyers will be necessary . . . to assure that existing laws and regulations do not unnecessarily interfere with the use of solar energy, and to draft new laws promoting solar energy to be sure the 'solutions' do not create more problems than they solve.
>
> The legal system will not determine the ultimate fate of solar energy technologies, but it will have a lot to do with the rate at which they are adopted. In a period of transition in our energy supply, time is a critical factor. The importance of the lawyer's role in accelerating the introduction of solar energy should therefore not be underestimated.[88]

These comments arguably hold equally true for all renewable energy resources and energy efficient technologies.

2.4.2 Law, economics and education

It has been stated that the degree of penetration of alternative energy technologies will depend on three factors: regulation, stimulation and education, or a combination of any two or more of these measures. Regulation is the major role of law, and one which has many illustrations in the traditional energy context. Before private investment can occur, legal certainty as to the rights and duties of the Parties is required. It is difficult to conceive of large-scale private investment occurring in any part of the energy industry if investors are not certain as to their legal position. In high-risk investment areas, such as petroleum exploration and production, comprehensive legal regulation has always preceded private investment. Legal certainty is required even in respect of small-scale private investment. For example, why would a private individual or company wish to invest in a solar energy appliance without an assurance that they will have a guaranteed right of solar access? Without such a right the appliance will be essentially worthless. There is certainly scope to minimise bureaucratic controls over the operation of the energy sector and, for example, it may be appropriate in certain circumstances, particularly with the implementation of environmental controls, for the government to negotiate codes of practice rather than rely on regulation.[89] However, there is no alternative to legal regulation to determine the basic management regime for the exploitation of each of the energy resources and the basic rights and duties of private owners and operators.

[88] A Miller, 'Legal Obstacles to Decentralised Solar Energy Technology: Part II' (1979) 1 *Solar Energy Reporter* 761, at 783.
[89] See L Campbell, 'Codes of Practice as an Alternative to Legislation' [1985] *Statute L Rev* 127; A Samuels, 'Codes of Practice and Legislation' [1986] *Statute L Rev* 29.

Although stimulatory measures are largely the preserve of economists, most stimulatory measures require laws for their introduction. Thus, for example, every proposed tax concession given to investors in the energy sector requires a change to an existing statute or regulation to implement it. Perhaps more importantly, society is not presented with a choice simply between regulation and stimulation to achieve a desired result. There is the further option of introducing both regulatory *and* stimulatory measures. This is often the most effective of the alternatives. It is sometimes referred to as the 'carrot and stick' approach. The 'stick' (that is, the regulatory measure) ensures that the private operator reaches prescribed minimum standards of performance. The 'carrot' (that is, the stimulatory measure) ensures that the operator goes as far as possible beyond the minimum prescribed performance standard. Regulation without stimulation means that there is no incentive to go beyond minimum standards, while stimulation without regulation may not produce any action at all.

It may be thought that education has nothing to do with the law. However, this misconceives the proper role of law in society. There are many illustrations of laws being introduced with a primarily educative function. Outside the energy field, laws requiring the mandatory wearing of seatbelts in cars and crash helmets for motorcycles, and laws requiring a compulsory health warning to be displayed on tobacco products, are useful examples. Within the energy sector, many jurisdictions already have laws designed to educate the public. An example is State and Territory legislation requiring the manufacturers and retailers of specified electric appliances to display a label on each appliance showing its average energy consumption and level of efficiency according to a prescribed testing procedure.[90]

As can thus be seen, the law has a vital role to play in relation to each of the major means of introducing change towards the adoption of sustainable energy technologies.

2.4.3 The meaning and scope of energy law

The role of the law can be understood by considering the definition of 'energy law'. Energy law has been described as 'the allocation of rights and duties concerning the exploitation of all energy resources between individuals, between individuals and the government, between governments and between States'.[91] The reference to 'energy resources' should not be seen as limited to the primary sources of energy, but should extend to secondary and substitute sources of energy. The most important secondary source of energy is electricity. The major substitute energy resource is energy conservation. This energy resource is indirect in the sense that it does not directly produce energy, and in fact is in one sense the antithesis of a resource in that it curtails the production of energy. In

[90] See Chapter 6 for a discussion of this issue.
[91] Adrian J Bradbrook, 'Energy Law as an Academic Discipline' (1996) 14 *JERL* 193, at 194.

another sense, however, it is as much an energy resource as any of the primary energy resources insofar as it is capable of satisfying society's demand for energy. For example, if society's demand for electricity can be reduced by a given amount due to the use of energy conservation techniques, this means that the amount of primary energy used is correspondingly reduced. Energy saved is as effective as energy generated in satisfying society's demands, and in this sense energy conservation is equivalent to the use of primary energy resources.[92]

The definition of energy law coined above refers to the 'exploitation' of energy resources. The methods of turning energy resources into productive and profitable use differ greatly between the various sources, and the involvement of the law must be separately considered in respect of each resource. For example, the exploitation of wind energy raises issues such as: How can access to the wind be legally safeguarded for owners of wind generators?[93] What environmental safeguards exist to protect against visual pollution caused by wind generators in environmentally sensitive locations?[94] To what extent should planning laws be modified so as to permit the construction of wind generators in urban and suburban districts?[95] And what remedies exist to protect neighbouring landowners from possible damage caused by flying rotor blades, collapsing towers or microclimate modification?[96]

The 'allocation of rights and duties' must next be considered. This expression is designed to consider the balance of legal rights and duties that must be established between the interested parties in respect of each energy resource. Again, the appropriate balance will differ fundamentally according to the nature of the resource. In the case of non-renewable energy resources, there is the initial fundamental issue of ownership rights in the resource.[97] Are or should the resources be vested in public ownership or should they be subject to private ownership? In the case of renewable energy systems, the notion of public ownership of the resource makes no sense. One cannot, for example, 'own' the sun, the wind, the tides or the waves. The issue in these cases is rather one of access to the resource. In the case of solar and wind energy access issues involve a balancing of the rights of a solar or wind user to erect and operate their devices as efficiently as possible;

[92] A unit of energy saved as a result of energy conservation techniques is sometimes referred to as a 'negawatt' (a negative watt).
[93] See Adrian J Bradbrook, 'The Access of Wind to Wind Generators' [1984] *AMPLA Yearbook* 433.
[94] See H Wilkinson, 'Wind Farms' (1994) 134 *New LJ* 314; Adrian Bradbrook, 'Liability in Nuisance for the Operation of Wind Generators' (1984) 1 *EPLJ* 128.
[95] See D Newman, 'Empowering the Wind: Overcoming Obstacles to Wind Energy Development in the United States' (2003) 3 *Sustainable Development L & Policy* 5; L Coit, *Wind Energy: Legal Issues and Institutional Barriers* (1979), at 9ff; J Riley, R Odland and H Barker, *Standards*, at 91.
[96] See Adrian Bradbrook, 'The Liability of the User of a Wind Generator in Tort for Personal Injuries' (1985) 15 *Melbourne U L Rev* 249; L Bass and P Weis, 'Safety Standards Development for Small Wind Energy Conversion Systems' (1981) 3 *Solar Law Reporter* 453; K Knox, 'Strategies and Warnings for Wind Generator Buyers' (1982) 24 *Wind Power Digest* 54.
[97] See Michael Crommelin, 'The US Rule of Capture: Its Place in Australia' [1986] *AMPLA Yearbook* 264; R Pierce, 'Coordinated Reservoirs Development – An Alternative to the Rule of Capture for the Ownership and Development of Oil and Gas' (1983) 4 *JERL* 1; Adrian Bradbrook, 'The Relevance of the Cujus Est Solum Doctrine to the Surface Landowner's Claims to Natural Resources Located Above and Beneath the Land' (1988) 11 *Adelaide L Rev* 462. The issues also arises in relation to geothermal resources: see Adrian Bradbrook, 'The Ownership of Geothermal Resources' [1987] *AMPLA Yearbook* 353; Sato and Crocker, 'Property Rights to Geothermal Resources', 247.

in other words, to avoid all possible physical barriers to the flow of wind and access to sunlight, with the rights of neighbouring landowners to develop their land as they consider fit.[98] In the same way as the law has to find a compromise between the state and a petroleum company in the case of the development of oil and gas resources, so the law has to achieve a balance in the case of solar and wind energy between neighbours. While the balance in the petroleum context is usually achieved by the introduction of legislation controlling petroleum exploration and production, in the case of solar and wind energy the balance is usually achieved by the use of the local planning laws. In the case of energy conservation, the roles of the individual and the State are effectively reversed. As it is in the national interest to conserve energy to the maximum extent practicable, the individuals or companies who engage in energy conservation techniques are helping the State as much as themselves, not simply financially, but in relation to other matters such as energy security or the avoidance of pollution. Thus, it is appropriate to think in terms of the individual or company having legal 'rights' and the State having legal 'duties' towards them.

The preceding discussion explains why the definition of energy law referred to above refers to the allocation of rights and duties concerning the exploitation of energy resources 'between individuals' and 'between individuals and the government'. We must now consider the role of energy law in allocating rights and duties 'between governments' and 'between States'.

The allocation of rights and duties between governments arises for consideration in federal jurisdictions such as Australia and raises issues of constitutional law. In Australia the Constitution reserves residual rights to the States and gives only enumerated powers to the Commonwealth government. Energy issues fall within the residual powers of the States and thus primary responsibility for energy laws lies at State level. To date, the existing laws affecting renewable energy resources and energy efficiency (apart from taxation issues), including the electricity industry, are purely at State level. However, with the newly established national electricity grid and a national market for electricity and other energy products, together with the increasing interconnection of the State grids, it is possible that the Commonwealth government will be able to attract jurisdiction to itself over the industry pursuant to the trade and commerce power (s 51(i)) and the corporations power (s 51(xx)) of the Constitution.[99]

Finally, rights and duties in the energy sector must be allocated by law between States. This, of course, raises a consideration of the application of the principles of international law in the context of energy. This area has evolved and continues to evolve very rapidly and represents the real cutting edge of energy law at the

[98] In relation to solar energy, see M M Eisenstadt, 'Access to Solar Energy: The Problem and its Current Status' (1982) 22 *Natural Resources J* 21; J Gergacz, 'Legal Aspects of Solar Energy: Easements for Sunlight and Individual Solar Energy Use' (1980) 18 *American Business L J* 414; Adrian Bradbrook, 'The Development of an Easement of Solar Access' (1982) 5 *UNSWLJ* 229. In relation to wind energy, see R Taubenfeld and H Taubenfeld, 'Wind Energy: Legal Issues and Legal Barriers' (1977) 31 *Southwestern L J* 1053; Adrian Bradbrook, 'The Access of Wind to Wind Generators' [1984] *AMPLA Yearbook* 433.

[99] Adrian Bradbrook and Alexandra Wawryk, 'Constitutional Implications of the Restructuring of the Australian Electricity Industry' (1996) 3 *Australasian Natural Resources L & Policy* 239.

present time. Until comparatively recently, energy was seen to be very much a national issue and one that required little, if any, international legal intervention. In recent years, however, world concern for the environment, together with the removal of trade barriers, has led to a realisation that international law has a significant role to play in this domain. The role of international law in promoting the use of renewable energy resources and energy efficiency is discussed in detail in the next chapter.

3

Energy, international environmental law and sustainable development

In this chapter the international environmental law and policy aspects that are relevant to energy law and the environment are assessed. The purpose of this is to discuss the many international instruments which have together shaped the parameters of what we now refer to as 'a sustainable energy law framework'. Principal among these is the 1992 United Nations Framework Convention on Climate Change (UNFCCC),[1] and its associated Kyoto Protocol,[2] which require the stabilisation of global greenhouse gas emissions to 1990 levels. The reason that this instrument is so significant is that it is the stationary energy sector, reliant on the burning of fossil fuels, which is, globally, the biggest emitter of greenhouse gas emissions. It is also important to understand the basic underpinnings of the Rio Declaration[3] and Agenda 21,[4] which established the parameters for nations to move towards sustainable development. The energy and climate change outcomes of the 2002 World Summit on Sustainable Development and the G8 Gleneagles Summit 2005 will also be mentioned, as they enunciate the global community's most recent commitments to a program of action towards developing a sustainable energy framework.

3.1 The role of energy in international law

Although public international law has existed for many centuries, it is only since the 1970s that it has concerned itself with energy issues. Traditionally the legal

[1] (1992) 31 ILM 849; 1771 UNTS 108 (in force 29 May 1992).
[2] (1998) 37 ILM 22; UN Doc FCCC/CP/1997/L.7/Add.1 (in force 16 February 2005).
[3] A/CONF.199/CRP/7. See <www.unep.org/Documents/Default.asp?DocumentID= 78&ArticleID=1163> (accessed 16 March 2005).
[4] A/Conf 151/26; discussed in Nicholas A Robinson (ed.), *Agenda 21: Earth's Action Plan*, Oceana Press, 1993. Available at <www.un.org/esa/sustdev/documents/agenda21/English> (accessed 31 January 2005).

regulation of energy issues has been regarded as a matter of domestic, rather than international law, and a matter that is exclusively for the States to resolve on an individual basis. This traditional approach has changed for a variety of reasons, largely involving international trade. First and foremost, there has been an exponential leap in the quantum of energy use worldwide, particularly in developed countries, since the end of the Second World War. This has led to increased energy trade and increased reliance in many countries on energy imports, particularly petroleum products, which in turn has led to heightened energy security concerns. These concerns were brought to world attention by the Arab oil embargo in 1973 and the subsequent oil price increases in 1979 and 1981. Although the only direct legal consequence flowing from the Organisation of Petroleum Exporting Countries' (OPEC) stranglehold on petroleum exports was the agreement to create a strategic petroleum reserve, to guard against future world export problems, the OPEC ascendancy in the 1970s was responsible for highlighting energy security concerns worldwide and caused many countries to rethink their energy strategies.[5]

The development of free trade principles under the GATT[6] and the creation of regional and bilateral free trade agreements also have significant implications for international energy markets. In relation to regional energy markets, the European Union is creating an internal energy market and a corresponding harmonisation of the energy laws of the member nations. The North American Free Trade Agreement (NAFTA),[7] which is now as far-reaching in this regard as the European Union's single energy market, entails a restriction on the sovereign rights of individual members to enact energy laws inconsistent with the freedom to trade across borders in the energy field.

The use of the high seas in modern times for energy production and transportation has also shown the increasing relevance of public international law to the energy field. Energy transportation of fossil fuels is largely the domain of large ocean-going tankers, some of which have foundered, causing severe environmental damage to adjacent coastal States.[8] This has led to the introduction

[5] On the importance of national energy security, particularly for developed countries, see United Nations Development Programme, United Nations Department of Economic and Social Affairs and World Energy Council, *World Energy Assessment: Energy and the Challenge of Sustainability*, United Nations, New York 2000, ch 4 (hereafter referred to as *World Energy Assessment*); B Barton et al, *Energy Security: Managing Risk in a Dynamic Legal and Regulatory Environment*, Oxford University Press, Oxford, 2004; J Gault, 'European Energy Security', OGEL at <www.gasandoil.com/ogel/>, 2004, vol 2, no 2; C L Orman, 'The National Energy Strategy – An Illusive Quest for Energy Security' (1992) 13 *Energy L J* 251.

[6] General Agreement on Tariffs and Trade, TIAS No 1700, 55 UNTS 194.

[7] For a discussion of the impact of NAFTA on energy trade, see e.g. R Page, 'Greenhouse Gas Emissions and Emissions Trading in North America: Kyoto Protocol and US Initiatives: Challenges for the NAFTA Family' (2002) 28 *Canada-United States LJ* 55; O Saunders, 'GATT, NAFTA and North American Energy Trade: A Canadian Perspective' (1994) 12 *J Energy and Natural Resources Law* 4; E Smith and D Cluchey, 'GATT, NAFTA and the Trade in Energy: A US Perspective' (1994) 12 *J Energy and Natural Resources Law* 27; D MacDougall, 'Trade in Energy and Natural Resources: The Role of GATT and Developing Countries' (1994) 12 *J Energy and Natural Resources Law* 95; C Redgwell, 'Energy, Environment and Trade in the European Community' (1994) 12 *J Energy and Natural Resources Law* 128.

[8] In particular, the *Erica*, the *Exxon Valdez*, the *Amoco Cadiz* and the *Torrey Canyon*. See P Birnie and A Boyle, *International Law and the Environment*, Oxford University Press, Oxford, 2nd edn, 2002, ch 7. In relation to oil pollution at sea more generally, R Bhatia and J Dinwoodie, 'Daily Oil Losses in Shipping Crude Oil: Measuring Crude Oil Loss Rates in Daily North Sea Shipping Operations' (2004) 32 *Energy Policy* 811.

of the 1973 MARPOL Convention[9] and the 1982 UN Convention on the Law of the Sea,[10] which redefine the legal relationship between the coastal and port States, on the one hand, and the flag State, on the other hand. The effect of these conventions is to increase significantly the obligations of the flag States in relation to the protection of the seas.[11] The high seas are also used increasingly for energy exploration and production, particularly offshore oil and gas. This has given rise to significant developments in international law relating to boundary disputes,[12] pipelines and artificial islands, and the abandonment of offshore installations.[13]

The involvement of energy issues in the sub-discipline of international environmental law has been even more recent. International environmental law has its origins in the Stockholm Declaration of 1972,[14] although this document makes no mention of energy. Since 1972, however, there has been increasing recognition of the fact that the environmental impact of energy use has an international dimension. This message has been brought home to the international community in spectacular fashion in recent times by a series of oil tanker disasters and, in respect of nuclear energy, by the Chernobyl and Three Mile Island incidents. Other major international environmental impacts associated in whole or in part with energy use and production include acid rain, climate change and the dumping of radioactive wastes. To a lesser extent one can also add the depletion of the ozone layer[15] and desertification.[16] As a result of these developments, energy is now very much a part of international environmental law.

The major hallmark of environmental law in recent times is that of sustainable development. This phrase was developed by the World Commission on

[9] International Convention for the Prevention of Pollution by Ships (MARPOL) (London), 12 ILM 1319 (1973) (in force 2 October 1983). Note that this Convention was amended by the Protocol Relating to the Convention for the Prevention of Pollution from Ships (MARPOL), 17 ILM 546 (1978) before coming into force. See A Griffin, 'MARPOL 73/78 and Vessel Pollution: A Glass Half Full or Half Empty' (1994) 1 *Ind J Global Legal Studies* 419; G Peet, 'The MARPOL Convention: Implementation and Effectiveness' (1992) 7 *Int J Estuarine and Coastal Law* 277.

[10] UN Convention on the Law of the Sea (Montego Bay), 21 ILM 1261 (1982).

[11] See e.g. A Boyle, 'Marine Pollution Under the Law of the Sea Convention' (1985) 79 *AJIL* 347; P Allott, 'Power Sharing in Law of the Sea' (1983) 77 *AJIL* 1.

[12] There have been numerous sea boundary disputes in recent times resolved either by agreement or by arbitration. These include the Gulf of Maine (United States and Canada), the English Channel (United Kingdom and France), the Gulf of St Lawrence (Canada and France), the North Sea (Germany, the Netherlands and Denmark) and the Oder Bight (Germany and Poland). Disputes still unresolved include the Timor Sea (Australia and East Timor) and the Spratly Islands (the Philippines, Vietnam and China). For a discussion of this area of law, see E D Brown, *Sea-Bed Energy and Minerals: The International Legal Regime*, Martinus Nijhoff, Dordrecht, 1992, Vol 1, 'The Continental Shelf'.

[13] See R Higgins, 'Abandonment of Sites and Structures: Relevant International Law' (1993) 11 *J Energy and Natural Resources Law* 6; R Bond, 'Abandonment and Reclamation of Energy Resource Sites and Facilities: A Joint Venturer's Perspective' (1993) 11 *Oil and Gas Law and Taxation Rev* 227.

[14] UN Doc. A/CONF/48/14/REV 1.

[15] This area of international law is discussed in J Setear, 'Ozone, Iteration and International Law' (2000) 40 *Va J Int L* 193; L Thorns, 'Comparative Analysis of International Regimes on Ozone and Climate Change With Implications for Regime Design' (2003) 41 *Columbia J Transnational L* 795; T C Faries, 'Clearing the Air: An Examination of International Law on the Protection of the Ozone Layer' (1990) 28 *Alberta L Rev* 818; Birnie and Boyle, *International Law and the Environment*, (2nd edn 2002), at 517–23; A Enders and A Porges, 'Successful Conventions and the Conventional Success: Saving the Ozone Layer', in K Anderson and R Blackhurse (eds), *The Greening of World Trade Issues* (1992), at 131; D Doolittle, 'Understanding the Ozone Depletion: The Meandering Road to the Montreal Protocol and Beyond' (1989) 16 *Ecology LQ* 408.

[16] UNDP et al, *World Energy Assessment*, at 66.

Environment and Development in its 1987 report, *Our Common Future*.[17] This report was the culmination of international research and investigation into the state of the global environment. The 21-member Commission, chaired by Norwegian Prime Minister, Gro Harlem Brundtland, heard evidence from public meetings held on all five continents over 3 years. The Report included environmental strategies for achieving sustainable development by the year 2000 and beyond, and was hailed by the United Nations Environment Programme as the most important document of the decade.

The Brundtland Report defined ecologically sustainable development as 'development which meets the needs of present generations without compromising the ability of future generations to meet their needs'. Various other definitions have been offered in national and state legislation. One of the most comprehensive is that in the *Aquaculture Act 2001* (SA), s 4:

(1) Development is 'ecologically sustainable' if it is managed to ensure that communities provide for their economic, social and physical well-being while –
   (a) natural and physical resources are maintained to meet the reasonably foreseeable needs of future generations; and
   (b) biological diversity and ecological processes and systems are protected; and
   (c) adverse effects on the environment are avoided, remedied or mitigated.

(2) In making decisions as to whether development is ecologically sustainable or to ensure that development is ecologically sustainable
   (a) long-term and short-term economic, environmental, social and equity considerations should be effectively integrated; and
   (b) if there are threats of serious or irreversible environmental harm, lack of full scientific certainty should not be taken to justify the postponement of decisions or measures to prevent the environmental harm.[18]

The majority of the legal instruments relating to environmental aspects of energy law have been developed since 1987 and represent the application of sustainable development principles. Some of the earlier instruments, however, predate the Brundtland Report. We will now consider the most important of these energy-related instruments in chronological sequence, dealing first with relevant conventions and then with non-binding, 'soft law' declarations. First, however, we must examine whether customary international law has a role to play in this area.

[17] World Commission on Environment and Development, *Our Common Future*, Oxford University Press, Melbourne, 1987.
[18] See also *Sustainable Forests (Timber) Act 2004* (Vic), ss 3, 5; *Resource Management Act 1991* (NZ), s 5(2). For a definition of sustainable development in international legal instruments, see the Rio Declaration on Environment and Development, principles 1, 8, 9, 10, 12 and 15.

3.2 Customary international law

There are three widely accepted principles of customary international law that appear to have potential application in this area. First, the duty to prevent and control environmental harm requires States to take adequate steps to control and regulate sources of serious global pollution or transboundary harm within their territory or subject to their jurisdiction. The origins of such a duty are the *Trail Smelter* decision[19] and Principle 21 of the 1972 Stockholm Declaration on the Human Environment.[20] In the *Trail Smelter* arbitration the tribunal held that 'no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another of the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence'.[21] Principle 21 of the Stockholm Declaration affirms the sovereign right of States to exploit their own resources pursuant to their own environmental policies and their responsibility to 'ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or to areas beyond the limits of national jurisdiction'. Principle 21 was regarded by many States present at the Stockholm Conference, and subsequently by the UN General Assembly, as reflecting customary international law.[22] Its content has been included in a number of later instruments, including UNCLOS, article 194(2), the 1985 ASEAN Convention on the Conservation of Nature and Natural Resources, article 20,[23] and in the Preamble of the United Nations Framework Convention on Climate Change. Principle 21 has been restated in the 1992 Rio Declaration. As applied in subsequent treaties and resolutions,[24] the Principle recognises a duty to prevent harm rather than merely make reparation for environmental damage. The Principle has been highly influential in later international developments. Older formulations of the 'no harm' principle dealt only with transboundary harm to other States, but conventions and declarations subsequent to the Stockholm Declaration support international acceptance of the protection of global common areas.[25] The International Court of Justice has confirmed in the 1997 *Gabçikovo-Nagymaros* (Hungary v Slovenia) decision that the duty not to cause transboundary environmental harm is a duty under general international law.[26]

[19] (1941) 35 AJIL 684. See also the *Corfu Channel* case (1949) ICJ Rep 1.
[20] UN Doc. A/CONF/48/14/REV 1. [21] (1941) 35 AJIL 684 at 716.
[22] On this subject, see e.g. L Sohn, 'The Stockholm Declaration on the Human Environment' (1973) 14 *Harvard LJ* 423 at 485–93. See also UNGA Res 2996 (XXVII) (1972).
[23] (1985) 15 EPL 64.
[24] See, for example, Final Act, Conference on Security and Cooperation in Europe, Helsinki, August 1976; Preliminary Declaration of a Programme of Action of the European Communities in respect to the Environment (1973) O.C.J. 112/1.
[25] See e.g. 1982 UNCLOS, arts 145, 209; Convention for the Regulation of Antarctic Mineral Resources Activities (27 ILM 868); 1991 Protocol to the Antarctic Treaty on Environmental Protection (30 ILM 678).
[26] (1997) ICJ Rep 7; discussed in P Bekker, (1998) 92 *American J Int L* 273; A Koe, 'Damming the Danube: The International Court of Justice and the Gabçikovo-Nagymaros Project' (1998) 20 *Sydney L Rev* 612; P Taylor, 'Case Concerning the Gabçikovo-Nagymaros Project: A message from The Hague on Sustainable Development' (1999) 3 *New Zealand J Environmental L* 109. See also the Advisory Opinion of the ICJ in *the Nuclear Weapons* case (1996) ICJ 226.

This first principle might initially appear to be an effective means of ensuring that adequate controls exist at international level to prevent individual States causing pollution to neighbouring States in all energy-related contexts. However, the precise scope of the legal duty to prevent transboundary pollution is not clear. Uncertainties exist on a number of matters. For example, it is not clear whether the obligation is one of due diligence or absolute prevention of harm;[27] moreover, the type and degree of harm from which States must be protected is not settled.[28] Although it is possible to talk generally of an international obligation not to harm the environment of other States, it is not possible to define precisely the content of the obligation. The duty must be examined individually as it applies to each type of environmental activity or harm.

Second, there is a duty of transboundary cooperation in the control of transboundary environmental risks.[29] This principle is supported in part by the law relating to the use of shared natural resources and requires prior consultation based on adequate information.[30] Pursuant to Principle 24 of the Stockholm Declaration, the duty extends to the case of management of transboundary or global environmental risks posed by hazardous or potentially harmful activities. These presumably include, *inter alia*, nuclear installations near borders and long-range transboundary air pollution. In addition to the Stockholm Declaration, some measure of prior notification and consultation has been called for in certain treaty regimes and in the environmental strategies of UNEP and other international bodies.[31]

Identical procedural obligations will not apply to each case of environmental risk. The risk of harm must be significant or appreciable, and the obligation will depend on the circumstances of each case. For example, the obligation to consult about nuclear power stations has been narrowly construed by State practice and applies only to installations within 30 km of a State border.[32] The duty imposes an obligation to negotiate in good faith but there are no substantive limitations on activities, such as a prohibition on the installation of nuclear facilities.[33]

Third, the duty of notification and cooperation in an environmental emergency is also widely accepted as customary law. State practice, case law, treaties and resolutions of international bodies support the existence of an obligation

[27] According to Birnie and Boyle, *International Law and the Environment*, at 113: 'Treaty formulations and the work of the ILC overwhelmingly favour the due diligence interpretation of states' primary environmental obligations'.
[28] See Birnie and Boyle, *International Law and the Environment*, at 94–102.
[29] For illustrations of State practice on this point, see the *Lac Lanoux* arbitration (1957) 24 ILR 101; *Nuclear Test Cases* (Australia v France) (1973) ICJ Rep 99; (1974) ICJ Rep 253; (New Zealand v France) (1973) ICJ Rep 135; (1974) ICJ Rep 457.
[30] See e.g. G Handl, 'The Principle of "Equitable Use" as applied to Internationally Shared Natural Resources: Its Role in Resolving Potential International Disputes over Transfrontier Pollution' (1978) 14 *Revue belge de droit international* 40; A Utton, 'International Environmental Law and Consultation Mechanisms' (1973) 12 *Columbia J Transnational L* 56.
[31] See, for example, 1982 UNCLOS, Articles 204–206; Convention for the Regulation of Antarctic Mineral Resource Activities (1988) 27 ILM 868; Protocol to the Antarctic Treaty on Environmental Protection (1991) 30 ILM 1461.
[32] See, for example, 1977 Denmark–Federal Republic of Germany Agreement Regulating the Exchange of Information on the Construction of Nuclear Installations along the Border (1978) 17 ILM 274.
[33] Birnie and Boyle, *International Law and the Environment*, at 128.

to give timely notification to States at risk of transboundary environmental harm to enable them to take measures for self-protection and minimisation of damage.[34]

Other principles relevant to the international control of energy-based pollution are in the process of evolving in international environmental law. These include the precautionary principle; the principle of sustainable development; intergenerational equity; transfer of technology; and, more controversially, the right to a decent environment.[35]

While these various principles outlined above have application in the energy context in relation to atmospheric pollution, they are as yet insufficiently developed and defined to address adequately the environmental difficulties concerning nuclear radiation, acid rain, ozone depletion and climate change. The area where custom is perhaps of least assistance is that of climate change. It is possible to argue that the 'no harm' principle in customary international law applies to protection of the global atmosphere. This point is made by Birnie and Boyle who draw together different instruments which regulate activities affecting the atmosphere and argue that a duty of 'no harm' exists. To begin with, Principle 21 of the Stockholm Declaration forms the basis for the long-range air pollution treaties and for various provisions of the 1982 UN Convention on the Law of the Sea. Although the global environment is not an area 'beyond the limits of national jurisdiction' and hence within the exact terms of Principle 21, Birnie and Boyle argue that it should, by analogy, fall within the protection afforded by international law to common areas such as the high seas.[36] Further support for the application of the 'no harm' principle to climate change is the 1977 Convention on the Prohibition of Military or Other Hostile Use of Environmental Modification Techniques, which indicates State concern regarding the hostile modification of the atmosphere. In addition, the 1980 UNEP Principles of Co-operation in Weather Modification recommend that weather modification activities should only be carried out in 'a manner designed to ensure that they do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction'.

Birnie and Boyle conclude that customary international law may provide some legal constraint on the conduct of activities likely to result in global climate change. However, there is no standard of due diligence that can be applied. The standards of due diligence contained in the Long-Range Transboundary Air Pollution Convention and the Ozone Convention cannot necessarily be generalised into customary law. The most telling argument against the customary rule applying to global climate change is the lack of consensus among States on the

[34] See, for example, *Corfu Channel* case (1949) ICJ Rep 22; 1982 UNCLOS, Articles 198, 211(7); 1989 Basel Convention on the Control of Transboundary Movement of Hazardous Waste, Article 13; 1976 Convention on the Protection of the Rhine Against Chemical Pollution, Article 11.

[35] For a discussion of emerging principles of international environmental law, see H Hohmann, *Precautionary Legal Duties and Principles of Modern International Environmental Law*, Graham & Trotman, London, 1994; A Kiss and D Shelton, *International Environmental Law*, Transnational Publishers Inc, New York, 3rd edn 2004, ch 5.

[36] Birnie and Boyle, *International Law and the Environment*, at 502.

need to reduce greenhouse gases and the extent of the required reductions. This indicates that the uniformity required to form a new rule of custom is lacking.

3.3 Conventions

3.3.1 The Acid Rain Convention

Acid rain is caused primarily by coal burning, which occurs mostly in power stations.[37] The problem varies in gravity around the world, depending on geography and climatic conditions, the incidence of coal-fired power stations and the sulphur content of the coal consumed. In the 1960s and 1970s the problem became of acute concern in the eastern part of North America, where Canadian forests have suffered as a consequence of airborne sulphur from power stations in the Mid-West of the United States, which burn high sulphur-content locally produced coal. In the Asia-Pacific region China is the most affected country.

The 1979 Convention on Long-Range Transboundary Air Pollution[38] is the one major international agreement regulating the emissions of substances that cause acid rain. It is the first multilateral convention that seeks to regulate the environmental consequences of energy production. The treaty is a framework Convention that provides the basic obligation of protecting humankind and the environment from air pollution. The specific obligations are contained in five Protocols to the Convention. Article 2 of the Convention states that the Parties 'are determined to protect man and his environment against air pollution', and goes on to provide that the Parties 'shall endeavour to limit and, as far as possible, gradually reduce and prevent air pollution including long-range transboundary air pollution'. Pursuant to articles 3–9, the Convention obliges Parties to develop and review policies and strategies on combating the discharge of air pollutants; engage in research and monitoring; exchange information on policies, scientific activities and technical measures; enter into early consultations; and implement and further develop the Co-operative Programme for the Monitoring and Evaluation of Long-Range Transboundary Air Pollution in Europe (EMEP).

In order to combat air pollution, article 6 requires the Parties to develop best policies and strategies, including air quality management systems and control measures. However, this requirement is stated to apply only to 'new or rebuilt installations'. The measures adopted are to be 'compatible with balanced

[37] For a general discussion of the problem of acid rain, see UNDP et al, *World Energy Assessment*, ch 3; C C Park, *Acid Rain: Rhetoric and Reality*, Methuen, London, 1987; H Dowlatabadi and W Harrington, 'Policies for the Mitigation of Acid Rain: A Critique of Evaluation Techniques' (1989) 17 *Energy Policy* 116; D P Adams and W P Page, *Acid Deposition: Environmental, Economic and Policy Issues*, Plenum Press, New York, 1985. For a discussion of the legal problems associated with acid rain, see e.g. N Fichthorn, 'Command-and-Control vs the Market: The Potential Effects of Other Clean Air Act Requirements on Acid Rain Compliance' (1991) 21 *Env L* 2069; J L Regens and R W Rycroft, 'Options for Financing Acid Rain Controls' (1986) 26 *Natural Resources J* 519; A Brunee, *Acid Rain and Ozone Layer Depletion*, Transnational Publishers, New York, 1988, at 225ff.

[38] (1979) 18 ILM 1442 (in force 1 June 1982).

development' and only the 'best available technology which is economically feasible' is to be used. This means that environmental protection is dependent on economic factors.

An Executive Body, comprised of representatives of the Contracting Parties, has been created by article 10 of the Convention. The Body meets annually and, *inter alia*, reviews the implementation and development of the Convention.

Of the four Protocols which have been developed to support the Convention, three are particularly relevant to the regulation of emissions that cause acid rain. These are the 1985 Protocol on the Reduction of Sulphur Emissions or Their Transboundary Fluxes by at least 30 Per Cent (Helsinki);[39] the 1988 Protocol concerning the Control of Emissions of Nitrogen Oxide or Their Transboundary Fluxes (Sofia);[40] the 1994 Protocol on Further Reduction of Sulphur Emissions (Oslo),[41] and the 1999 Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone (Gothenburg).[42]

The 1985 Protocol on the Reduction of Sulphur Emissions is a relatively simple document. Article 2 imposes a flat rate reduction in sulphur emissions or their transboundary fluxes of 30% for each Party ratifying the Protocol. Three other duties aimed at reducing emissions are contained in the Protocol. First, by article 4 each Party must annually report its annual sulphur emissions and the basis of calculation to the executive body. Second, pursuant to article 6, each Party must develop without undue delay national programs, policies and strategies to serve as a means of reducing sulphur emissions or their transboundary fluxes by at least 30% by 1993 and report thereon to the executive body. Third, article 3 of the Protocol obliges the Parties to study at the national level the necessity for further reductions beyond the initial 30% reduction when environmental considerations warrant.

The 1985 Protocol on Sulphur Reductions did not apply to the control of nitrogen oxide, another pollutant that causes acid rain. This omission is addressed in the 1988 Protocol concerning the Control of Emissions of Nitrogen Oxide or Their Transboundary Fluxes. Article 2.1 of this Protocol requires Parties to reduce their national annual emissions of nitrogen oxides or their transboundary fluxes of such emissions to 1987 levels by the end of 1994. By article 2.2, the Parties must apply national emission standards to major new stationary sources and new mobile sources based on the best available technologies which are economically feasible, and are obliged to introduce pollution control measures for major existing stationary sources.

The 1988 Protocol is noteworthy for being the first of the Protocols established under the Convention to employ the 'critical loads' approach, rather than a percentage-based approach, to the reduction of emissions. 'Critical load' is defined in article 1.7 as meaning 'a quantitative estimate of the exposure to one or more pollutants below which significant harmful effects on specified sensitive

[39] (1988) 27 ILM 707. In force 2 September 1987.
[40] (1988) 27 ILM 698. In force 14 February 1991.
[41] (1994) 33 ILM 1540.
[42] EMuT 979:84/H.

elements of the environment do not occur according to present knowledge'. The approach requires the setting of environmental goals and the linking of these goals to the required emission reductions. The current deposition levels and the natural characteristics of the affected areas are first determined, following which critical values and corresponding objectives are then recommended and are converted into the necessary emission reductions by the use of EMEP computer model calculations.[43] The approach appears preferable to flat rate reductions for several reasons: it can take regional peculiarities into account; it avoids the arbitrary establishment of reduction rates and reference years by taking into account environmental goals and cost-benefit calculations; and it forms a good base for the coordination of national strategies.[44] The 'critical loads' approach was subsequently adopted in the 1991 Protocol Concerning the Control of Emissions of Volatile Organic Compounds or Their Transboundary Fluxes[45] and the 1994 Protocol on Further Reduction of Sulphur Emissions.

The 1988 Protocol obliges the Parties, no later than 6 months after the date of entry into force of the Protocol, to commence negotiations on further steps to reduce annual emissions, taking into account the best available scientific and technological development and internationally accepted critical loads (article 2.3). To that end, the Parties must cooperate to establish critical loads, reductions based on the loads and measures and a timetable for achieving the reductions.

The Protocol contains a number of other obligations. By article 3.1, the Parties must facilitate the exchange of technology to reduce emissions, particularly through the promotion of commercial exchanges, direct industrial contact and cooperation including joint ventures, exchange of information and experience, and the provision of technical experience. No later than 6 months after the date of entry into force of the Protocol the Parties must commence consideration of procedures to create more favourable conditions for the exchange of technology to reduce emissions of nitrogen oxides (article 3.3). Pursuant to article 4, as soon as possible and no later than 2 years after entry into force of the Protocol, the Parties must make unleaded fuel sufficiently available, in particular cases as a minimum along main international transit routes. In addition, articles 5–8 require the Parties to regularly review the Protocol taking into account the best scientific substantiation and technological development, give high priority to research and monitoring based on the critical loads approach, develop without undue delay national programs, policies and strategies to implement obligation, and report annually to the Executive Body.

The 1994 Protocol on Further Reduction of Sulphur Emissions imposes additional sulphur reduction requirements. Like the 1988 Protocol, the critical loads approach is used to determine reduction targets for each Party. There are a number of basic obligations contained in article 2 under which the Parties must reduce their emissions in accordance with requirements set out in various

[43] Hohmann, *Precautionary Legal Duties*, at 287. [44] Ibid. [45] (1992) 31 ILM 568.

Annexes. For example, pursuant to article 2.2, as a minimum the Parties must reduce and maintain their annual sulphur emissions with the timing and levels specified in Annex II. Annex II provides goals for sulphur emissions reduction, which are specific to each country. Unlike the 1985 Protocol, emission limits are required by article 2.5 for new and existing major stationary combustion sources.[46]

The Protocol also provides in article 2.3 for the designation in Annex III of Sulphur Oxides Management Areas (SOMAs) in critical areas, the first such declared area being south-east Canada. Where transboundary flows can be traced to emissions from a particular area within a country's jurisdiction, that area may be designated a SOMA. If the only emissions contributing to acidification are from an area listed as a SOMA in the Protocol, then the Party must as a minimum reduce and maintain its annual sulphur emissions *in the area so listed* (that is, not for the nation as a whole) in accordance with the timing and levels specified in Annex II.

In order to implement the basic obligations listed in article 2 of the 1994 Protocol, each Party is required by article 4 to adopt national strategies, policies and programs no later than 6 months after the Protocol enters into force and must take and apply national measures to control and reduce its sulphur emissions. The Protocol also contains in articles 2–9 other obligations relating to the exchange of technology, reporting requirements, research, development and monitoring, compliance, the review of existing obligations, continued negotiations on reductions, and the settlement of disputes.

The 1994 Protocol incorporates in its Preamble references to recently developed international principles such as the precautionary principle and the concept of sustainable development. It is noteworthy that energy has assumed a far more prominent role in this Protocol than in the others. Energy conservation and renewable energy are explicitly mentioned in the Protocol. By article 2.4, the Parties must make use of the most effective measures for the reduction of sulphur emissions appropriate in their particular circumstances, for new and existing sources, including measures to increase energy efficiency and to increase the use of renewable energy. By article 3, the Parties must, consistent with their national laws, regulations and practices, facilitate the exchange of technologies and techniques, including those that increase energy efficiency and the use of renewable energy. There is also an obligation in article 6(e) to encourage research, development, monitoring and cooperation related to energy technologies, and to encourage techniques to enhance energy efficiency, energy conservation and the use of renewable energy.

The most recent agreement under the 1979 Convention is the 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone,[47]

[46] A stationary combustion source is defined in Article 1.14 to mean 'any technical apparatus or group of technical apparatus that is co-located on a common site and is or could be discharging waste gases through a common stack, in which fuels are oxidized in order to use the heat generated'.
[47] EMuT 979:84/H.

which recently entered into force on 17 May 2005. Currently there are only 16 State Parties, consisting of the United States, the European Union and a number of European States.

The 1999 Protocol aims to cut emissions of four pollutants: sulphur dioxide, nitrogen oxides, volatile organic compounds (VOCs) and ammonia, by setting country-by-country emission ceilings to be achieved by the year 2010. It is based on the critical loads approach with different requirements for different countries. The requirements were adopted according to cost-effectiveness; that is, to achieve specified environmental targets at the lowest overall cost for Europe as a whole. The Protocol is of specific relevance to energy as the Protocol sets tight limits for specific emission sources, including electricity generation and road transport. Guidance documents adopted with the Protocol specify a large range of abatement techniques and economic instruments designed to reduce emissions in the relevant sectors.[48] According to the United Nations Economic Commission for Europe, the effect of the Protocol will be to reduce the area in Europe with excessive levels of acidification from 93 million hectares in 1990 to 15 million hectares and to halve the number of days with excessive ozone levels.[49]

3.3.2 Nuclear energy conventions

Unlike acid rain, which is an inevitable consequence of high sulphur coal burning, nuclear radiation is normally contained within the reactor itself and only becomes a problem when the safeguards malfunction. When problems arise, however, the effects can be devastating. The widespread international impact of atmospheric contamination of nuclear radiation was dramatically highlighted by the Chernobyl incident in 1986, when significant nuclear fall-out was reported as far away as Sweden and Scotland.[50]

A number of treaties apply to various aspects of nuclear energy use. However, international regulation in this area has been less stringent than in the case of other environmentally hazardous activities such as oil pollution. There are numerous bilateral agreements and a number of regional agreements relating to nuclear safety. These deal with concerns such as the exchange of information and assistance in an emergency.[51] This section will concentrate primarily on

[48] United Nations Economic and Social Council, Doc. EB.AIR/1999/2 (11 October 1999). Available at <www.unece.org/env/documents/1999/eb/eb.air.1992.2e.pdf> (accessed 16 March 2005).
[49] <www.unece.org/env/lrtap/multi_h1.htm> (accessed 16 March 2005).
[50] International environmental law relating to nuclear energy is discussed in numerous articles. The best known include: B Kunth, 'International Aspects of Nuclear Installations Licensing' (1987) 5 *J Energy and Natural Resources Law* 202; A E Boyle, 'Nuclear Energy and International Law: An Environmental Perspective' [1989] *British Yearbook of International Law* 257; Birnie and Boyle, *International Law and the Environment*, ch 9; P Cameron et al, *Nuclear Energy Law After Chernobyl*, Graham & Trotman, London, 1988; L A Malone, 'The Chernobyl Accident: A Case Study in International Law Regulating State Responsibility for Transnational Nuclear Pollution' (1987) 12 *Columbia J Environmental Law* 203.
[51] Regional agreements include the Council of European Communities Decision of 14 December 1987 on Community Arrangements for the Early Exchange of Information in the Event of a Radiological Emergency; the Nordic Mutual Emergency Assistance Agreement in Connection with Radiation Accidents 1963; and the Criteria for the Levels of Radioactive Releases from Nuclear Power Plants into the Environment at which it is Necessary to Inform the Other CMEA Member Countries 1984.

a discussion of the multilateral agreements between the member countries of the International Atomic Energy Agency (IAEA) regulating the safety of nuclear installations.[52]

3.3.2.1 Conventions relating to nuclear safety standards and State responsibility

The IAEA was established in 1957 by the Statute of the International Atomic Energy Agency.[53] Pursuant to article II, its primary objective is 'to accelerate and enlarge the contribution of nuclear energy to peace, health and prosperity throughout the world'. The Agency also has a duty to establish and administer safety standards, but as this is stated in article III.A.6 to be a 'function' rather than an 'objective', it is clearly a secondary role. The prevalent belief at the time of the establishment of the IAEA was that the risks of nuclear power could be managed successfully by national governments. The IAEA has no power to enforce safety standards under the Statute. The standards adopted have been influential as guidelines for States because their preparation reflects technical and expert consensus arising from consultation with governments and specialist bodies, but have no legal significance. The IAEA has only very limited powers to inspect the safety conditions of nuclear installations.[54]

The minimal powers of the IAEA and other international institutions[55] to enforce safety standards led one commentator to state:[56]

> International regulation of the safety of nuclear power, and its potential environmental impact, is among the weakest examples of the regulation of major ultra-hazardous transboundary environmental risks. It gives minimal assurance of common standards, offers limited international inspection and oversight, and leaves to governments a largely unfettered discretion to determine their own balance of safety measures and economic interest. Moreover, it relies heavily on voluntary compliance.

The damage caused by the explosion at Chernobyl cast doubts on the adequacy of existing national and international regulation of nuclear facilities. Since then the 'environmental' role of the IAEA has assumed a new dimension. In September 1991 the IAEA convened an International Conference on the Safety of Nuclear Power. As a result of the conference, the Convention on Nuclear Safety was developed and opened for signing in Vienna on 20 September 1994.[57] It entered into force on 24 October 1996.

[52] See generally, I A Kacem, 'Safety of Nuclear Installations, Spent Nuclear Fuel and Radioactive Waste Management in the European Union: A Legal Analysis' (2004) 13 *European Environmental L Rev* 109; S R Helton, 'The Legal Problems of Spent Nuclear Fuel Disposal' (2002) 23 *Energy L J* 179.
[53] 8 UST 1092;TIAS 3873. In force 29 July 1957.
[54] See A Boyle, 'Nuclear Energy and International Law: An Environmental Perspective' (1989) 60 *British Yearbook of Int L* 257, at 265–66; N L Horbach, 'Assistance Programmes of the International Atomic Energy Agency to the CEEC/NIS', in N L Horbach (ed.), *Contemporary Developments in Nuclear Energy Law*, Kluwer Law International, 1999, at 448ff.
[55] Other international institutions concerned with nuclear safety include EURATOM, the OECD Nuclear Energy Agency and the ILO.
[56] Boyle, 'Nuclear Energy', at 269.
[57] (1994) 33 ILM 1518. See generally Horbach, *Contemporary Developments*, at 89–132, and the introductory note by P Szasz, 'International Atomic Energy Agency: Convention on Nuclear Safety' (1994) 33 ILM 1514.

The Convention reaffirms in paragraph (iii) of its Preamble that responsibility for nuclear safety rests in the State having jurisdiction over a nuclear installation. By article 3, the Convention applies to the safety of 'nuclear installations'. 'Nuclear installation' is described in article 2(i) for the purposes of the Convention as 'any land-based civil nuclear power plant . . . including such storage, handling and treatment facilities for radioactive materials as are on the same site and are directly related to the operation of the nuclear power plant'. The Convention does not cover the safety of military and non land-based facilities.

Article 4 of the Convention obliges each Party to take, within the framework of its national law, the legislative, regulatory and administrative measures and other steps necessary for implementing its obligations under the Convention. States are obliged by article 7 to establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations; such framework must provide for the establishment of national safety requirements and regulations, a system of compulsory licensing with regard to nuclear installations, a system of inspection and assessment of nuclear installations to ascertain compliance by operators, and the enforcement of applicable regulations and licence terms, including suspension, modification or revocation. Pursuant to article 9, the primary responsibility for the safety of a nuclear installation rests with the holder of the relevant licence, and each State must take steps to ensure the licence-holder meets its responsibility.

By article 8, each Contracting Party must establish or designate a regulatory body to implement the legislative and regulatory framework referred to in article 7, and must provide the body with adequate resources and authority to fulfil its responsibilities. The functions of this body must be separated from any other body or organisation concerned with the promotion or utilisation of nuclear energy.

The Convention addresses the safety of existing nuclear installations. Article 6 provides:

> Each Contracting Party shall take the appropriate steps to ensure that the safety of nuclear installations existing at the time the Convention enters into force for that Contracting Party is reviewed as soon as possible. When necessary in the context of this Convention, the Contracting Party shall ensure that all reasonably practicable improvements are made as a matter of urgency to upgrade the safety of the nuclear installation. If such upgrading cannot be achieved, plans should be implemented to shut down the nuclear installation as soon as practicably possible. The timing of the shut-down may take into account the whole energy context and possible alternatives as well as the social, environmental and economic impact.

A number of general and specific safety considerations that must be taken into account in the operation of nuclear installations are set out in the Convention. The Parties are not obliged to ensure compliance with the IAEA standards. Rather, pursuant to paragraph (viii) of the Preamble, the Convention entails a commitment to the 'application of fundamental safety principles for nuclear installations

rather than that of detailed safety standards'. Article 5 requires each Party to submit to periodic review a report on the measures it has taken to implement each of the obligations under the Convention. By article 21, this must occur at least once every 3 years. If any Party fails to adopt IAEA safety standards, then arguably it would need to explain how the alternative measures undertaken have achieved adequate safety.

According to one legal commentator, while the Convention does not create a clearly binding regime:

> it does establish for the Parties a system of accountability which may gradually impose the necessary substantive international safety standards on the nuclear industry. These standards may gradually come to constitute the basis for international liability should a Party fail to observe the weak substantive provisions of the Convention or its procedural requirements, or even if it should, without adequate reason, resist critical observations as to its procedures made at the review meetings.[58]

The 1994 Convention has been followed by the Joint Convention on Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, adopted on 5 September 1997.[59] The need for this latter Convention had been foreshadowed by the Contracting Parties in the Preamble to the Nuclear Safety Convention.

The Convention contains provisions relating to the safety of spent fuel management (chapter 2), the safety of radioactive waste management (chapter 3), general safety provisions (chapter 4) and the mechanism for implementation (chapter 6). By article 3, the Convention concerns the safety of spent fuel and radioactive waste management when these result from the operation of civilian nuclear reactors or civilian applications. Excluded from the scope of the Convention are waste that only contains naturally occurring radioactive materials, waste that does not originate from the nuclear fuel cycle, and spent fuel and radioactive waste within military or defence programs.

Article 4 of the Convention requires State Parties to take appropriate action to achieve the following objectives:

- to ensure that criticality and the removal of residual heat generated during spent fuel management are adequately addressed;
- to ensure that the generation of radioactive waste associated with spent fuel management is kept to the minimum practicable;
- to take into account interdependencies among the different steps in spent fuel management;
- to provide for the effective protection of individuals, society and the environment;
- to take into account the chemical, biological and other hazards that may be associated with spent fuel management; and

[58] Ibid, at 1516.
[59] IAEA Docs GOV/INF/821, GC(41)/INF/12 of 22 September 1997 and GC(41)/INF/12/Corr.1 of 1 October 1997. This Joint Convention is discussed in P Cameron, 'Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management', in Horbach (ed), *Contemporary Developments*, at 117ff. See also S R Helton, 'The Legal Problems of Spent Nuclear Fuel Disposal' (2002) 23 *Energy LJ* 179.

- to aim to avoid actions that may impose reasonably predictable impacts upon future generations greater that those permitted for the current generation, and to aim to avoiding imposing undue burdens on future generations.

The compliance system under this Convention is based on peer review. The Parties are required to report on the measures that they have taken to implement the terms of the Convention. Article 32 requires the Parties to submit national reports to the review meeting about nuclear safety practice and article 33 obliges the Parties to participate in these meetings. The details of the national reports are specified.

As for implementation, by article 19 each Party is required to establish and maintain a legislative and regulatory framework to control the safety of spent fuel and radioactive waste management. This must establish applicable national safety regulations and requirements for radiation safety, must set up a system for licensing spent fuel and radioactive waste management and ensure that such operations are prohibited without a licence. Further, each Party must establish a system for regulatory inspection, documentation and reporting and appropriate institutional control, together with a clear allocation of responsibilities between the appropriate instrumentalities involved in the management of spent fuel and radioactive waste management. Article 20 specifies that the requirements are to be fulfilled by setting up a regulatory body to be entrusted with the implementation of the provisions contained in article 19. Various rules in relation to radiation protection and emergency preparedness are also specified in articles 24 and 25.

Finally, the Convention regulates in article 27 the transboundary movement or shipment of spent fuel or radioactive waste from a State of origin to a State of destination, in accordance with the IAEA Code of Practice on International Transboundary Movement of Radioactive Waste.[60] The Convention recognises the sovereign right of Parties to prohibit the movement of radioactive waste into, from or through its territory, and obliges Parties to take steps to ensure that such movement is undertaken in a manner consistent with the provisions of the Convention and other binding international instruments. Various procedural requirements for the shipment of spent fuel or radioactive waste are specified.[61]

3.3.2.2 Nuclear emergencies conventions

A feature of the Chernobyl disaster was the delay by the USSR in notifying other nations likely to be adversely affected by the accident. It is generally considered that some of the adverse effects could have been avoided if the USSR had promptly notified the world community of the nature of the incident and had sought immediate assistance from other States.[62] This realisation led to the

[60] Resolution GC(XXXIV)/RES/530, adopted on 21 September 1990.
[61] See P Cameron et al, *Nuclear Energy Law after Chernobyl*, at 124–5.
[62] See generally P Cameron, 'The Vienna Convention on Early Notification and Assistance', in P Cameron et al, *Nuclear Energy Law After Chernobyl*, Graham & Trotman, London, 1988; D Stuckey, 'Early Notification of a Nuclear Accident: The Response to Chernobyl' (1988) 14 *Brooklyn J Int L* 687.

Convention on Early Notification of a Nuclear Accident[63] and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency,[64] both signed in Vienna on 26 September 1986.

The Convention on Early Notification of a Nuclear Accident, by articles 1 and 2, imposes on a State Party a duty to notify other States in the case of accidents involving facilities or activities of the State Party or of persons or legal entities under its jurisdiction or control. The duty arises where a release of radioactive material occurs or is likely to occur and which has resulted or may result in an international transboundary release of 'radiologically safety significance' for another State. The State must also provide information on the occurrence, which will minimise the radiological consequences to other States. The information that is to be provided is specified in detail in article 5 of the Convention.

The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency is intended to provide a framework for the organisation and provision of assistance by State Parties and/or the IAEA to any Party requesting assistance. The Convention provides in article 1.1 that 'the States Parties shall co-operate between themselves and with the International Atomic Energy Agency . . . to facilitate prompt assistance in the event of a nuclear accident or radiological emergency to minimise its consequences and to protect life, property and the environment from the effects of radioactive releases'.

Pursuant to article 2.1, a State Party may call for assistance from any other State Party, whether or not the accident or emergency originates within its territory, jurisdiction or control. Although any State is entitled to ask for assistance, there is no obligation upon a State to seek assistance or stem the emergency. Where assistance is provided, its overall direction, control, coordination and supervision of the assistance are the responsibility of the requesting State (article 3).

A major feature of the Convention is that it facilitates but does not require any State Party to provide assistance to another. Upon a State Party receiving a request for assistance, that Party has an obligation to decide promptly and notify the requesting State whether it is in a position to render the assistance requested and the scope and terms of the assistance that might be rendered. This falls well short of an obligation to render assistance. By articles 8 and 10, the Convention grants to assisting States and their personnel immunity from legal proceedings brought by the requesting State and an indemnity from proceedings brought by others.

3.3.3 Climate Change Convention and Kyoto Protocol

Climate change has the potential to be the most serious of all the problems of atmospheric pollution in terms of global environmental impact.[65] A variety of

[63] (1986) 25 ILM 1370. In force 27 October 1986.
[64] (1986) 25 ILM 1377. In force 26 February 1987.
[65] The materials on climate change are voluminous. Among the most thoughtful of the recent publications on this subject are V Grover (ed.), *Climate Change: Perspectives Five Years After Kyoto*, Science Publishers Inc,

gases contribute to this problem, including hydrofluorocarbons responsible for the depletion of the ozone layer. Thus, to a certain extent the problems of ozone depletion and climate change are interrelated. By far the greatest problem in the climate change issue, however, is the increasing release of carbon into the atmosphere, the bulk of which results from coal-fired power stations, although the use of oil and gas also makes a significant contribution. Although published statistics differ, all agree that well over half of the climate change problem is caused by energy use and production.

Global climate change formed an important part of the agenda at the Rio Conference largely as a result of the research collated by the Intergovernmental Panel on Climate Change (IPCC). The IPCC was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) due to a concern about increased greenhouse gas emissions and the potential for global climate change. The role of the IPCC is to assess scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. The assessments are based mainly on peer reviewed and published scientific/technical literature.

The IPCC has three Working Groups and a Task Force. Working Group I assesses the scientific aspects of the climate system and climate change, Working Group II assesses the vulnerability of socio-economic and natural systems to climate change, including the negative and positive consequences of climate change, and options for adapting to it, Working Group III assesses options for limiting greenhouse gas emissions and otherwise mitigating climate change, and the Task Force on National Greenhouse Gas Inventories is responsible for overseeing the IPCC's National Greenhouse Gas Inventories Program.[66] The First IPCC Assessment Report was completed in 1990 and played a significant part in persuading the international community to adopt the United Nations Framework Convention on Climate Change (UNFCCC).

Almost 10 years after the adoption of the UNFCCC, the IPCC released its most recent scientific research on climate change in a report entitled IPCC Third Assessment Report – Climate Change 2001.[67] Importantly, climate change science and modelling has improved to such an extent since the Rio Conference that the IPCC is more confident of its predictions. It presented the following collective picture of warming and climate change. Surface temperatures have increased 0.6° over the 20th century, which is the largest increase in the last 1000 years. The 1990s was the warmest decade with 1998 being the warmest year ever recorded. Sea-ice extent decreased 10–15%, and the thickness in Arctic sea-ice

Hamilton, Canada, 2002; M Grubb (ed.), *Energy Policies and the Greenhouse Effect*, Dartmouth Publishing, Aldershot, 1990; J D Scheraga and N A Leary, 'Improving the Efficiency of Policies to Reduce CO2 Emissions' (1992) 20 *Energy Policy* 394; S Boyle, 'A Global Fossil Free Energy Scenario: Towards Climate Stabilisation' (1994) 22 *Energy Policy* 106; R J Swart, 'Climate Targets and Comprehensive Greenhouse Gas Emissions Trading: Reconciling the Desirable and the Feasible' (1993) 17 *Natural Resources Forum* 43; P G Brown, 'Climate Change and the Planetary Trust' (1992) 20 *Energy Policy* 208.

[66] See <www.ipcc.ch/about/about.htm> (accessed 26 July 2005).

[67] Available at <http://www.grida.no/climate/ipcc_tar/> (accessed 16 November 2004).

declined 40% in summer. The global average sea level has risen and ocean heat has increased. Other climate changes have occurred like precipitation, cloud cover, and high and low temperatures.

Emissions of greenhouse gases and aerosols continue to alter the atmosphere to affect climate. The concentration of carbon dioxide has increased 31% since 1750. The current rate of increase is unprecedented in 20,000 years. Three-quarters of the increase in the last 20 years is due to fossil fuel burning. The concentration of methane has increased 151% since 1750, and more than half is anthropogenic. The concentration of N_2O increased 17% and one-third is anthropogenic. Natural factors make a small contribution. Consequently, there is newer and stronger evidence that most of the global warming over the last 50 years is attributable to human activities.

Based on long-term studies of 20 years, the IPCC's Report also pointed to the impact of global climate change including recent regional climate changes, particularly temperature increases, which have already affected many physical and biological systems. These include: the shrinking of glaciers, thawing of permafrost, later freezing and earlier break-up of ice on rivers and lakes, longer growing seasons, shifts of plant and animal ranges, declines in plant and animal populations, earlier flowering of trees, emergence of insects, and egg-laying birds.[68]

Natural systems are vulnerable to climate change and some will be irreversibly damaged because of limited adaptive capacity. Many human systems are also sensitive to climate change and some are vulnerable like water, food security, forestry, coastal zones and marine systems (fisheries), human settlements (sea-level rise and flooding), disease, increased demand for energy, industry, insurance and other financial services.

The IPCC stated that adaptation is a necessary strategy at all scales to complement climate change mitigation efforts. However, those with least resources have least opportunity for adaptation and so are most vulnerable, while vulnerability varies across regions.

3.3.3.1 The United Nations Framework Convention on Climate Change (UNFCCC)

The Preamble to the UNFCCC[69] contained the following principles relevant to energy and sustainable development: that the Earth's climate and adverse effects are a common concern of humankind; that the greenhouse effect will increase warming of the Earth's surface and atmosphere and adversely affect natural ecosystems and humankind, although uncertainties in predictions of climate change were noted; that there is a need for appropriate international response in accordance with common but differentiated responsibilities; that developed countries should take immediate action to develop comprehensive strategies;

[68] Note that anthropogenic climate change has been listed as a key threatening process under Schedule 3 of the *Threatened Species Conservation Act 1995* (NSW).
[69] Available at <http://unfccc.int/resource/docs/convkp/conveng.pdf>.

that the climate system should be protected for present and future generations (intergenerational equity); and that responses to climate change should be co-ordinated with social and economic development. The precautionary principle is also recognised as a guiding principle for all signatories to the UNFCCC. The ultimate objective of the UNFCCC is to achieve stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

The most relevant commitments, for our purposes, are: to develop, update, publish and make available national inventories of anthropogenic emissions and removals of sinks (article 4.1(a)); to enact effective legislation to achieve the objectives of the UNFCCC; to formulate, implement, publish and update national and regional programs to mitigate climate change (article 4.1(b)); to sustainably manage sinks and reservoirs of greenhouse gases (article 4.1(d)); and to take climate change into account when undertaking environmental impact assessments (article 4.1(f)). Developed countries are required to take the lead in reducing emissions by adopting national policies. Parties should also undertake and share appropriate research on global climate change, while educating the public about global climate change and its effects (article 6). The Parties are also required at Conferences of the Parties to regularly review progress made in implementing the UNFCCC.

3.3.3.2 The Kyoto Protocol

At the third Conference of the Parties in 1997, signatories to the UNFCCC met to develop a Protocol for advancing the goals of the Convention. The Protocol is now known as the Kyoto Protocol.[70] It has had a chequered history with negotiations over its implementation failing (at COP 6 at The Hague) and being reinvigorated (in Bonn), only to have the United States and Australia withdraw from the Protocol. This withdrawal has severely undermined international multilateral efforts to curb greenhouse gas emissions. The United States is the largest emitter of greenhouse gases. Australia emits about 1% of the world's greenhouse gases but Australians are among the highest per capita emitters in the world.

The most important feature of the Protocol is that the so-called Annex B parties agreed to specific individual targets for reducing greenhouse gas emissions, so that overall emissions in the first commitment period 2008–12 would be at 5% below 1990 levels. Parties must have achieved demonstrable progress in achieving these targets by 2005. Economies in transition are permitted to use a year other than 1990 as their baseline (article 3).

Under article 3.3, reductions in greenhouse gas emissions resulting from forestry activities, limited to afforestation, reforestation and deforestation since 1990, may be used to meet the commitments of each Party. It was also agreed that, in addition to these, human-induced activities relating to revegetation, forest management, cropland management, and grazing land management could

[70] Available at <http://unfccc.int/resource/docs/convkp/kpeng.html> (accessed 16 November 2004).

be counted towards commitments in the second and subsequent commitment periods.[71] However, a Party may choose to have them counted for its first commitment period, provided that the activities have taken place since 1990. To comply with article 3, Parties must keep an annual inventory of anthropogenic emissions and removals of sinks (article 7). Information in the inventory must be reviewed by expert review teams, selected from those nominated by Parties and intergovernmental organisations. The inventory must provide a thorough and comprehensive technical assessment of all aspects of implementation, including a report on problems with fulfilling commitments. The inventories must be circulated to all Parties (article 8).

Developing countries did not commit themselves to any binding targets under the Protocol, although those that ratified the UNFCCC remain obliged to comply with those commitments. At COP 8 in Marrakesh, new guidelines were adopted to be followed by developing countries, which are required to report on their emissions, and the steps they are taking to meet their commitments under the UN Framework Convention on Climate Change (UNFCCC). The Protocol also provides that developed countries should provide new financial resources to assist developing countries to meet their commitments (article 11).

Quite obviously, Parties must have in place a national system for estimating anthropogenic emissions and the removals of sinks, relying on methodologies that are acceptable to the IPCC. The Parties are required to regularly review and revise their methodologies (article 5). Parties must also formulate cost-effective national and regional programs to mitigate climate change from the energy, transport, industry, agricultural and other sectors. Information on these programs must be submitted to the Conference of the Parties. Parties are also expected to promote strategies for technology transfers, to cooperate in scientific and technical research, and develop education and training programs (article 10).

To actually achieve the Kyoto targets, each Party should implement the following policies and measures: the enhancement of energy efficiency; the enhancement of sinks and reservoirs; sustainable forms of agriculture; research on renewable energy and environmentally sound technologies; reduction of market imperfections; encourage reforms in relevant sectors to reduce greenhouse gases, for example, transport; reduce methane in waste management; and share and exchange information (article 2).

Under the Protocol, Parties must regularly review implementation of the Protocol to assess the environmental, economic and social effects of measures taken as well as cumulative impacts. They must also exchange information on measures taken, and seek cooperation of international, intergovernmental and

[71] See the Report of the Conference of the Parties on the Second Part of its Sixth Session, held at Bonn from 16 to 27 July 2001, at 10, available at <http://unfccc.int/resource/docs/cop6secpart/05a02.pdf> (accessed 16 November 2004). This provision is included in Article 3.4, also known as the 'Australia clause', as it was a concession proposed, and won, by the Australian government in Bonn. The Australian government successfully persuaded the international community to allow a more generous accounting of emissions reductions resulting from halting broadscale landclearing.

non-governmental bodies which can act as observers at Conference of Parties (article 13).

A very innovative aspect of the Protocol is that Parties are allowed to achieve their emission reduction targets by relying on the 'flexibility mechanisms' or 'least cost abatement measures'. These include joint implementation (JI) (article 6), the clean development mechanism (CDM) (article 12), and emissions trading (article 17). Joint implementation means that developed countries can invest in projects in other developed countries to acquire credits to assist in meeting assigned amounts, if generated in the first commitment period 2008–12. Participation in JI projects must be voluntary and is open to public and private entities. A JI project must be one that would not normally be undertaken by the receiving Party, and must, in this sense, be 'additional' (article 6(b)). The acquisition of emission reduction units, derived from a JI project, by a Party must be 'supplemental' to domestic actions for the purposes of meeting its emission reduction target (article 6(d)).

The Clean Development Mechanism (CDM) allows developed countries to invest in emission-reducing projects in developing countries, and to obtain certified emission reductions towards meeting assigned amounts. This allows developed countries not only to meet their emission reduction targets outside of their own jurisdictions, but also to find a ready export market for their sustainable energy technologies. Emission reductions resulting from each project activity must be certified by operational entities on the basis of: voluntary participation approved by each Party involved; real, measurable, and long-term benefits related to the mitigation of climate change; and reductions in emissions that are additional to any that would occur in the absence of the certified project activity (article 12(5)). Participation may involve public and private entities (article 12(9)). Certified emission reductions obtained between 2000 and 2008 may be used to achieve compliance in the first commitment period (article 12(10)).

At COP 6 at The Hague, the use of sinks as CDM projects proved contentious. However, this was resolved in Bonn, where it was agreed that this would be allowed, but limited to afforestation and reforestation projects during the first commitment period which would be capped at 1% of base-year emissions. There was also considerable concern about the appropriate regulation of CDM projects being 'exported' to developing countries. It was agreed at COP 6 that an Executive Board of the Clean Development Mechanism (CDM) should be established. This Board is now established and has released the Modalities and Procedures of the CDM: Role of the Executive Board.[72]

With respect to emissions trading, now that the Kyoto Protocol has been ratified, the Parties will establish and participate in an international emissions trading regime. Under this scheme, developed countries can trade emissions to meet their assigned amounts. One of the issues that had to be resolved between the Parties was the concern that Annex I Parties could 'oversell' units and

[72] Decision 15/CP.7, available at <http://cdm.unfccc.int/EB/rules/modproced.html#CEB>.

subsequently be unable to meet their own emissions targets. At the Bonn negotiations, it was agreed that each Party be required to hold a minimum level of emission reduction units (ERUs), certified emission reductions (CERs), assigned amount units (AAUs) and removal units (RMUs) in its national registry. This is known as the 'commitment period reserve'.[73] This reserve is calculated as the lower of the following: 90% of the Party's assigned amount, as defined in Articles 3.7 and 3.8 of the Protocol,[74] or the level of national emissions indicated in the Party's most recent emissions inventory (multiplied by five, for the five years of the commitment period).[75]

To participate in the flexibility mechanisms, Annex I Parties must meet the following eligibility requirements: they must have ratified the Kyoto Protocol; they must have calculated their assigned amount in terms of tonnes of CO_2-equivalent emissions;[76] they must have in place a national system for estimating emissions and removals of greenhouse gases within their territory; they must have in place a national registry to record and track the creation and movement of ERUs, CERs, AAUs and RMUs and must annually report such information to the secretariat; and they must annually report information on emissions and removals to the secretariat.[77]

To establish eligibility each Annex I Party must submit a report on the above information to the secretariat, at the latest by 1 January 2007 (or a year after becoming a Party to the Protocol, whichever is later). This report will be reviewed, and any questions arising will be dealt with by the Enforcement Branch of the Compliance Committee within 16 months of submission through a set of expedited procedures. A Party which is found to not meet the eligibility requirements may seek reinstatement of eligibility through a further expedited procedure.[78]

In spite of making these flexibility mechanisms available to Parties, the Marrakesh Accords require that domestic actions (as opposed to use of the mechanisms) constitute a 'significant element' of the efforts made by each Annex I Party to meet their target. While they do not set a quantified proportion that is to be met through domestic action, the Protocol requires that Annex I Parties provide information in their national communications under the Protocol to demonstrate that their use of the mechanisms is 'supplemental to domestic action' to achieve their targets.[79]

Compliance with the Protocol will be monitored by a Compliance Committee comprising two branches: a Facilitative Branch and an Enforcement Branch. The facilitative branch will provide advice and assistance to Parties to promote

[73] See <http://unfccc.int/kyoto_mechanisms/emissions_trading/items/2731txt.php> (accessed 16 November 2004).
[74] This calculation is likely to be relevant to Annex I Parties which prove, at the end of the commitment period, to be 'net buyers' of units under the mechanisms.
[75] This calculation is likely to be relevant to Annex I Parties which prove, at the end of the commitment period, to be 'net sellers' of units under the mechanisms.
[76] As referred to in articles 3.7 and 3.8 and Annex B of the Protocol.
[77] FCCC/CP/2001/13/Add.2 available at <http://unfccc.int/resource/docs/cop7/13a02.pdf#page=2> (accessed 16 November 2004).
[78] Ibid. [79] Ibid.

compliance, whereas the enforcement branch has the power to determine consequences for Parties not meeting their commitments. The branches each comprise 10 members, including one representative from each of the five official UN regions (Africa, Asia, Latin America and the Caribbean, Central and Eastern Europe, and Western Europe and Others), one from the small island developing states, as well as two each from Annex I and non-Annex I Parties. Decisions of the Facilitative Branch may be taken by a three-quarters majority, but decisions of the Enforcement Branch require, in addition, a double majority of both Annex I and non-Annex I Parties. The Committee also meets in a Plenary composed of members of both branches.[80]

The Protocol entered into force on 16 February 2005, on the 90th day after the date on which not less than 55 Parties to the Convention, incorporating Annex I Parties that accounted in total for at least 55% of the total carbon dioxide emissions for 1990, ratified the Protocol (article 25). After the United States' and Australia's withdrawal from the Protocol there was considerable concern that it would never be ratified. However, on 4 November 2004, Russia ratified the Protocol in a move that is generally regarded as a *quid pro quo* for the admission of Russia to the World Trade Organization. Russia's ratification was important as its emissions account for 17% of overall emissions from developed countries, and without Russia the Protocol could not have come into force.

3.3.4 Energy Charter Treaty and Protocol on Energy Efficiency

International law in respect of energy efficiency has its origin in the Energy Charter Treaty[81] and its associated Protocol on Energy Efficiency and Related Environmental Aspects[82] (hereafter referred to as the Treaty and the Protocol, respectively).[83] The origin of these documents was the European Energy Charter (hereafter referred to as the Charter). This non-binding document was negotiated in 1990–91 between a number of western European nations and other developed countries, on the one hand, and eastern European and other nations which were formerly part of the USSR, on the other hand. The purpose of the Charter was to encourage investment and trade in the energy markets of eastern Europe after the collapse of communism in the late 1980s.[84] The Charter was signed on 17 December 1991 at The Hague by 47 nations, consisting of most western and eastern European nations, together with the United States, Canada, Japan, Australia and New Zealand.

Following the signing of the Charter the parties agreed to continue negotiations with a view to enshrining the terms of the Charter in the form of a binding

[80] See FCCC/CP/2001/13/Add.3 available at <http://unfccc.int/resource/docs/cop7/13a03.pdf#page=64> (accessed 16 November 2004).
[81] (1995) 34 ILM 360. [82] (1995) 34 ILM 446.
[83] For a discussion of the international negotiations preceding the Treaty, see J Doré, 'Negotiating the Energy Charter Treaty', in T Wälde (ed.), *The Energy Charter Treaty*, Kluwer Law International, London, 1996, ch 5.
[84] For the background to the Charter, see T Wälde, 'Introductory Note – European Energy Charter Conference' (1995) 34 ILM 360 at 361–2.

treaty, and also agreed to open discussions on developing protocols in respect of energy efficiency, nuclear energy and hydrocarbon energy. Agreement was reached on the terms of a treaty in 1994, although the United States and Canada indicated that they did not wish to become contracting parties. New Zealand also dropped out of the negotiations when they became protracted and when it became clear that the original rationale for the Treaty was no longer applicable.[85] Thus, in the final analysis the only non-European contracting Parties are Japan and Australia. The Treaty was open for signature from 17 December 1994 and has 51 contracting Parties.[86] As for the protocols, the proposed protocol on hydrocarbon energy was abandoned at an early stage, while the negotiations on nuclear energy are still ongoing. In contrast, agreement was quickly reached on the terms of the Protocol on Energy Efficiency and Related Matters, and the Protocol was open for signature simultaneously with the Treaty. There are currently 50 signatories.

3.3.4.1 Energy Charter Treaty

The majority of the terms of the Treaty relate to issues of international energy investment and trade. Environmental issues, including energy efficiency, are limited to article 19, which reads in part as follows:

> In pursuit of sustainable development and taking into account its obligations under those international agreements concerning the environment to which it is party, each Contracting Party shall strive to minimize in an economically efficient manner harmful Environmental Impacts occurring either within or outside its Area from all operations within the Energy Cycle in its Area, taking proper account of safety. In doing so each Contracting Party shall act in a Cost-Effective manner. In its policies and actions each Contracting Party shall strive to take precautionary measures to prevent or minimize environmental degradation. The Contracting Parties agree that the polluter in the Areas of Contracting Parties, should, in principle, bear the cost of pollution, including transboundary pollution, with due regard to the public interest and without distorting investment in the Energy Cycle or international trade. Contracting Parties shall accordingly:
>
> . . .
>
> (d) have particular regard to Improving Energy Efficiency, to developing and using renewable energy sources, to promoting the use of cleaner fuels and to employing technologies and technological means that reduce pollution.

'Improving Energy Efficiency' is defined in article 19(3)(c) as meaning 'acting to maintain the same unit of output (of a good or service) without reducing the quality or performance of the output, while reducing the amount of energy

[85] The original rationale was that intensified trade relations and cooperation in the energy sector could enhance the move towards democracy in the former Eastern bloc countries and act as a catalyst for economic revival.

[86] The following five countries have not yet ratified the Treaty: Australia, Belarus, Iceland, Norway and the Russian Federation. For a discussion of the Treaty, see R Axelrod, 'The European Energy Charter Treaty: Reality or Illusion?' (1996) 24 *Energy Policy* 497; T Wälde and K Christie, *Energy Charter Treaty: Selected Topics* University of Dundee, Dundee, 1995; R Stevenson, 'Energy Charter Treaty: Implications for Australia' (2001) 19 *JERL* 113; T Wälde and P Wouters, 'State Responsibility and the Energy Charter Treaty' (1997) 2 *Hofstra L & Policy Symposium* 117.

required to produce that output'. This appears to correspond exactly to the conventional understanding of the term among energy professionals, although it makes no mention of the possibility of the Parties contracting to reduce energy consumption.[87]

'Energy Cycle' is defined broadly in article 19(3)(a) as:

> the entire energy chain, including activities related to prospecting for, exploration, production, conversion, storage, transport, distribution and consumption of the various forms of energy, and the treatment and disposal of wastes, as well as the decommissioning, cessation or closure of these activities, minimizing harmful Environmental Impacts.[88]

The provision is thus clearly aimed at improving energy efficiency in all conceivable circumstances and applications, and applies to various externalities associated with energy use and production frequently excluded from energy costing proposals and analyses by economists.[89]

For those countries which are contracting Parties to the Treaty but not to the Protocol, the above provisions represent the sum total of their international law obligations to promote energy efficiency. How effective are these provisions? The first point worthy of mention is that article 19 espouses the leading principles of international environmental law. This discipline, which is recent in origin and is in constant evolution, has in recent years developed general principles supporting sustainable development, intergenerational equity, the precautionary principle and the 'polluter pays' principle. Except for intergenerational equity, these principles feature in the introductory wording of article 19. In this sense, article 19 has integrated energy efficiency into international environmental law and has countered the traditional criticism that the law has given cursory treatment to the role of energy in society.[90] Unfortunately, however, the wording of article 19 only incorporates the above-mentioned principles in a non-binding and loose form. Thus, each contracting Party must 'strive to minimize . . . harmful Environmental Impacts', must 'strive to take precautionary measures to prevent or minimize environmental degradation', and 'should, in principle, bear the cost of pollution'. There is clearly no possibility of international enforcement of any of these obligations in light of the tentative wording of the provision. Adherence by contracting Parties can be regarded as purely discretionary, and the obligations are no more than hortatory. Further, article 19 makes it clear that such environmental obligations are secondary to economic considerations. Thus, each

[87] C Shine, 'Environmental Protection Under the Energy Charter Treaty', in T Wälde and K Christie, *Energy Charter Treaty*, at 539.

[88] 'Environmental Impact' is defined very broadly in article 19(3)(b) as meaning 'any effect caused by a given activity on the environment, including human health and safety, flora, soil, air, water, climate, landscape and historical monuments or other physical structures or the interactions among these factors; it also includes effects on cultural heritage or socio-economic conditions resulting from alterations to those factors'.

[89] For a discussion of the costing of energy externalities and the politics associated with their inclusion in energy costing, see World Energy Council, *Energy for Tomorrow's World*, 60–1; Pace University Center for Environmental Legal Studies, *Environmental Costs of Electricity*, Oceana Publications Inc., New York, 1990.

[90] On this subject, see A J Bradbrook, 'Energy Law: A Neglected Aspect of Environmental Law' (1993) 19 *Melbourne U L Rev* 1 at 1–2.

contracting Party must strive to minimize harmful environmental impacts 'in an economically efficient manner' and 'shall act in a Cost-Effective manner'.[91] In addition, the 'polluter pays' principle is qualified by the obligation for contracting Parties to act 'without distorting investment in the Energy Cycle or international trade'. It is evident that the environmental provisions in the Treaty are very much an adjunct to its investment and trade orientation.[92]

Overall, article 19 represents no more than a hesitant first step in the environmental goal of promoting energy efficiency in the international law arena. While it is an important achievement to secure international agreement to legislate on the topic, the terms of article 19 appear susceptible to being ignored or, at best, being paid lip service to, by States which do not wish to take action in this field. States can certainly accede to the Treaty without concerning themselves unduly about their energy efficiency obligations.

3.3.4.2 Protocol on Energy Efficiency and Related Matters

The Protocol imposes more meaningful obligations in relation to energy efficiency, although there are still many shortcomings. Like article 19 of the Treaty, the Protocol adopts the principle of sustainable development. One of the stated objectives of the Protocol is stated by article 1(2)(a) to be 'the promotion of energy efficiency policies consistent with sustainable development'. Another major objective, in article 1(2)(b) is that energy markets should be based on 'a fuller reflection of environmental costs and benefits'. A similar wording is repeated in the Preamble to the Protocol and in article 3(2)(a). This makes obvious reference to the polluter pays principle. As in the case of article 19 of the Treaty, the commitment to this principle is only partial as the word 'fuller' indicates that a total adherence to the principle is neither demanded nor expected. Surprisingly, there is no reference anywhere in the Protocol to the precautionary principle. In this regard the commitment of the Protocol to environmental protection may be regarded as weaker than that of the Treaty, although it must be remembered that pursuant to article 14 of the Protocol it is not possible to become a signatory to the Protocol without also being a signatory to the Treaty.

In terms of general principles other than those specifically related to general environmental law, perhaps the most striking achievement of the Protocol is the acceptance of the notion that energy efficiency can in itself amount to an energy resource. This is made clear in article 1(1) which, referring to the scope of the Protocol, states: 'This Protocol defines policy principles for the promotion of energy efficiency as a considerable source of energy'. This clause constitutes explicit recognition of the argument first advanced by Amory Lovins, who coined the phrase 'negawatt' (a 'negative watt') to indicate that a unit of energy saved

[91] 'Cost-Effective' means 'to achieve a defined objective at the lowest cost or to achieve the greatest benefit at a given cost': article 19(3)(d).
[92] See Shine, 'Environmental Protection Under the ECT', at 544.

is equivalent in worth to an additional unit of energy generated.[93] This is the origin of the modern push towards demand-side management and integrated resource planning as a more sustainable alternative to supply-driven energy policies.

Other noteworthy general features of the Protocol relate to economic principles. Contrary to the view of some economic thought, the Preamble declares that the promotion of energy efficiency cannot be left exclusively to the private sector. The relevant clause in the Preamble states:

> Recognizing that commercial forms of cooperation may need to be complemented by intergovernmental cooperation, particularly in the area of energy policy formulation and analysis as well as in other areas which are essential to the enhancement of the energy efficiency but not suitable for private funding.

The Protocol also explicitly rejects the strand of economic argument that the law has no role to play in the realm of energy conservation and renewable energy. These arguments run along the lines that the available measures to promote these energy sources can be divided into regulation, stimulation and education. Education is argued to be irrelevant to law, stimulation is argued to be a matter for economists rather than lawyers, and the sole possible role of law, that of regulation, is rejected as being heavy-handed and inappropriate in the modern competitive world markets.[94] The rejection of these arguments occurs in three places: in article 3(1), which requires contracting parties to 'cooperate and, as appropriate, assist each other in developing and implementing energy efficiency policies, laws and regulations'; in article 3(2), which requires contracting Parties to 'establish energy efficiency policies and appropriate legal and regulatory frameworks'; and in article 8(3), which states that 'In implementing their energy efficiency programmes, Contracting Parties shall ensure that adequate institutional and legal infrastructure exist'.

The Protocol imposes obligations on contracting Parties to take action in support of energy efficiency at both the national and international levels. The national obligations are contained in articles 3, 5 and 8. Article 3 requires the Parties to 'develop and implement energy efficiency policies, laws and regulations', while article 8 states that each Party 'shall develop, implement and regularly update energy efficiency programmes best suited to its circumstances'. The interrelationship between the sections is by no means clear, as the Protocol does not attempt to explain the difference between 'policies' in article 3 and 'programmes' in article 8. One possibility is that article 3 of the Protocol lists those actions requiring domestic legislation, while article 8 refers to actions which might be implemented by executive action of the government without the need for legislation. This possibility appears to be countered, however, by the reference in

[93] See A B Lovins, *Soft Energy Paths*, Penguin Books, London, 1977; A B Lovins, 'Negawatts; Twelve Transitions, Eight Improvements and One Distraction' (1996) 24 *Energy Policy* 331.
[94] On this point, see A J Bradbrook, 'Energy Law as an Academic Discipline' (1996) 14 *J Energy and Natural Resources Law* 180.

article 8(3) to the requirement that contracting Parties 'ensure that adequate institutional and legal infrastructure exist'. It must also be remembered that the question whether domestic legislation is required to implement government policies and programs will depend on the nature of the legal system in operation in each jurisdiction and the terms of each nation's Constitution. In reality, it is submitted that there is no conceptual difference between the obligations contained in articles 3 and 8 and that the terms of each article must be treated as cumulative.

The major parts of article 3 read as follows:

> (2) Contracting Parties shall establish energy efficiency policies and appropriate legal and regulatory frameworks which promote, inter alia:
> (a) efficient functioning of market mechanisms including market-oriented price formation and a fuller reflection of environmental costs and benefits;
> (b) reduction of barriers to energy efficiency, thus stimulating investments;
> (c) mechanisms for financing energy efficiency initiatives;
> (d) education and awareness;
> (e) dissemination and transfer of technologies;
> (f) transparency of legal and regulatory frameworks.
> (7) Contracting Parties shall strive to achieve the full benefit of energy efficiency throughout the Energy Cycle. To this end they shall, to the best of their competence, formulate and implement energy efficiency policies and cooperative or coordinated actions based on Cost-Effectiveness and economic efficiency, taking due account of environmental aspects.[95]

Article 5 reads:

> Contracting Parties shall formulate strategies and policy aims for Improving Energy Efficiency and thereby reducing Environmental Impacts of the Energy Cycle as appropriate in relation to their own specific energy conditions. These strategies and policy aims shall be transparent to all interested parties.

Article 3(2) has the advantage of comprehensiveness. The paragraphs in the article are couched widely and are stated to be non-inclusive. In addition, the sub-article is phrased in such a way as to impose at least a general obligation on all contracting parties to take some action in support of energy efficiency. Unfortunately, article 3(3) suffers from the same qualifications as article 19 of the Treaty inasmuch as the obligation of States is limited to striving to achieve the full benefit of energy efficiency, and to acting to the best of their competence to formulate and implement energy efficiency policies. These obligations are far too vague to be enforceable.

Similar problems beset article 5. While there are significant differences in the energy mix and demands of different countries, and in this regard it is unrealistic to require each country to take similar measures in support of energy efficiency, the clause 'as appropriate in relation to their own specific energy conditions'

[95] 'Energy Cycle' and 'Cost-Effectiveness' are defined in article 2 of the Protocol in identical form as in article 19(3) of the Treaty; see notes 88 and 91 above, and accompanying text.

effectively gives each country carte blanche to do as much or as little in relation to energy efficiency as it might wish at any given time. The article effectively makes each country the sole arbiter of what is appropriate action and makes international enforcement impossible.

The wording of article 5 is echoed in article 8(1), which requires each contracting Party to 'develop, implement and regularly update energy efficiency programmes best suited to its circumstances'. Again, what is 'best suited to its circumstances' is a subjective test effectively within the exclusive preserve of each nation.

Article 8(2) refers to the activities to be included within domestic programs. It reads:

> These programmes may include activities such as the:
> (a) development of long-term energy demand and supply scenario to guide decision-making;
> (b) assessment of the energy, environmental and economic impact of actions taken;
> (c) definition of standards designed to improve the efficiency of energy using equipment, and efforts to harmonize these internationally to avoid trade distortions;
> (d) development and encouragement of private initiative and industrial cooperation, including joint ventures;
> (e) promotion of the use of the most energy efficient technologies that are economically viable and environmentally sound;
> (f) encouragement of innovative approaches for investments in energy efficiency improvements, such as Third Party Financing and co-financing;
> (g) development of appropriate energy balances and databases, for example with data on energy demand at a sufficiently detailed level and on technologies for Improving Energy Efficiency;[96]
> (h) promotion of the creation of advisory and consultancy services which may be operated by public or private industry or utilities and which provide information about energy efficiency programmes and technologies, and assist customers and enterprises;
> (i) support and promotion of cogeneration and of measures to increase the efficiency of district heat production and distribution systems to buildings and industry;
> (j) establishment of specialized energy efficiency bodies at appropriate levels, that are sufficiently funded and staffed to develop and implement policies.

At first glance, article 8(2) appears broad-based and comprehensive. The sub-article recognises, for example, that lack of action in support of energy efficiency measures results from the limitations of current financing arrangements and supports the need for innovative approaches to remedy the current situation. The recognition and promotion of scenario planning to determine long-term energy supply and demand is also enlightened inasmuch as traditional planning has proved to be notoriously unreliable. Two problems exist, however. First, the paragraphs in article 8(2) are only optional, as the clause uses the verb

[96] 'Improving Energy Efficiency' is defined in article 2(6) in identical form as in article 19(3)(c) of the Treaty: see note 87 above, and accompanying text.

'may' rather than 'shall'. Secondly, and more importantly, the programs listed in the sub-article only contain a small fraction of the provisions that have been adopted in domestic legislation, or at least considered for adoption, by the governments of more progressive nations in support of energy efficiency. Far from being broad-based and comprehensive, article 8(2) is in reality narrow and limited in scope.

The international obligations of the contracting Parties relate to cooperation and assistance. By article 3(1), contracting Parties shall cooperate and, as appropriate, assist each other in developing and implementing energy efficiency policies, laws and regulations. Articles 3(5) and 3(7) are also relevant in this regard:

> (5) When cooperating to achieve the objectives of this Protocol, Contracting Parties shall take into account the differences in adverse effects and abatement costs between Contracting Parties.
>
> . . .
>
> (7) Cooperative or coordinated action shall take into account relevant principles adopted in international agreements, aimed at protection and improvement of the environment, to which Contracting Parties are parties.

Article 3(5) is interesting in that it recognises that the Parties' obligations under the Protocol are not necessarily uniform. The Protocol is not novel in this regard, as differing responsibilities between nations have already been accepted as a feature of international environmental law treaties in the Montreal Protocol on Substances that Deplete the Ozone Layer (and its later amendments)[97] and in the United Nations Framework Convention on Climate Change.[98] The international community has accepted in these cases that it is unrealistic to expect both developed and developing countries to undertake equal responsibility for environmental action in light of their gross disparity in wealth, and also on account of the fact that the majority of the pollution has been produced by developed nations. It appears that article 3(5) of the Protocol is following this trend. It is unfortunate that the sub-article is not more specific, as its brevity leads to confusion and uncertainty.

The term 'adverse effects' is certainly ambiguous. It could be referring to the general environmental state of each nation, and may imply that States that have more serious environmental difficulties should be expected to take greater action in support of energy efficiency measures. Alternatively, the term could be referring to adverse economical effects. If this is the correct interpretation, it would mean that those countries where the relative costs of adopting energy efficiency measures would be greater (for example, because of the need to import expensive equipment or foreign professionals) would not be expected to take as much action in support of the objectives of the Protocol as other contracting Parties. As a further alternative, 'adverse effects' may be referring to each contracting

[97] (1987) 26 ILM 1541. [98] (1992) 31 ILM 849; 1771 UNTS 108.

Party's economic situation. On this interpretation, countries such as Canada and Australia, which have invested heavily in fossil fuels and whose economy is largely based on the export of fossil fuel resources, might be able to justify taking less action in support of energy efficiency measures.

The term 'abatement costs' is also ambiguous. This could be interpreted as meaning that developing nations are not expected to spend as much money in support of the objectives of the Protocol as developed nations. Alternatively, it could justify a consideration of the respective costs of establishing similar energy efficiency measures in different nations. Such costs may well differ significantly between nations, bearing in mind matters such as whether materials and technology have to be imported or exist locally. A further possible relevant consideration in this context is the extent to which each nation has already adopted energy efficiency measures. For countries which have already invested heavily in energy efficiency, such as Japan, the costs of further abatement may require increasingly sophisticated and expensive technology and may be considerable in comparison with those nations which have invested little in this area and which could make considerable improvements by undertaking basic and relatively cheap measures. Are nations that have taken a responsible approach to energy efficiency in the past to be penalised for their foresight?

Article 3(7) recognises the interrelationship between the Protocol and other international environmental law treaties and protocols. Although this is not specifically mentioned, the provision is presumably included to acknowledge that certain energy efficiency measures may have already been taken in pursuance of the discharge of obligations imposed on the contracting Parties under the Montreal Protocol on Substances that Deplete the Ozone Layer (and later amendments) and the Framework Convention on Climate Change. The wording of article 3(7) appears to ensure that countries that have already taken energy efficiency measures under the earlier conventions will receive a credit for their actions under the Protocol.

As regards the type of cooperation required under the Protocol, article 9 states simply that this may take any appropriate form. Areas of possible cooperation are listed in the Annex to the Protocol. This Annex is stated in its heading to be an 'illustrative and non-exhaustive list'. The list is noteworthy for its comprehensiveness, both in scope and in detail. As well as identifying a variety of areas of cooperation in respect of energy efficiency in power generation and transmission, and in the transport, industrial and building sectors of the economy, the list includes financing measures (third party financing, joint ventures and co-financing), efficiencies in municipalities and local community services (district heating systems, efficient gas distribution systems, energy planning technologies, twinning of towns, energy management in cities and in public buildings, and waste management and energy recovery waste), as well as energy efficiency analysis in refining, conversion, transport and distribution of hydrocarbons and international training and education programs. It is by far the most

comprehensive list of energy efficiency measures ever attempted in any legal document, international or domestic.

3.4 Non-binding declarations

3.4.1 United Nations Conference on Environment and Development (UNCED)

Sustainable development was the focus of the 1992 UNCED held in Rio de Janeiro. At that Conference, five important international documents were developed: the Rio Declaration, Agenda 21, United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), and the Statement of Principles for the Sustainable Management of Forests.[99] These documents have formed the basis for global initiatives to achieve sustainable development, and are all relevant to global climate change in one way or another. For example, the management of the world's forests has a significant bearing on global climate change, and climate change in turn will, and already does, have significant impacts on the earth's biodiversity.

As mentioned above, the Rio Declaration, Agenda 21 and the Johannesburg Plan of Implementation provide the backdrop for commonly understood principles of sustainable development. It is instructive to refer to those aspects of the instruments that relate to a sustainable energy law framework.

3.4.2 The Rio Declaration

The principal objectives of the Rio Declaration were to establish 'a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people', and to develop international agreements which would 'respect the interests of all and protect the integrity of the global environmental and developmental system'. Principle 1 of the Declaration proclaims human beings, entitled to a healthy and productive life in harmony with nature, to be at the centre of concerns of sustainable development. It also reaffirmed in Principle 2 the sovereign right of States to exploit their resources, while bearing in mind their obligation to not allow domestic activities to cause transboundary damage to the environment. Perhaps the most influential principles of the Declaration have proved to be the principle of intergenerational equity, the precautionary principle, and the polluter pays principle. By Principle 3, intergenerational equity requires current rates of development to equitably meet the development and environmental needs of present and future generations. The precautionary approach is that, 'where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a

[99] A/CONF. 151/26 (Vol III).

reason for postponing cost-effective measures to prevent environmental degradation' (Principle 15). Finally, the polluter pays principle envisages the 'internalisation of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution' (Principle 16). All of these principles are relevant to the development of a sustainable energy law framework.

Other enduring principles are poverty alleviation (Principle 5), the common but differentiated responsibilities of countries to achieve sustainable development (Principle 7), capacity building and technology transfer (Principle 9), and public participation in decision-making (including women and indigenous people) (Principles 10, 20 and 22). States were also called upon to enact effective environmental laws (Principle 11), including the provision of compensation for the effects of pollution and other forms of environmental degradation (Principle 13), environmental impact assessment (Principle 17), and effective legal remedies (Principle 10).

3.4.3 Agenda 21

Chapter 9 of Agenda 21 also makes specific reference to the protection of the atmosphere, referring to the 1985 Vienna Convention for the Protection of the Ozone Layer, the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer as amended, and the 1992 United Nations Framework Convention on Climate Change. The first two instruments provide for the protection of the ozone layer while, as already mentioned, the UNFCCC is directed at global greenhouse gas emissions. However, the links between ozone protection and global climate change should not be missed, as many of the gases developed to take the place of ozone-depleting gases have now been found to be 'synthetic greenhouse gases'.[100]

Agenda 21 specifies that activities undertaken to protect the atmosphere should be integrated with social and economic development, taking into account the needs of developing countries to achieve sustained economic growth and eradicate poverty (chapter 9.3). The three Agenda 21 program areas relevant to our purposes are: improving the scientific basis for decision-making; promoting sustainable development though energy development, efficiency and consumption; and preventing stratospheric ozone depletion (chapter 9.5). Various activities are recommended for improving the scientific basis for decision-making including: promoting and cooperating on research initiatives to better understand 'the levels of greenhouse gas concentrations, that would cause dangerous anthropogenic interference with the climate system and the environment as a whole, and the associated rates of change that would not allow ecosystems to adapt naturally'.

[100] See, for example, legislative activity by the Australian government in this regard enacting the *Ozone Protection and Synthetic Greenhouse Gas (Import Levy) Act 1995*; *Ozone Protection and Synthetic Greenhouse Gas (Manufacture Levy) Act 1995*; *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989*; Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995 (as amended).

With respect to energy resources, Agenda 21 provides that governments should: develop economically and environmentally sound energy sources, including renewable energy systems (chapter 9.12(a), (d)); review current energy supply mixes to determine how new and renewable energy systems could be increased (chapter 9.12(f)); promote the use of improved energy efficient technologies (chapter 9.12(c)); and establish labelling programs for products to inform decision-makers and consumers about opportunities for energy efficiency (chapter 9.12(l)).

3.4.4 Millennium Development Goals[101]

From an energy perspective, the Millennium Development Goals (MDGs), established in the United Nations' General Assembly Millennium Declaration 2000,[102] are disappointing in that there is no mention of the need to provide universal access to energy services or to tackle any of the issues surrounding energy, poverty and sustainable development. The stated goals are: eradicating extreme poverty and hunger; achieving universal primary education; promoting gender equality and empowering women; reducing child mortality; improving maternal health; combating HIV/AIDS, malaria and other diseases; ensuring environmental sustainability; and developing a global partnership for development. The disappointment lies in that access to energy services is not specifically mentioned anywhere in the MDGs. In reality, however, as stated in a Background Paper by the UNEP on the MDGs, access to energy services is an essential prerequisite to the achievement of all of the stated goals.[103] This point was further emphasised and expanded upon in the UNDP's *World Energy Assessment 2004 Update*. In Annex 1 to this document, the authors provide a matrix of energy and the MDGs, illustrating the role of energy services in achieving each of these aims.[104] The *Update* concluded on this issue: '[n]one of the MDGs can be achieved without much greater access to improved quality and quantity of energy services'.[105]

3.4.5 World Summit on Sustainable Development

Following on from the Rio Conference, global climate change and energy were once again addressed by the international community at the 2002 World Summit on Sustainable Development (WSSD). Leading up to the WSSD, the UN Secretary-

[101] See <www.un.org/millenniumgoals> (accessed 15 August 2005).
[102] UNGA Resolution 55/2 (8 September 2000); available at <www.un.org/millennium/declaration/ares552e.htm> (accessed 15 August 2005).
[103] See United Nations Environment Programme, *Background Paper – Advancing the Millennium Development Goals Through the Rule of Law*, DRAFT/BR/17.01.05.
[104] United Nations Development Programme, United Nations Department of Economic and Social Affairs and World Energy Council, *World Energy Assessment 2004 Update*, United Nations, New York, 2004, at 80. See also Department for Institutional Development (DFID), *Energy for the Poor – Underpinning the Millennium Development Goals*, DFID, London, August 2002.
[105] UNDP et al, *World Energy Assessment 2004 Update*, at 18. See also WEHAB Working Group report, *A Framework for Action on Energy*, prepared for the World Summit on Sustainable Development, August 2002, at 11.

General, Kofi Annan, proposed the development of the WEHAB initiative that focused on five key areas, namely Water, Energy, Health, Agriculture and Biodiversity. These themes were regarded as integral to a coherent international approach to the implementation of sustainable development. They were specifically incorporated into the Johannesburg Plan of Implementation of the World Summit on Sustainable Development.[106]

Prior to the WSSD, the WEHAB Working Group published *A Framework for Action on Energy*.[107] The publication points out that past global conferences, including the 1992 United Nations Conference on Environment and Development (UNCED), set out ambitious strategies for sustainable development, principally through Agenda 21. However, no specific chapter of Agenda 21 refers to energy. The role of energy in achieving sustainable development has since received increased attention and the Ninth Session of the Commission for Sustainable Development (CSD-9), held in April 2001, focused explicitly on energy. The Session highlighted the role of energy and its links to the three pillars of sustainable development, namely social, economic and environmental considerations. The decisions taken at CSD-9 provided the foundation upon which to establish a blueprint for creating energy pathways for sustainable development at the World Summit on Sustainable Development.

The major challenges for sustainable energy development in the years ahead were identified in *A Framework for Action on Energy* as: accessibility, energy efficiency, renewable energy, advanced fossil fuel technologies, and energy and transport.

3.4.5.1 Accessibility of energy[108]

The *Framework* recognises that wider access to reliable, affordable and socially acceptable energy services is a prerequisite for meeting the challenge of the Millennium Development Goal[109] of halving the proportion of people living on less than US$1 a day by 2015. Here the greatest challenge exists in rural areas and increasingly in large poor communities that live within the margins of cities. Rural development should be the overall priority in meeting the access challenge and should focus on: increasing investments; deploying decentralised energy systems using conventional and renewable energy sources; promoting local energy entrepreneurs; establishing financial mechanisms; and strengthening policies and regulatory systems to expand the level of energy services.

The *Framework* recognises that there are considerable institutional impediments to achieving this goal including declining official development assistance (ODA) to developing countries. Also, in the face of macroeconomic reform, public-sector investment in expanding energy services is difficult to provide.

[106] A/CONF/L/6/Rev.2. See <http://www.un.org/esa/ sustdev/documents/WSSD_POI_PD/English/WSSD_PlanImpl.pdf> (accessed 16 January 2005).
[107] See WEHAB Working Group, *A Framework for Action on Energy*.
[108] See A Bradbrook and J Gardam, 'Placing the Access to Energy Within the Human Rights Framework' (2006) *Human Rights Quarterly* (forthcoming).
[109] Available at <http://www.un.org/millenniumgoals/> (accessed 16 February 2005).

Consequently, the *Framework* emphasises the fact that new methods of public/private cooperation are necessary to attract private-sector investment.

3.4.5.2 Energy efficiency

Energy efficiency remains problematic according to the *Framework* in spite of the fact that it can be found in energy end-uses, sectors and services. The *Framework* specifically recommends the following measures: energy efficiency standards; appliance and product labelling; demand-side management; and building and construction standards, as well as the development of regional partnerships to set norms and institutional frameworks for energy efficiency.

3.4.5.3 Renewable energy

Renewable energy technologies are regarded as particularly well suited for rural energy development and an environmentally sound alternative to grid extension. These technologies are commercially available, field-proven and particularly promising for technology transfer to developing countries. The Group of Eight Renewable Energy Task Force[110] (see footnote below) has recognised that by expanding renewable energy technologies in industrialised countries the cost of renewable energy will be reduced, and, that with supportive policy measures, market incentives and promotion activities, rural energy needs can be met.

3.4.5.4 Advanced fossil fuel technologies

The *Framework* recognises that although fossil fuels will continue to be the primary energy supply option worldwide, they must be used more efficiently and their negative environmental impacts must be reduced at the local, regional and global level. This challenge also requires technology transfers from industrial to developing countries. The Clean Development Mechanism (CDM) included in the Kyoto Protocol is cited as a major incentive for industry leadership in this area.[111] Also, private-sector organisations are seen as playing an important role in facilitating consensus building on public-private partnerships and interregional cooperation in the area of advanced fossil fuels.

3.4.5.5 Energy and transport

Transport – the most energy intensive sector – is viewed as a key challenge for sustainable development as it causes significant pollution problems. The two

[110] See Corrado Clini and Mark Moody-Stuart, *Renewable Energy: Development That Lasts*, 2001 G8 Renewable Energy Task Force Chairmen's Report. After the G8's Okinawa Summit in 2000, the G8 Renewable Energy Task Force was established to assess the barriers to, and to recommend actions that would encourage, the uptake of renewable energy technologies in developing countries. The principal finding of the Task Force is that renewable energy resources can sharply reduce global environmental impacts as well as energy security risks. However, the Task Force found that the creation of widespread commercial renewable energy markets is hampered by the following barriers: cost; insufficient human and institutional infrastructure; high up-front costs of renewables and other impediments to capital mobilisation; and weak incentives and inconsistent policies.

[111] Note, however, that only countries that have ratified the Kyoto Protocol are permitted to participate formally in the CDM.

major challenges for transport are the wider adoption of clean fuels and modal shifts to cleaner and more efficient forms of transport.

3.4.6 Johannesburg Plan of Implementation

The Plan of Implementation, which represents the final text negotiated at the WSSD, builds on the achievements made since UNCED and seeks to expedite the realisation of the remaining goals. Under the Plan, all nations have committed themselves to undertaking concrete actions and measures at all levels. They have also committed to enhancing international cooperation, taking into account the Rio Principles, including the principle of common but differentiated responsibilities as set out in Principle 7 of the Rio Declaration on Environment and Development. The Plan states that poverty eradication, changing unsustainable patterns of production and consumption, and protecting and managing the natural resource base of economic and social development are overarching objectives of, and essential requirements for, sustainable development.

Clause 19 of the Plan of Implementation[112] deals specifically with energy, calling upon governments, as well as relevant regional and international organisations and other relevant stakeholders, to implement the recommendations and conclusions of the CSD-9 concerning energy for sustainable development. The text of the Plan requires, more specifically, that actions be taken at all levels to:

(a) Take further action to mobilise the provision of financial resources, technology transfer, capacity building and the diffusion of environmentally sound technologies;
(b) Integrate energy considerations, including energy efficiency, affordability and accessibility, into socio-economic programs;
(c) Develop and disseminate alternative energy technologies with the aim of giving a greater share of the energy mix to renewable energies, improving energy efficiency and greater reliance on advanced energy technologies, including cleaner fossil fuel technologies;
(d) Combine the increased use of renewable energy resources, more efficient use of energy, greater reliance on advanced energy technologies, including advanced and cleaner fossil fuel technologies, and the sustainable use of traditional energy resources;
(e) Diversify energy supply by developing advanced, cleaner, more efficient, affordable and cost-effective energy technologies, including fossil fuel technologies and renewable energy technologies, hydro included, and their transfer to developing countries on concessional terms as mutually agreed. The Plan of Implementation also calls on nations, with a sense of urgency, to substantially increase the global share of renewable energy sources with

[112] Note that this section represents an edited version of Clause 19. For the full text of Clause 19 see <http://www.johannesburgsummit.org/html/document/ summit_docs/plan_final1009.doc>.

the objective of increasing its contribution to total energy supply, but it does not set any targets; [113]

(f) Support efforts, including through provision of financial and technical assistance to developing countries, with the involvement of the private sector, to reduce flaring and venting of gas associated with crude oil production;

(g) Develop and utilise indigenous energy sources and infrastructures for various local uses and promote rural community participation in developing and utilising renewable energy technologies to meet their daily energy needs to find simple and local solutions;

(h) Establish domestic programs for energy efficiency;

(i) Accelerate the development, dissemination and deployment of affordable and cleaner energy efficiency and energy conservation technologies in particular to developing countries;

(j) Recommend that international financial institutions' and other agencies' policies support developing countries, as well as countries with economies in transition, in their own efforts to establish policy and regulatory frameworks which create a level playing field between renewable energy, energy efficiency, and advanced energy technologies;

(k) Promote increased research and development in the field of various energy technologies, including renewable energy, energy efficiency and advanced energy technologies, including advanced and cleaner fossil fuel technologies;

(l) Promote networking between centres of excellence on energy for sustainable development that could support and promote efforts at capacity-building and technology transfer activities, particularly of developing countries, as well as serve as information clearing houses;

(m) Promote education to provide information for both men and women about available energy sources and technologies;

(n) Utilise financial instruments and mechanisms, in particular the Global Environment Facility (GEF), to provide financial resources to developing countries to meet their capacity needs for training, technical know-how and strengthening national institutions;

(o) Support efforts to improve the functioning, transparency and information about energy markets with respect to both supply and demand, with the aim of achieving greater stability and predictability and to ensure consumer access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services;

(p) Introduce policies to reduce market distortions which would promote energy systems compatible with sustainable development through the use

[113] This clause was greeted with disappointment by a number of organisations as the Draft Plan of Implementation required industrialised countries to increase the share of renewable energy sources of total primary energy supply by at least 2% of total energy supply by 2010 relative to 2000. During the plenary session on energy many stakeholders made representations calling for a global renewable energy target by 2010.

of improved market signals, and by removing market distortions, including restructuring taxation and phasing out harmful subsidies, reflect their environmental impacts;

(q) Take action, where appropriate, to phase out subsidies in this area that inhibit sustainable development;[114]

(r) Encourage governments to improve the functioning of national energy markets in such a way that they support sustainable development, overcome market barriers and improve accessibility;

(s) Strengthen national and regional energy institutions or arrangements for enhancing regional and international cooperation on energy for sustainable development, in particular to assist developing countries;

(t) Urge countries to develop and implement actions within the framework of the ninth session of the Commission on Sustainable Development, including through public-private partnerships;

(u) Promote cooperation between international and regional institutions and bodies dealing with different aspects of energy for sustainable development;

(v) Strengthen and facilitate, as appropriate, regional cooperation arrangements for promoting cross-border energy trade, including the interconnection of electricity grids and oil and natural gas pipelines; and

(w) Strengthen and, where appropriate, facilitate dialogue forums among regional, national and international producers and consumers of energy.

3.4.6.1 Climate change

Clause 36 of the Plan of Implementation deals with climate change and reiterates that change in the Earth's climate and its adverse effects are a common concern of humankind. The Plan reaffirms that the United Nations Framework Convention on Climate Change is the key instrument for addressing climate change and reaffirms countries' commitments to achieving the stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The Plan recalled the United Nations Millennium Declaration, in which heads of State and Governments resolved to make every effort to ensure the entry into force of the Kyoto Protocol by the 10th anniversary of the UNCED in 2002. States that have ratified the Protocol strongly urge States that have not already done so to ratify the Protocol in a timely manner.

[114] Note, however, that no targets were set in this regard. This is in spite of the Draft Plan for Implementation recommending that countries 'adopt, at the national level, policies leading to timetables for progressively phasing out energy subsidies which inhibit sustainable development. Developed countries should lead the way and, subject to a satisfactory review in 2007, they could be followed progressively by developing countries'. The phasing out of subsidies was supported during the plenary session on energy by representatives of the NGO movement as well as local government. They referred to the 'perverse subsidies' in countries of the North which support energy derived from fossil fuels and drew attention to the negative social and environmental impacts of these subsidies. The local government representative claimed that the subsidies amount to US$1 billion annually and that these subsidies should be used rather to support the commercialisation of renewable energy technologies.

For our purposes, Clause 36[115] requires countries to: meet all the commitments and obligations under the UNFCCC; develop and transfer technological solutions; develop and disseminate innovative technologies in respect of key sectors of development, particularly energy; and encourage investment, including through private-sector involvement and market-oriented approaches, as well as through supportive public policies and international cooperation.

3.4.7 The G8 Gleneagles 2005 Plan of Action

The most recent non-binding international legal instrument promoting sustainable energy development is the G8 Gleneagles 2005 Plan of Action, 'Climate Change, Clean Energy and Sustainable Development'.[116] In this far-ranging document, the G8 members undertook to take action in the key areas of transforming the way we use energy, powering a cleaner future, promoting energy research and development and financing the transition to cleaner energy (para 1).

In relation to transforming the way we use energy, the most important measures in the Plan of Action to improve energy efficiency are as follows:

- Promote energy efficient buildings by inviting the International Energy Agency (IEA) to review existing building standards and codes in developed and developing countries, and develop energy indicators to assess efficiency and identify policy best practices (para 5);
- Encourage the coordination of international policies on labelling, standard setting and testing procedures for energy efficiency appliances, by asking the IEA to undertake a study to review existing global appliance standards and codes, extending the use of clear and consistent labelling to raise consumer awareness of the energy consumption of appliances, work nationally and in cooperation with other countries to seek improvements in the efficiency and environmental performance of products in priority sectors, and to explore the potential to coordinate standards with other countries (para 6);
- Encourage the development of cleaner, more efficient and lower-emitting vehicles, and promote their deployment, by adopting ambitious policies to encourage sales of such vehicles in G8 countries, including making the use of public procurement, asking the IEA to review existing standards and codes for vehicle efficiency and identify best practice, encourage cooperation on technology research, development and deployment in cleaner gasoline and diesel technologies, biofuels, synthetic fuels, hybrid technology, battery performance and hydrogen-powered vehicles, and raising consumer awareness of the environmental impacts of their vehicle choices through clear and consistent labelling for relevant energy consumption, efficiency and exhaust data emissions (para 7);

[115] Note that this text is an edited version of Clause 36. For the full text see <http://www.johannesburgsummit.org/html/document/summit_docs/plan_final1009.doc>.
[116] See <www.g8.gov.uk> (accessed 15 August 2005).

- Encourage the improvement of energy efficiency in industry by working with the multilateral development banks to expand the use of voluntary energy assessments as a part of major investments in new or existing projects in energy intensive sectors, to invite the IEA to develop its work to assess efficiency performance and seek to identify areas where further analysis of energy efficiency measures by industry could add value, and to develop partnerships with industry to reduce the greenhouse gas emissions intensity of the major industrial sectors of our economy (para 9).

In relation to powering a cleaner future, the Plan of Action states in para 11:

> To respond to the scale of the challenges we face, we need to diversify our energy supply mix, including increased use of renewables. Fossil fuels will continue to be an important part of the global energy mix, and we will need to find ways to manage the associated air pollution and greenhouse gas emissions. We need to capitalize on all the opportunities available to improve the efficiency along the entire process chain, from extraction, to energy generation and transmission, and to maximize the large and untapped potential of lower-emitting alternative sources of energy.

In relation to cleaner fossil fuels, the Plan of Action states that the G8 will support a variety of efforts to make electricity generation from coal and other fossil fuels cleaner and more efficient by, *inter alia*, working with industry and with national and international research programs and partnerships on projects to demonstrate the potential of advanced fuel technologies, including clean coal; support IEA work assisting economies to review, assess and disseminate widely information on energy efficiency of coal-fired power plants and to recommend options to make best practice more accessible; work to accelerate the development and commercialisation of carbon capture and storage technology; and encourage the capture of methane (para 13).

As for renewable energy, the G8 proposes to promote the continued development and commercialisation of renewable energy by, *inter alia*, working with developing countries to provide capacity-building assistance, develop policy frameworks, undertake research and development, assess the potential for renewable energy, and to launch a Global Bioenergy Partnership to support wide, cost-effective biomass and biofuels deployment (para 16).

In relation to promoting networks for research and development, the G8 recognises the need for increased commitment to international cooperation in and coordination of research and development of energy technologies (para 18), and express its support for research and development of technologies and practices that use hydrogen as an energy carrier (para 19). The G8 further proposes to seek ways to improve the current arrangements for collaboration between developed and developing countries, and enhance developing country participation in existing networks (para 20).

A range of measures are proposed in paras 21–29 to finance the transition to cleaner energy. The parties acknowledge in para 21 that positive investment

climates and effective market models are critical to the uptake of new technologies and increased access to energy for economic growth. The G8 recognises that there are a range of tools to support a market-led approach to cleaner technology and energy resources, and that each country will select those appropriate to its national circumstances (para 21). The parties agree to support a market-led approach to encouraging energy efficiency, and accelerating investment and the deployment of cleaner technologies that will help transition to a low-emission future; to promote dialogue on the role, suitability, potential synergies and timing of various policy approaches within the context of each country's national circumstances; to invite the World Bank and other multinational development banks to increase dialogue with borrowers on energy issues; and to continue to work through their own bilateral development programs, in line with their own national priorities, to promote more sustainable energy policies worldwide. The G8 will also work through multi-stakeholder partnerships to develop the policy, regulatory and financing frameworks needed in the major developing countries to provide a commercially attractive balance of risk and reward to private investors.

In its Gleneagles Communiqué, the Parties acknowledge in para 8 that tackling climate change and promoting clean technologies, while pursuing energy security and sustainable development, will require a global concerted effort over a sustained period. For this reason the Parties have agreed to take forward a Dialogue on Climate Change, Clean Energy and Sustainable Development, and invite other interested countries with significant energy needs to join them (para 9). The United Kingdom has agreed to hold meetings to take the Dialogue forward during 2006 and will identify specific implementation plans for carrying out each of the commitments under the Plan of Action (para 12). The Russian Federation, which will assume the Presidency of the G8 in 2006, has decided to focus on energy (para 13).

While the G8 is, by its Constitution, limited in membership to the wealthiest seven nations (plus the Russian Federation), the emphasis recently given by the organisation to the advancement of sustainable energy goals represents a refreshing change from past attitudes and may well serve as a catalyst for more sustained and effective action on this front from other international agencies and nations. The Gleneagles Plan of Action is certainly the most comprehensive and supportive international instrument to date in relation to sustainable energy issues.

3.5 Conclusion

What is quite clear is that since the 1992 UNCED conference, energy policy and supporting legislation must be developed within the broader context of ecologically sustainable development and a carbon-constrained economy. The international environmental law instruments, discussed above, contain a

number of key messages for energy policy development. They are that: energy use should be ecologically sustainable; renewable energy technologies should be promoted and adequately represented in the energy fuel mix; national energy efficiency programs should be pursued; market distortions and perverse subsidies, which impede a sustainable energy market, should be removed; national energy markets should function in a way that promotes sustainable development; and that grid extensions are not necessarily the preferred method of increasing access to electricity, particularly in developing countries.

4

Evaluating Australian government initiatives on energy, climate change and the environment

In this chapter, the impacts of climate change on Australia are considered and then the book turns to an analysis of the Australian government's response to climate change and the carbon emissions from the energy sector. Clearly, since the vast majority of Australia's greenhouse gas emissions derive from this sector, it is this sector which should be firmly under the Australian government's regulatory gaze. We conclude, after assessing all the available evidence, that the Australian government's refusal to ratify the Kyoto Protocol and to properly regulate emissions from the energy sector are not an appropriate, or environmentally responsible, response for ensuring the development of a sustainable energy framework for Australia. The environmental impacts of climate change are extremely serious, and in our view the Australian government could do far more, if it had the political will to do so, to control one of the most pressing global problems of our times.

4.1 Australia's vulnerability to climate change

The latest scientific data and predictions made by the Intergovernmental Panel on Climate Change (IPCC),[1] Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO)[2] and the World Wide Fund for Nature (WWF)[3] about the likely impacts of global climate change on Australia are sobering. The

[1] Intergovernmental Panel on Climate Change, *Climate Change 2001: Impacts, Adaptation and Vulnerability*, 51–4 (2001), available at <http://www.ipcc.ch/index.html>.
[2] See Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Climate Change Projections for Australia* (2001), available at <http://www.dar.csiro.au/publications/projections2001.pdf>.
[3] See Media Release, World Wide Fund for Nature, Federal Government Must Act on Kyoto to Avert Further Reef Bleaching (8 Jan 2002), available at <http://www.wwf.org.au>.

IPCC Report indicates that: water resources are already stressed in some areas and are therefore highly vulnerable, especially with respect to salinisation; a warming of 1°C would threaten the survival of species that are currently growing near the upper limit of their temperature range, notably in marginal alpine regions;[4] food production is threatened because agricultural activities are particularly vulnerable to regional reductions in rainfall in south-west and inland Australia; with respect to industry and human settlement, the trend towards greater population and investment in exposed regions will increase its vulnerability to cyclones and storm surges; and many natural ecosystems in Australia have a limited capacity to adapt to global climate change.

In July 2001, the CSIRO updated its regional climate projections and impacts for Australia in line with new findings by the IPCC showing expected changes in temperature, sea level, rainfall, evaporation and moisture balance. Changes in climate will affect agriculture, forestry, natural systems, pests and weeds, water resources and some coastal communities. It is likely to result in a decrease in stream flow in the Murray–Darling Basin, increasing the competition over already scarce water supplies and impacting on both agricultural industries and urban communities. In addition, climate change would also have significant implications for dry land salinity.

The 2000 National Action Plan on Salinity and Water Quality indicates that already more than A$130 million of agricultural production is lost annually from salinity. More than A$6 million is spent every year on building maintenance related to salinity in South Australia; salinity causes A$9 million damage annually to roads and highways in south-west New South Wales. The area of salt-affected land in Western Australia is increasing at a rate of one football field per hour; if salinity is not effectively managed within 20 years, the salt content in Adelaide's drinking water may exceed World Health Organization standards for desirable drinking water in 2 of every 5 days; and increased salinity could cause the extinction of approximately 450 species of native flora and 250 species of invertebrate water fauna in the Western Australian wheat belt.[5]

Meanwhile, in 2002, the WWF urged the federal government to take immediate action to cut the nation's greenhouse gas emissions and to save the Great Barrier Reef from mass coral bleaching. The United States National Oceanic and Atmospheric Administration has discovered a large potential coral bleaching 'hot spot' over large parts of the Reef. This discovery has been confirmed by the University of Queensland, which found occurrences of coral bleaching off Heron Island where the corals are already 10–20% bleached. The bleaching could threaten thousands of jobs in regional Queensland which depend upon tourism associated with the Reef.

[4] Note that anthropogenic climate change has been listed as a key threatening process under Schedule 3 of the *Threatened Species Conservation Act 1995* (NSW).
[5] See generally *Our Vital Resources: National Action Plan for Salinity and Water Quality*, at <http://www.napswq.gov.au/publications/vital_resources.html> (accessed 29 May 2003).

4.2 Constitutional responsibility for managing energy and climate change

Australia has a federal system of government, as laid out in its Constitution adopted in 1900. The Australian Constitution grants certain specified powers to the Commonwealth while vesting all others in the States. Of relevance to environmental law is the fact that the States are given the power under the Constitution to manage their natural resources. While it has no specific grant of environmental power, in the 1970s the Commonwealth began to legislate with respect to matters over which it had constitutional responsibility. It enacted the *Environment Protection (Impact of Proposals) Act 1974* which required all Commonwealth officers to consider whether or not their activities were likely to have a significant impact on the environment. If they were, then the officer should decide to call for an environmental impact assessment to be done. The Federal government also enacted the *Great Barrier Reef Marine Park Act 1975* to regulate the management of the Park, which was under Federal government authority.

In 1983, the Federal government's constitutional right to legislate with respect to environmental matters was tested in a famous case, *Commonwealth of Australia v State of Tasmania*,[6] also known as the *Tasmanian Dams* case. In this case, the Tasmanian government challenged the right of the Federal government to enact the *World Heritage Properties Conservation Act 1983*. The Act was drafted and enacted specifically to override the decision of the Tasmanian government to permit the development of a hydro-electricity scheme on the Franklin River. The Federal government argued that it was relying on its external affairs power to ensure domestic implementation of the Convention Concerning the Protection of the World Cultural and Natural Heritage. Also, since the hydro-electric scheme would be developed by a corporation and would trade in electricity, the Federal government relied on the corporations power, and trade and commerce power, to enact the legislation. It also referred to the provisions in the Act which protected Aboriginal heritage so bringing the Act within the 'people of any race' power. The High Court, in a 4:3 decision, upheld the Federal government's right to rely on the corporations power and the external affairs power to enact the legislation.

Although the Federal government can legislate to protect the environment, most natural resource legislation will be found in State legislation. State responsibility for natural resource management includes the management of resources like: energy; water; native vegetation; biodiversity; salinity; fisheries; forestry and national parks and wildlife. Legislation is generally in the style of command and control regulation whereby an activity is prohibited except under permission of a licence. Conditions are attached to the grant of licence and the statute provides criminal, civil and administrative penalties for non-compliance with a licence.

A significant intervention in resolving which level of government has responsibility for environmental management was the 1993 Intergovernmental

[6] (1983) 46 ALR 625.

Agreement on the Environment (IGAE). The Commonwealth, State and Territory governments, known as the Council of Australian Governments (COAG), reached agreement on areas of regulatory responsibility including environmental impact assessment, pollution control and heritage conservation. The IGAE followed a decade of constitutional litigation between the States and the Commonwealth after the *Tasmanian Dams* case.[7]

Consistently with the spirit of the IGAE, the governments have also attempted to develop a number of national approaches to natural resource management (NRM) which are relevant for our purposes. In 2001, COAG established a special intergovernmental body to deal with NRM known as the Natural Resource Management Ministerial Council (NRMMC).

In 2004, for example, the NRMMC released the 2004–2007 National Biodiversity and Climate Change Action Plan (AP) to identify priority areas for research and monitoring and to get a better understanding of the potential impacts of climate change on Australia's biodiversity. The objectives of the AP are to: improve our understanding of the impacts of climate change on biodiversity; increase awareness of climate change impacts and our capacity to respond; minimise the impacts of climate change on inland aquatic and semi-aquatic ecosystems; minimise the impacts of climate change on marine, estuarine and coastal ecosystems; minimise the impacts of climate change on native terrestrial species, communities and ecosystems; minimise the impact of invasive organisms on biodiversity in future climates; and factor the impacts of climate change on biodiversity into natural resource management and land-use planning. The AP builds on commitments already made in the National Objectives and Targets for Biodiversity Conservation 2001–2005 and the initiatives to conserve biodiversity and address climate change at State and Territory levels. It sets out a number of adaptation strategies to minimise the impacts of climate change.

The other very important COAG body for our purposes is the Ministerial Council on Energy referred to extensively in Chapter 5.

Having set out the constitutional powers to legislate on environmental matters, and more recent cooperative arrangements between the Federal and the State governments, the Australian government's response to the significant problems posed by climate change and attempts to establish a sustainable energy framework for Australia can be assessed.

4.3 The Australian government's responses at an international level to greenhouse gas emissions

As indicated earlier, the Federal government has consistently refused to ratify the Kyoto Protocol unless the United States and developing countries ratify. The government has claimed that without such ratification the Protocol will not be

[7] See, for example, *Richardson v Forestry Commission* (1988) 77 ALR 237 and *Queensland v Commonwealth* (1989) 86 ALR 519.

effective, and will damage Australia's economy. While it continues to insist that it will not ratify the Protocol, it will be difficult to construct an energy policy that is consistent with the principles of ESD (Environmentally Sustainable Development). This is because the Protocol is regarded by the international community as an important instrument to begin combating one of the most significant barriers to ESD – global climate change.

To understand the Federal government's stance on the Kyoto Protocol it is necessary to analyse the position which it adopted going into the Kyoto negotiations in December 1997. Prior to Kyoto, the Federal government insisted that it wanted the outcome of the negotiations to be fair and achievable, defining a fair outcome as one where the costs of reducing greenhouse emissions would be shared equitably by all countries.[8]

In developing its pre-Kyoto position, the Federal government relied on economic modelling undertaken by the Australian Bureau of Agricultural and Resource Economics (ABARE).[9] ABARE concluded that the cost to the Australian economy of reducing greenhouse emissions would be 22 times higher than the loss estimated by the average European country, and six times higher than the United States. This meant that Australia would be expected to sacrifice jobs even though it only contributes 1% of the world's emissions compared with 19% for the USA, and 14% for the EU. For Australia to meet the proposed target it would have to sacrifice highly efficient coal mining, mineral processing[10] and agricultural production.[11] Australia also argued that the target would result in the displacement of emissions to neighbours.[12] As a result, Australia argued strongly for the principle of *differentiation* to be accepted and adopted when setting national emissions reduction targets as this would also encourage developing countries to participate in reduction programs.[13]

There has been a great deal of criticism of the government's position at Kyoto particularly since it relied entirely on ABARE modelling to reach the conclusions that it did. ABARE modelling did not consider the potential losses to Australia like the social, environmental and economic costs of bushfires, floods and tropical cyclones, natural disasters resulting in loss of crops and production and widespread property damage.[14] ABARE also did not account for benefits to the Australian economy of developing and selling renewable energy

[8] In the Federal government's view, uniform international emissions targets, of reducing emissions to 5% below that of 1990, would not be fair while the EU allowed some countries to reduce their emissions by 30% while others would increase emissions by 40%. Furthermore, based on anticipated economic growth, Australia's emissions would probably increase by 40% compared with 1990 levels.

[9] ABARE is a public sector economic research agency located in the Commonwealth Department of Primary Industry and Energy.

[10] In particular, energy-based commodities like the processing of aluminium which produces high emissions.

[11] Australia's food and fibre production results in high methane emissions from cattle and sheep (second highest per capita in the world).

[12] For example, if Australia were to be penalised for emissions produced in processing natural liquid gas for export to neighbours, neighbours would not get the benefit of a less polluting energy source.

[13] Note that ABARE forecast that by 2004 emissions from developing countries will exceed those from developed countries.

[14] Between 1989 and 1994 Federal government spent $280m on disaster relief.

technologies like solar and wind, in which it has been recognised as a world leader.[15]

In addition, the consultation process used by ABARE to draw its conclusions was found to be fundamentally flawed by a Commonwealth Ombudsman[16] investigation, instigated by the Australian Conservation Foundation (ACF). The ACF's principal complaint was that 45% of the costs of ABARE's modelling were borne by 'sponsors' who had been offered a place on a 'steering committee'. With sponsors having to pay a $50,000 membership fee, participation was only affordable for industry groups. The Ombudsman found that: the constitution of the steering committee showed the close involvement of industry in modelling; the steering committee was not a proper one in accordance with the Australian Public Service because it had no proper terms of reference, should have ensured that all stakeholders were represented to give a balanced view, and that information should have been regularly disseminated to stakeholders; that it was highly unusual to charge a fee for participation in a steering committee; that greenhouse gas emissions are an important matter of public policy; that ABARE had made erroneous claims with regard to referees of the report; that ABARE had acted inappropriately; that ABARE must ensure that all sources of external funding be disclosed in research publications based on its climate change models; and that guidelines given to agencies to deal with external funds are not adequate.

Indeed, more recent studies refute ABARE's climate change modelling. The 2002 *Warwick McKibbin Report* concludes that the cost of participating in the Kyoto Protocol to Australia by 2010 is estimated to be 0.41% of GNP, or approximately $A3.4 billion in 1999 dollars. This loss rises over time to 0.58% of GNP in 2015 and 0.67% of GNP in 2020. If measures for greenhouse gas reductions identified by the Australian Greenhouse Office (AGO), like emissions trading, are adopted over the period, the loss is reduced to 0.33% in 2010, 0.47% in 2015 and 0.51% by 2020. However, if Australia does *not* participate in Kyoto but other Annex B countries (excluding the United States) do participate, the cost is still high to Australia, representing 0.40% of GNP in 2010, 0.38% in 2015 and 0.30% by 2020. This cost is reduced, however, by adopting the AGO measures.[17] Meanwhile, in 2003 the NSW Cabinet Office released the *Report of the Kyoto Protocol Ratification Advisory Group: A Risk Assessment*. The Advisory Group found that if Australia *does* ratify and meets its targets using international emissions trading, the impacts are likely to be the following: GDP would be 0.11% ($875 million per year) lower than under a business as usual approach in the first commitment

[15] See, for example, The Allen Consulting Group, *Sustainable Energy Jobs Report* (2003) available at <http://www.allenconsult.com.au/publications/download.php?id=221&type=pdf&file=1> and the *Sustainable Energy Jobs Report: Wind Manufacturing Case Study* (2003) available at <http://www.allenconsult.com.au/publications/download.php?id=220&type=pdf&file=1>. The Reports conclude that in a competitive energy market, the States that establish a strong and dynamic sustainable energy sector will build a significant first mover advantage.

[16] Exercising powers under the *Commonwealth Ombudsman Act 1977* (Cth).

[17] See *Modeling Results for the Kyoto Protocol*, *Warwick McKibbin Report to the Australian Greenhouse Office*, 5 April 2002, available at <http://www.greenhouse.gov.au/international/kyoto/pubs/modeling.pdf>.

period. If Australia *does not* ratify and a domestic emission trading scheme is adopted, the impact is likely to be the following: GDP will be 0.26% ($2 billion) lower each year.

4.4 Responses from civil society to the refusal to ratify Kyoto

Civil society has been quite vociferous in its opposition to the Federal government's stance on Kyoto. In February 2002, the Australia Institute, an independent think tank, produced a report which showed that the Federal government has supported narrow industry interests by refusing to ratify. The Institute notes that the Australian aluminium industry has been the most forceful opponent of policies to reduce greenhouse gas emissions, claiming that higher energy prices would damage its competitiveness and force it to move offshore. The industry consumes almost 15% of all electricity consumed in Australia, with emissions accounting for 5.9% of Australia's total emissions. In addition, the industry pays below market prices for electricity, which represents a subsidy estimated to be between $210 million–$250 million.[18]

The aluminium industry's claims about the costs of electricity in a carbon-constrained economy were refuted in an Origin Energy report, produced by McLennan Magasanik Associates.[19] The report refuted ABARE's claim that cutting greenhouse gas emissions could increase the cost of electricity by 50% by 2015. The report found that a higher level of gas-fired generation coupled with increasing the Mandatory Renewable Energy Target (MRET) to 10% under the *Renewable Energy (Electricity) Act 2000* (Cth) would enable Australia to meet its Kyoto targets, without the rise in price predicted by ABARE. In fact, the report concludes that the impact on price would be minimal and would not impact on the cost competitiveness of Australian industries that are energy intensive.

Also, Environment Business Australia (EBA), the peak body for the environment and sustainability industry, produced a report entitled *The Business Case for Ratification of the Kyoto Protocol*.[20] EBA identified three fundamental issues that need to be addressed: the need for comprehensive unbiased modelling that is not captured by a particular business sector and that analyses the costs and benefits to Australia of not ratifying the Kyoto Protocol;[21] Australia's long-term competitiveness and economic growth; and the emerging environment and sustainability

[18] Note that *The Heat is On: Australia's Greenhouse Future* (Federal Senate References Committee, 2000) recommended greater transparency from large electricity consumers about the prices they pay for electricity if those prices are fixed outside the pool and especially where their low electricity prices are being subsidised by public monies; Recommendations 25–26; see Hal Turton, *The Aluminium Smelting Industry: Structure, Market Power, Subsidies and Greenhouse Gas Emissions* (The Australia Institute Discussion Paper, Jan 2002), available at <http://www.tai.org.au>.

[19] See *Incremental Electricity Supply Costs from Additional Renewable and Gas-fired Generation in Australia* (23 August 2003) available at <http://www.originenergy.com.au/about/files/MMAReport.pdf>.

[20] Environment Business Australia, *The Business Case for Ratification of the Kyoto Protocol: Consultation Draft*, 2 July 2002.

[21] Ibid at 5.

industry, like the renewable energy industry, which could become an important player in world markets. The EBA stated that modelling needs 'to incorporate conflicting time scales, demographic pressure, perverse subsidies and the external costs of pollution, costs of mitigation or adaptation, new technologies and systems offering a low carbon future, and above all a framework that enable[s] effective market[s] to develop and operate'.

All of the major environmental NGOs have rejected the Australian government's refusal to ratify. The ACF accused the Federal government of marooning Australia with 'an old style smokestack economy'. It pointed also to the fact that renewable energy, emissions trading and energy efficiency developments are being forced offshore.[22] Meanwhile Greenpeace Australia Pacific has released an opinion poll which indicates that the majority of Australians reject the Federal government's stance on Kyoto.[23] Of those polled[24] only 17% of Australians agreed with the government while 71% believed it to be in Australia's interests to ratify. The poll also showed that 62% of respondents believed that ratifying would have a positive or no effect on the economy with only 22% disagreeing.

The Australian Catholic bishops have called on government to ratify the Kyoto Protocol.[25] Releasing their annual social justice statement, *A New Earth – The Environmental Challenge*, the bishops highlighted the fact that Australians are known to be the highest emitters of greenhouse gases in the world and that they owe a duty to their seven million Pacific Island neighbours to curb their excessive lifestyles. The Pacific Islanders' survival is at risk from rising sea levels.

Finally, 250 of Australia's academic economists are signatories to a statement on climate change.[26] These economists, including 39 professors, have all urged the Prime Minister to ratify the Protocol citing the serious environmental,[27] economic and social risks that Australia is likely to suffer as a result of global climate change. The economists claim that policy options are already available that would slow climate change without harming employment and living standards in Australia.

4.5 The Federal government adopts a 'no-regrets' policy on climate change

Despite numerous calls to ratify the Kyoto Protocol, the Federal government has not indicated any departure from its refusal to ratify and relies instead on a 'no-regrets' policy. In terms of the policy, the government claims to have invested

[22] Australian Conservation Foundation, 'Australian-US "pollution" partnership', Media Release, 11 July 2002.
[23] Greenpeace Australia Pacific, 'Australians support Kyoto', Media Release, 9 July 2002.
[24] A telephone poll of 1000 people was conducted across Australia between 14–16 June 2002 by Taylor Nelson Sofres.
[25] Media Release, Bishops' Committee for Justice, Development, Ecology and Peace, 13 September 2002.
[26] Australia Institute, Media Release, 14 August 2002.
[27] The economists, in expressing their concerns about climate change, referred to the IPCC's assessment, among others, of the harm that Australia is likely to suffer.

$1 billion in various voluntary greenhouse initiatives. One of the most significant of these initiatives was the establishment of the Australian Greenhouse Office (AGO), the world's first government agency dedicated to cutting greenhouse gas emissions. It was established in 1998 as a separate agency within the environment portfolio to provide a whole-of-government approach to greenhouse matters.

The AGO administers the Commonwealth government's climate change package, Safeguarding the Future: Australia's Response to Climate Change[28] and the Measures for a Better Environment package announced as part of Australia's new tax system in 1999.[29]

The 1997 Safeguarding the Future package includes:

- The Greenhouse Challenge, which is a voluntary industry program to reduce greenhouse gas emissions, drive continuous improvement and enhance knowledge and understanding of the best ways of managing greenhouse gas emissions (A$27.1 million);
- The Renewable Energy Equity Fund, which is an investment program to encourage the commercialisation of research and development in renewable energy technologies (A$19.5 million); and
- The Renewable Energy Commercialisation Program (RECP), which is a grant program to support innovative renewable energy equipment and technologies (A$29.6 million).[30]

The 1999 revised tax system package, Measures for a Better Environment, includes the following programs:

- Greenhouse Gas Abatement Program (GGAP)[31] to financially support activities likely to result in substantial emissions reductions or substantial sink enhancement, particularly in the first Kyoto Protocol commitment period of 2008–12 (A$400 million);
- Renewable Remote Power Generation Program to increase the uptake of renewable energy in remote areas, especially to meet the energy needs of indigenous people (A$179.9 million);
- Photovoltaic Rebate Program (PVRP) to encourage the long-term use of photovoltaic technology especially by granting subsidies for the use of solar hot water systems (A$34.6 million);
- Alternative Fuels Conversion Program (AFCP) to reduce emissions and improve urban air quality by encouraging heavier commercial road

[28] Statement by John Howard, Prime Minister of Australia, Safeguarding the Future: Australia's Response to Climate Change (20 November 1997), available at <http://www.greenhouse.gov.au/ago/safeguarding.html>.

[29] See AGO, at <http://www.greenhouse.gov.au/measures> (accessed 15 April 2004). This package was announced in May 1999 as part of the introduction of the Goods and Services Tax (GST) in Australia. It was negotiated with the Australian Democrats who allowed the GST legislation to pass in the Senate based on the additional greenhouse initiatives contained in the package.

[30] See also *Renewable Energy (Electricity) Act 2000* (Cth).

[31] The aims of the Program are to: fund initiatives that will result in sustained reductions in emissions during the first commitment period (2008–12); be cost-effective while having a least cost impact on the economy; be consistent with the principles of ecologically sustainable development; and generate the use of new technologies and provide opportunities particularly for rural and regional Australia. See *The Heat is On*, notes 17 and 34, at 120.

vehicles and public transport buses to operate on compressed natural gas, or liquefied petroleum gas (A$71.4 million); and
- Extension of RECP program with additional funding for industry development component (A$26 million).[32]

The total value of the programs is $1.8 billion.

A more recent 'no-regrets' initiative of the AGO has been the Greenhouse Friendly/Greenhouse Free program, which is an endorsement for products with greenhouse emissions offset by projects financed by companies and approved by the AGO. The AGO provides companies with approved methods for estimating greenhouse emission reductions from abatement projects and a list of Greenhouse Challenge accredited verifiers so proposed abatement projects can be independently verified.[33]

As will be shown, various groups, including the AGO, have serious doubts as to whether the Federal government's 'no-regrets' policy will deliver any significant reductions in emissions.

4.6 The Senate reviews the Federal government's response to global climate change

There is no doubt that a significant amount of Federal government funding has been spent on reducing Australia's greenhouse gases under the 'no-regrets policy', and that inevitably some reductions in emissions will be achieved. The question remains, nevertheless, whether this policy will deliver the reductions required, particularly when one considers the Auditor-General's assessment of the funding package, mentioned below. In addition, on 7 November 2000 the Australian Senate Environment, Communications, Information Technology and the Arts References Committee tabled a Report[34] entitled *The Heat is On: Australia's Greenhouse Future*. [35] The Report was critical of many aspects of the Federal government's 'no-regrets' policy, as well as some of the regulatory measures that have been attempted. The Committee made 104 recommendations, focusing on: the impacts of global warming; the Kyoto Protocol; Australia's

[32] For example, the aim of the National Average Fuel Consumption Target is to impose new fuel efficiency standards to secure a 15% fuel efficiency improvement target by 2010 over business as usual. Note that the *Fuel Quality Standards Act 2000* (Cth) has been passed by the Federal government to enable it to make mandatory national quality standards for fuel supplied in Australia. The standards will be based on international standard vehicle and emission control technologies. Standards will be set for petrol, diesel and liquefied petroleum gas. One of the main objectives of the Act is to reduce pollutants and emissions arising from the use of fuel that may cause environmental, greenhouse and health problems. In addition, a new labelling system for passenger vehicles sold in Australia has been introduced. The label is required under a new Australian Design Rule (ADR) 81/00 Fuel Consumption Labelling for Light Vehicles and must state the fuel consumption in litres per 100 km to enable consumers to make decisions based on fuel efficiency and environmental protection.
[33] Greenhouse Friendly Certification Program, available at <http://www.greenhouse.gov.au/greenhousefriendly/index.html> (accessed 14 April 2004).
[34] See discussion below. Note that the References Committee conducted 13 public hearings as part of the inquiry and received 227 submissions, as well as holding a number of roundtables and site inspections.
[35] The Senate referred the global warming inquiry to the Committee on 11 August 1999.

greenhouse performance and strategy; the energy, transport and agricultural sectors; the Greenhouse Challenge; and emissions trading.

The following recommendations are worth noting: that the Federal government take a leadership role in international negotiations on climate change to achieve ratification of the Protocol;[36] that the Council of Australian Governments (COAG) designate the reduction of greenhouse emissions as a goal of ongoing energy market reform;[37] that the Australian renewable energy industry capture 5% of the global market by 2015;[38] that the Greenhouse Challenge program be radically overhauled as it will otherwise severely constrain the government's capacity to achieve significant emission abatement;[39] that there be more substantial action in the transport sector across a broad range of government activity;[40] and that there is a need for a coordinated approach to emissions from the forestry, land management and agriculture sectors.[41]

The Federal government rejected a number of the key criticisms made by the Senate Committee. The essence of its response was simply to restate the programs and policies which it has implemented, in spite of the fact that many of these initiatives had been heavily criticised in the Report.[42]

4.7 Restructuring and underspending of the AGO

Since the Senate released *The Heat is On* there have been further indications that all is not well with the 'no-regrets' policy. The AGO was reviewed in 2002 and although it maintains its status as an executive agency, its powers have been subordinated to some extent to the Department of Foreign Affairs and Trade. Also the AGO is now required to report more formally to both the Minister for the Environment and Heritage and the Minister for Industry and Resources. This is to cure the perception that the AGO has displayed a bias towards environment rather than industry interests.[43] Given the fact that some industry interests have militated against the ratification of the Kyoto Protocol, this consultation requirement is likely to constrain the activities of the AGO, at least to some extent.

[36] Ibid Recommendation 10. [37] Ibid Recommendations 30–32, 36, 37.
[38] Ibid Recommendations 41–44. [39] Ibid Recommendations 84–95.
[40] Ibid Recommendations 45–65. [41] Ibid Recommendations 66–83.
[42] See the 100-page AGO's *Government Response to the Heat is On*, June 2001. See also Senator Hill's Media Release where he reiterated the government's commitment to the National Greenhouse Strategy; National Greenhouse Gas Inventory; Measures for a Better Environment package; Safeguarding the Future package; Greenhouse Challenge; Energy Efficiency Best Practice program; various renewable and alternative energy initiatives; investigations into domestic greenhouse trading, credit for early action; and a greenhouse trigger in the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). Note that the greenhouse trigger has not yet been gazetted.
[43] Key recommendations include: revoking the AGO's status as an executive agency and incorporating in Environment Australia while retaining its distinct identity; allowing the AGO to continue to lead domestic greenhouse policy but requiring it to take a subordinate position to the Department of Foreign Affairs and Trade on international greenhouse issues; and that a whole-of-government approach be adopted to greenhouse policy, rather than favouring environmental interests; see Hon. Warwick L Smith LLB *Independent Review of the Australian Greenhouse Office* (June 2002, released 4 February 2003), at iii.

Meanwhile, the AGO's 2001/2002 *Annual Report*[44] showed that the Federal government had underspent on climate change by $144 million. Much of the money that was not spent was allocated to the Measures for a Better Environment Package, which was the package negotiated by the Democrats with the government to secure Democrat support for the introduction of the GST. Other very successful schemes, like the Photovoltaic Rebate Program, which offers a rebate to homeowners who install solar panels, was threatened with closure until the Federal government agreed to re-fund it for 2 years. Can the slower than expected uptake of funding be attributed to the fact that to date the 'no-regrets policy' is largely voluntary? Experience in New South Wales with greenhouse benchmarks for electricity retailers (discussed in Chapter 6) may provide a clue.

4.8 The Australian National Audit Office audits the AGO

Many of the concerns raised by the Senate Committee were reiterated by the Australian National Audit Office (ANAO) in a 2004 audit of the AGO.[45] The ANAO has made a number of key findings.

4.8.1 Planning for results and program objectives

The ANAO found that the revised tax package, Measures for a Better Environment (MBE), was developed in a short time frame with little input from the AGO. The absence of a comprehensive risk assessment early in the life of the programs had negative consequences for the PVRP and the ACFP programs, which are two of the key programs in the MBE package. There was a lower than expected demand for ACFP funding and a higher than expected demand for PVRP funding.[46] Across all seven programs, commitments as of 30 June 2003 represent 71.1% of total funding, but actual expenditure only accounts for 23.4%.[47] Also, although the MBE established objectives and performance measures for all programs, they are too broad with few measurable targets, making it difficult to capture and meaningfully report on key program results.

[44] *Australian Greenhouse Office Annual Report 2001–2002* (Australian Greenhouse Office: 2002); see also Media Release, Shadow Minister for the Environment and Heritage, 31 October 2002. In particular, there has been a slower than expected uptake of monies allocated to the GGAP and the Remote Renewables Program.
[45] *Australian Greenhouse Office Audit Report* No. 34 (2003–2004), available at <http://www.anao.gov.au/WebSite.nsf/ WhatsNew/133248B3DFD000FBCA256E4C006F0A6F!OpenDocument>.
[46] Note that in June 2003, there was a real danger that this successful program would run out of funding. However, the program recently received an extension for a further 2 years to June 2007, with additional funding of $11.4 million. As part of the extension, program guidelines are currently being reviewed by the Department of Environment and Heritage; see <http://www.greenhouse.gov.au/renewable/pv/> (accessed 19 October 2005).
[47] Ibid.

4.8.2 The design of performance measures

The ANAO found that the AGO tends to develop performance measures as programs evolve rather than at the outset.[48] This means that the AGO has significantly improved its performance measures since it was last reviewed in 2000. However, there are challenges remaining. These include problems measuring the impact of programs and the extent of emissions abatement. Reconciling national emissions projections with the actual program results and progress data has been an ongoing challenge for the AGO. The ANAO believes that a more integrated system across programs should be given high priority to enhance the accuracy and consistency of performance information.

4.8.3 The design of program delivery

Cost-effectiveness and transparency are two key issues related to program delivery. While the programs examined by the ANAO were generally designed to meet transparency and public accountability requirements, the ANAO is concerned about the transparency of the Greenhouse Challenge. In particular, the ANAO reiterated concerns raised by the 2000 *The Heat is On* report as to whether the abatements claimed accurately reflect the results achieved by the program.[49] For example, there is insufficient evidence that the Challenge has produced results that are different from those derived from a 'business as usual' approach, where companies were in any case improving environmental management through adopting ISO 14001 standards or complying with State initiatives for reducing greenhouse gas emissions.[50] The ANAO states that methodologies need to be refined as a high priority to ensure that the program design reflects acceptable standards of transparency and accountability.[51]

4.8.4 Guidelines and applications

The ANAO found that all relevant programs examined in the audit have detailed guidelines that cover issues of eligibility, selection criteria, appraisal, monitoring and evaluation.[52] The programs also have application forms that are clear and linked to guidelines and program objectives.

4.8.5 Appraisal and selection

The ANAO found that in order to improve the rigour and transparency of the appraisal and selection process, the AGO should apply an order of merit rating scheme across competitive programs, and make recommendations on selection to the Minister that highlight projects which are most likely to achieve their stated objectives.[53]

[48] Ibid. [49] Ibid. [50] Ibid. [51] Ibid. [52] Ibid. [53] Ibid.

4.8.6 Management and monitoring of agreements

The ANAO found that funding agreements across the projects are well drafted and the links between payments and the achievement of milestones are explicitly stated.[54] However, where time frames for negotiating funding agreements have lasted for 2 years, the risk increases that projects will not achieve their objectives. The ANAO also found that actual expenditure has been low compared with original budget estimates.[55] Overall, the system for managing agreements with the use of legal agreements is good.

4.8.7 Evaluation and reporting

The AGO has developed good practice in evaluating all of the programs subject to the audit. However, there is room for improvement, particularly with respect to the risk of overstating abatement.

4.8.8 Public reporting on results

The ANAO found that annual reports prepared by the AGO have a number of shortcomings, especially where targets in place for programs have not been consistently reported against.[56] Trends and changes over time are not always obvious and risks and challenges are not well articulated. In many cases, where targets do exist, there is a lack of actual program performance data to illustrate progress against the target. For example, under the AFCP program the target is to convert 800 buses in each of the 4 years of the program.[57] However, the 2002–03 Annual Report states that 568 buses have been converted to natural gas reflecting a 150% increase since the program began, which does not report performance against the target.[58] This could mislead the public as to the success of the program. Also where the Minister has indicated that measures adopted will eventually produce a reduction in greenhouse gases of 67 Mt $CO_{2\text{-}e}$ (metric tonnes of carbon equivalent), the annual report provides no basis to demonstrate progress towards this target from the programs being funded.[59] The ANAO concluded that there is significant scope for improvement in the AGO's reporting processes.[60]

4.8.9 Conclusions

Clearly, according to the Auditor-General's report there are still many concerns about the AGO's management of the 'no-regrets' package, as well as the ability of the package itself to deliver significant greenhouse gas emissions reductions for Australia. This report must surely be another blow to the Australian government's continued insistence that, because it has allocated A$1.8 billion to its 'no-regrets' package, it is immune from criticism for its stance on climate change.

[54] Ibid. [55] Ibid. [56] Ibid. [57] Ibid. [58] Ibid. [59] Ibid. [60] Ibid.

4.9 Has the Australian government legislated to bring energy and climate change within its environmental assessment jurisdiction?

4.9.1 *Environment Protection and Biodiversity Conservation Act 1999* (Cth)

Although as we indicated above, the Australian government has implied constitutional powers to regulate energy and climate change matters in Australia, it has done very little to bring these issues within its jurisdiction.

The most significant piece of Commonwealth environmental law currently in existence is the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). The constitutional basis for the EPBCA is primarily external affairs as it incorporates into domestic legislation Australia's obligations under various international environmental conventions including the Convention Concerning the Protection of the World Cultural and Natural Heritage,[61] the Convention on Biological Diversity,[62] and the Ramsar Convention on Wetlands.[63] The Australian government also relied on the corporations power and the trade and commerce power to enact the legislation. For these reasons, it is clear that the EPBCA could be used to incorporate into domestic law Australia's obligations under the United Nations Framework Convention on Climate Change which it has ratified. However, as will be shown below, the Australian government has declined to use it for these purposes.

The Act was created by the Australian government as a result of the agreements struck under the 1993 Intergovernmental Agreement on the Environment. It commenced on 16 July 2000. The environmental assessment provisions are 'triggered' where an activity has or will have a significant impact on matters of national environmental significance. These include: 'declared' World Heritage property;[64] 'declared' wetlands;[65] listed threatened species or communities;[66] listed migratory species;[67] nuclear actions;[68] the marine environment;[69] additional matters prescribed by regulation;[70] and Commonwealth land.[71]

Before deciding on what type of environmental assessment is appropriate, the Minister must first decide whether an action is a 'controlled action'.[72] In deciding whether action is a 'controlled action', the Minister must consider the Administrative Guidelines. Then the Minister must designate a person as the proponent of the action who must then provide the Minister with preliminary information to enable him/her to decide on an approach for assessment.

The Minister must then decide on an assessment approach which could be: assessment by an accredited assessment process; assessment on preliminary

[61] ILM available at <http://whc.unesco.org/world_he.htm> (accessed 3 December 2004).
[62] ILM available at <http://www.biodiv.org/convention/articles.asp> (accessed 3 December 2004).
[63] ILM available at <http://www.ramsar.org/> (accessed 3 December 2004).
[64] *Environment Protection and Biodiversity Conservation Act 1999* (Cth) s 12.
[65] Ibid s 16. [66] Ibid s 18. [67] Ibid s 20. [68] Ibid s 21. [69] Ibid s 23.
[70] Ibid s 25. [71] Ibid s 26. [72] Ibid s 67.

documentation; assessment by public environment report; assessment by environmental impact statement; or assessment by inquiry.[73] The Minister may enter into bilateral agreements with States and Territories with respect to assessment process.[74] States may be accredited either to carry out the assessment, or to carry out the assessment and give approval.

4.9.2 Draft 'greenhouse trigger' under the EPBCA: where is it hiding?

In November 2000, a draft regulation, constituting a potential EPBCA 'greenhouse trigger', was circulated for comment by the then Minister for the Environment, Senator Robert Hill. It will be remembered that in addition to the matters of national significance enumerated in the EPBCA, other matters may be prescribed by the Minister by way of regulation. The draft regulation provided that action that results, will result or is likely to result in the emission of greenhouse gases (GHGs) equalling 0.5 million tonnes of carbon dioxide is prescribed. An action results in GHG emissions if GHGs are emitted as a direct result of the action, or in the process of generating or transmitting electricity that is used for the action, or in the process of producing or transporting fuel that is used for the action. The amount of GHGs emitted was to be worked out in accordance with the *National Greenhouse Gas Inventory Workbook*.

The regulation would not apply to action that before 10 November 2000, the Minister decided under s 75(1) of the Act was a controlled action, or if specifically authorised under a law before the commencement of the regulation and no further authorisation of the action was required under a law that has the object of protecting the environment or promoting the conservation and ecologically sustainable use of resources, or the action is a continuing lawful use.

Despite the circulation of this draft regulation in 2000, it has still not been gazetted. Frequent requests by the authors to determine the status of the regulation have been met with the response that the regulation is still under consideration.

4.9.3 Assessing wind farm developments under the EPBCA

The development of wind farms as a renewable energy source has caught the attention of various state governments, which have sought to legislate specifically for their development.[75] The question arises whether such developments are assessable under the EPBCA. It is likely that all wind farm developments will be referred under the EPBCA for assessment as they commonly impact on 'matters

[73] Ibid Part 8. [74] Ibid Part 5.

[75] See for example, *Electricity Industry (Wind Farm Development) Act 2004* (Vic), and announcement by NSW Minister for Infrastructure, Planning and Natural Resources that all large-scale wind farm developments will be declared State significant development and be assessed by the Minister under the *Environmental Planning and Assessment Act 1979* (NSW).

of national significance'. These include impacts on listed threatened species, listed migratory species and Ramsar wetlands. Controlled action determinations under the EPBCA are site specific and are unique to each proposal in relation to the siting and numbers of turbines. An assessment of wind farm proposals will include whether they are located in migratory flight paths, are in close proximity to Ramsar wetlands or in the vicinity of listed threatened species or migratory species. The assessment approach required under the EPBCA is unique to each proposal and depends on the level of information provided by the proponent in the preliminary documentation.

Meanwhile, the Australian Wind Energy Association (AWEA) has recently developed its own *Wind Farms and Birds: Interim Standards for Risk Assessment*.[76] The AWEA reports that the Australian wind energy industry is developing rapidly with 5000MW of capacity either already developed, being developed or anticipated by 2010. However, the AWEA acknowledges the following impacts of wind farms on birds: collisions by birds with operating wind turbines, leading to mortality; and disturbance to birds and resulting avoidance of habitats in and near wind farms. Collisions are likely to depend on technology issues such as the type of wind turbine, site characteristics, the risk behaviours of birds and weather conditions.

The AWEA's new recommendations now suggest three levels of assessment for wind farms. These include:

- Level 1 – if an initial assessment determines that the risk to birds is low, or can be reduced to a low level through appropriate mitigation measures, design reviews or siting alteration, no further investigation is recommended. If not, Level 2 investigations are recommended
- Level 2 – investigations must refine the risk assessment done in Level 1 and undertake a more intense assessment of the risks. If the assessment determines that the risk to birds is low, or can be reduced to a low level through appropriate mitigation measures, design reviews or siting alteration, no further investigation is recommended. If not, Level 3 investigations are recommended.
- Level 3 – further investigations of the risk are undertaken.

These investigations will provide: estimates of the level of risk of significant bird impacts; baseline data for use in operational phase monitoring of impacts; and information for use in the design of risk mitigation measures.

4.9.4 Are forestry activities a matter of national significance?

As discussed below, the burning of biomass derived from native forests is recognised as a renewable energy source under the *Renewable Energy (Electricity) Act 2000* (Cth). This particular provision of the legislation caused considerable concern at the time of its enactment, and threatened its passage through the Senate.

[76] AWEA, July 2005 available at <http://www.auswea.com.au/auswea/downloads/Bird_Report.pdf> (accessed 16 October 2005).

The concern centred on the impact of the legislation on old growth forests, but also on the fact that the burning of biomass is itself a greenhouse intensive activity. Given this, the question arises whether or not the EPBCA is 'triggered' where biomass is harvested from old growth forests. It will be remembered that under the predecessor to the EPBCA, the *Environment Protection (Impact of Proposals) Act 1974*, forestry activities implicated the Federal government. The Act required an officer of the Commonwealth to consider whether or not a decision would have a significant environmental impact. If so the officer was required to call for an environmental impact assessment to be undertaken.

Unfortunately, the environmental assessment provisions of the EPBCA do not apply to Regional Forestry Agreement forestry operations. Now forestry activities occur in terms of Regional Forestry Agreements (RFAs) which are 20-year plans for the management of Australia's native forests. They are the result of a 1992 agreement between the Commonwealth, State and Territory governments to work towards a shared vision of Australia's forests, resulting in the National Forest Policy Statement (NFPS). The NFPS sets out broad national goals to be pursued at regional levels. RFAs are supposed to strike a reasonable balance between conserving Australia's forest estate and its enduring use for economic production and recreation. There are 10 RFAs in four States: Western Australia, Victoria, Tasmania and New South Wales. The RFAs are based on a series of Comprehensive Regional Assessments (CRAs) of the social, economic, environmental and cultural and natural heritage values of each region's native forests. The development of the RFAs was very controversial within the environmental movement in Australia. The effect of the RFAs is that the use of biomass for renewable energy is assessed only at a State level under relevant environmental impact assessment legislation.

It is worth noting, however, that the 2003 *Renewable Opportunities, A Review of the Operation of the Renewable Energy (Electricity) Act 2000* (MRET Review)[77] reported that as of 30 April 2003, 127,338 Renewable Energy Certificates, generated from the burning of wood waste, had been registered, but that none of these were from non-plantation forestry. The Review concludes therefore that no adverse biodiversity impacts had arisen from the operation of the Act.

4.10 Renewable energy legislation at the Federal level

4.10.1 *Renewable Energy (Electricity) Act 2000* (Cth)

Building on the relative success of the Green Power program the Federal government has enacted the *Renewable Energy (Electricity) Act 2000* (Cth).[78] The

[77] MRET Review available at <http://www.mretreview.gov.au/report/index.html>.
[78] For a detailed discussion of this Act see Adrian Bradbrook and Alexandra S Wawryk, 'Government Initiatives Promoting Renewable Energy for Electricity Generation in Australia' (2002) 25(1) *UNSW Law Journal* 124 at 146–53.

object of the Act is to encourage the *additional* 2% generation of electricity from renewable sources by 2010. As a result of historic investment in hydro-electric schemes in Tasmania and New South Wales, dating back to the 1950s, 10% of Australia's electricity supply was renewable before the introduction of the Act.

4.10.1.1 Creating Renewable Energy Certificates

Under the Act accredited power stations will be given a 1997 eligible renewable power baseline. Power stations will create renewable energy certificates (RECs) when they generate power using renewable energy sources[79] that exceed the 1997 baseline.[80] Certificates can also be created by installations of solar hot water heaters that are installed after January 2001 and which replace non-renewable heaters.[81]

A generator needs to be registered and accredited before a certificate can be issued in relation to the power generated by it. If an application for accreditation is approved, the power station must be allocated a unique identification code and it must be advised of the code.[82] Certificates must be created electronically containing a unique identification code, the electronic signature of the person who created the certificate, the date on which the electricity was generated and the date on which the certificate was created. Certificates must be registered with the Regulator. It is an offence of strict liability to create a certificate that one is not entitled to create and a penalty can be imposed in respect of the creation of each improperly created certificate. Once registered, certificates can be transferred to any person subject to the Regulator being notified. Any body accredited by the Australian Securities and Investment Commission or similar body can act as a broker in renewable energy certificates between renewable electricity generators, liable parties and third parties.[83] Once a certificate is surrendered by a liable party to the Regulator it loses its validity.[84]

4.10.1.2 Renewable energy sources

The following energy sources are 'eligible renewable energy sources':

(a) hydro;
(b) wind;
(c) solar;
(d) bagasse cogeneration;
(e) black liquor;
(f) wood waste;
(g) energy crops;
(h) crop waste;
(i) food and agricultural wet waste;
(j) landfill gas;
(k) municipal solid waste combustion;

[79] Eligible renewable energy sources are defined in s 16 of the *Renewable Energy (Electricity) Act 2000* (Cth).
[80] Ibid, s 18. [81] Ibid, ss 18–30 for detailed provisions relating to RECs.
[82] Ibid, Part 2. [83] Ibid, Part 2, Division 4. [84] Ibid, Part 2.

(l) sewage gas;
(m) geothermal-aquifer;
(n) tidal;
(o) photovoltaic and photovoltaic Renewable Stand Alone Power Supply systems;
(p) wind and wind hybrid Renewable Stand Alone Power Supply systems;
(q) micro hydro Renewable Stand Alone Power Supply systems;
(r) solar hot water;
(s) co-firing;
(t) wave;
(u) ocean;
(v) fuel cells;
(w) hot dry rocks.

However, the following energy sources are not eligible renewable energy sources:
(a) fossil fuels;
(b) waste products derived from fossil fuels.

4.10.1.3 'Liable entities' under the Act

The legislation is directed primarily at 'liable entities';[85] that is, entities which make a 'relevant acquisition' of electricity that is either a wholesale acquisition or a notional wholesale acquisition. A wholesale acquisition is essentially an acquisition from the National Electricity Market Management Commission (NEMMCO).[86] A notional wholesale acquisition is where a person acquires electricity from a generator and that person is not registered under the National Electricity Code, or where there is less than 1 km between the point at which the electricity is generated and the point at which the electricity is used. The electricity must be transmitted and distributed on a line that is used solely for this specific purpose.[87] These exceptions give effect to the government's agreement not to regulate self-generators under the scheme.

Liable entities are required to achieve individual renewable energy targets based on their projected market share of consumption, which can be projected 3 years in advance.[88] A liable entity calculates its target with reference to the renewable power percentage (RPP) that must be achieved in any given year. The RPP should be set by Regulation before 31 March each year and must relate to the required gigawatt hours (GWh), or mandatory renewable energy target (MRET), as set out in the Act (see table 4.1).[89]

A liable entity must surrender RECs to the Renewable Energy Regulator in discharge of its renewable energy liabilities under the Act.[90] So, if a liable entity makes a relevant acquisition of 100,000MWh of electricity in a given year, it would multiply that by the RPP to work out the number of RECs it has to surrender. For

[85] Ibid, s 35. [86] Ibid s 32. [87] Ibid s 33.
[88] Ibid, ss 36–43. Note that Green Power sales will not be able to be used by energy suppliers to meet their MRET obligations.
[89] Ibid s 40. [90] Ibid, s 41.

Required GWh of renewable source electricity	
Year	Required additional GWh
2001	300
2002	1100
2003	1800
2004	2600
2005	3400
2006	4500
2007	5600
2008	6800
2009	8100
2010 and later years	9500

Table 4.1 *Renewable energy targets*

example, the RPP for the year 2001 was 0.24%. Consequently, an acquisition of 100,000MWh would require the entity to surrender 240 certificates to discharge its liability that year.

The Act envisages that a market in RECs might develop where one liability entity is in possession of excess RECs and another has too few RECs to meet its obligation under the Act. To this end a REC which is registered may be transferred to any person.[91] However, a liable entity will face a non tax-deductible penalty of $40/MWh if it has not acquired sufficient RECs.[92] An entity can carry forward a 10% shortfall to the following year thus reducing its liability to pay the penalty.[93]

In the first year of the operation of the Act 659,000 RECs were surrendered to the Regulator, representing an oversupply of RECs for 2001 to a factor of 2.2.[94]

Early assessment of the legislation, however, indicates that the Act will not deliver the 2% increase in renewable energy. This is because energy consumption in Australia is likely to double by 2010. The legislation as it currently stands will only deliver a 0.9% increase in renewable energy.[95] This is hardly impressive given the renewable energy targets set in other countries, as discussed in Chapter 7.

4.10.1.4 Acquiring sufficient RECs: what risks for 'liable entities'?

As mentioned above, 'liable entities' are required to purchase sufficient RECs to meet their annual quota of '*required renewable energy*'.[96] A liable entity's annual quota is calculated by multiplying the total amount of electricity in MWh that it

[91] Ibid, s 27. [92] See s 6 of the *Renewable Energy (Electricity) (Charge) Act 2000* (Cth).
[93] See *Renewable Opportunities* (MRET Review), 2003, s 36.
[94] See <http://www.orer.gov.au/pubs/bioenergy.pdf> (accessed 12 August 2002).
[95] See Origin Energy report, produced by McLennan Magasanik Associates, which shows that the legislation will only produce a 0.9% increase in renewable energy in 2010.
[96] *Renewable Energy (Electricity) Act 2000*, s 38.

acquired during the year by the renewable power percentage (RPP) for the year. If an entity does not have sufficient RECs to meet the required amount, a shortfall occurs. When a shortfall occurs, an entity may be liable to pay a penalty which is currently set at $40/MWh. A close analysis of the Act shows that there is a level of risk for 'liable entities' in predicting the number of RECs they need to acquire. There are two levels of uncertainty: that their predicted annual acquisitions of electricity fall short of their actual acquisitions, and that the RPP itself is difficult to predict.

4.10.1.4.1 False predictions of total acquisitions

Since the liability to purchase RECs depends on total annual acquisitions of electricity, 'liable parties' will try to predict in advance what their annual acquisition will be and how many RECs they need to acquire. However, when their obligation to surrender RECs falls due, liable parties may find that their actual total acquisition has exceeded their predicted acquisition. Where this happens, the liable parties will have to pay the shortfall penalty. However, the Act anticipates this risk to some extent by allowing a liable party to carry forward a 10% shortfall in RECs and add this to its REC target for the following year.

4.10.1.4.2 Calculating the RPP

Since the liability to acquire RECs is dependent on the RPP, it is important to be able to predict what the RPP will be. Determining the RPP is largely dependent on the annual target for additional renewable energy acquisitions for the market as a whole, as set out in the table reproduced above. However, there are two alternative methods for calculating the RPP for a given year. The most likely means is that the Governor-General will simply determine the RPP by making a regulation (s 39(1)). Alternatively, if this does not occur, the Act provides a formula under s 39(2) for calculating the RPP.

When making the RPP by regulation (s 39(1)), the following factors are to be considered (s 39(3)):

(a) the required GWh of renewable source electricity for the year (see the targets set out in the table above)
(b) the amount estimated as the total amount of electricity that will be acquired under relevant acquisitions during the year; and
(c) the amount by which the required GWhs of renewable source electricity for all previous years (according to the table in s 40) has exceeded, or has been exceeded by, the amount for renewable source electricity required under the scheme in those years. (The amount required under the scheme is calculated by multiplying the total amount of electricity acquired during the year by the RPP for that year (s 39(4)).

In other words, the annual RPP is set after considering the annual target, the estimated total acquisition of electricity for the following year and the market's shortfalls or surpluses in previous years. Hence the RPP is determined by many

factors which have a relatively high level of uncertainty, which will be discussed further below.

As mentioned above, it is anticipated that the RPP will be set by regulation each year. However in the event that it is not set, the Act provides for a default RPP, known as an *interim RPP* (s 39(2)). The interim power percentage for the year is:

(a) for the year commencing on 1 January 2001 – 0.24% and
(b) for any later year – the rate worked out using the formula:

$$\frac{\text{Renewable power percentage for the previous year} \times \text{Required GWh for the year (s 40)}}{\text{Required GWh for the previous year}}$$

The Act specifically provides that where a regulation is made under s 39(1), the formula set out in s 39(2) should not be used to set the RPP. Only the factors referred to in s 39(3) should be considered. In other words, the simple calculation provided in s 39(2) is superseded by the more complicated list of factors which must be considered when making a regulation.

4.10.1.4.3 Predicting the RPP for any given year

It can be seen that the formula for setting the interim RPP is predictable. The RPP is calculated using definable factors – the RPP for the previous year and the table provided in s 40 which sets the annual renewable energy targets. However, where a regulation is made under s 39(1), the RPP becomes dependent on the exercise of ministerial discretion. Although the annual targets must be *considered* by the Minister (s 39(3)), they are not relied upon to calculate the RPP in quite the same way as when the interim RPP is determined (under s 39(2)). This is because the Minister must also consider the extent to which the annual targets have exceeded, or been exceeded by the amount of renewable source electricity required under the scheme in previous years (s 39(3)(c)), as well as an estimate of the total amount of electricity that will be acquired during the year for which the RPP is being set. These factors will inform the Minister whether the renewable power percentage for a given year needs to be increased or decreased in order to meet the annual target for the following year. It is clear that this calculation is not done according to a simple formula. This creates uncertainty for 'liable entities' because their obligation to acquire RECs is directly linked to the RPP for a given year. The uncertainty impacts their risk of incurring shortfall penalties.

4.10.1.5 Lodging energy acquisition statements

A liable entity who acquired electricity under a relevant acquisition during a year must lodge an energy acquisition statement for the year on or before 14 February in the following year setting out the name and postal address of the liable entity, the amount of electricity acquired under relevant acquisitions during the year, the value, in MWh, of RECs being surrendered for that year, and any carried forward

shortfall or surplus for the previous year, and any carried forward surplus for the current year.[97]

The statement must be lodged with the Regulator accompanied by details of all RECs being surrendered for that year. Only valid certificates can be surrendered and must have been created before the end of the year to which the acquisition statement relates. The liable person must be recorded in the register of certificates as the owner of the certificate.

Renewable energy shortfall statements must also be submitted. The Act provides for a self-assessment mechanism for reporting certificate shortfalls to the Regulator. If a liable entity lodges a renewable energy shortfall statement and has not previously lodged a shortfall statement for that year with the Regulator, the statement is regarded as the assessment of the entity's shortfall. If a liable party has lodged an energy acquisition statement without lodging a shortfall statement and the Regulator is of the opinion that the party has a shortfall, an assessment of liability may be made by the Regulator on the entity's behalf. The Regulator can also make necessary amendments and additions to assessments. Liable entities who are dissatisfied with an assessment can lodge written objections to the Regulator within 60 days of an assessment being made, setting out the grounds for the objection. A late objection can also be made but must be accompanied by a written request for an extension of time. The Regulator must make an objection decision either allowing or disallowing the objection. If the liable entity proceeds to appeal before the Administrative Appeals Tribunal or the Federal Court it can only rely upon the matters covered by the objection. The Act provides that penalties may be charged for failing to provide statements and information and for making false and misleading statements.

4.10.1.6 Auditing of 'liable entities'

The affairs of registered persons and liable entities may be audited under the Act. Authorised officers who are officers or employees of the Office of the Renewable Energy Regulator may be appointed by the Regulator. An authorised officer, for the purposes of substantiating information supplied under the Act, may enter any premises and exercise monitoring powers provided for under the Act. This includes, among others, searching premises, examining activities, taking photographs, videos or audio recordings and inspecting documents. The penalty for giving false and misleading evidence or documents to an authorised officer is imprisonment for 1 year.[98]

4.10.1.7 Registers

The Regulator must maintain electronic registers of registered persons, accredited power stations and renewable energy certificates, which must be available for inspection on the Internet.

[97] Ibid, Part 5. [98] Ibid, Part 11.

4.10.2 Review of the Act

In early 2003, the Minister for the Environment and Heritage announced a review of the Act, as required under the Act. The Review Panel completed its Report in September 2003.[99] The Report comprises eight chapters: an Introduction; Progress Towards the Mandatory Renewable Energy Target (MRET) Objectives; Wider Impacts of the MRET Measure; Energy Policy Considerations; Environment Policy Considerations; Industry Policy Considerations; Refining the MRET Measure; and Eligibility and Operational Issues. The Panel has also provided a list of 30 recommendations. The most important elements of the Report follow.

4.10.2.1 Progress towards MRET objectives

The Panel found that the legislation has contributed significantly to renewable energy generation coming primarily from the hydro and solar hot water sectors, with strong but small growth arising out of wind generation. Industry sales have grown from $1.1 billion per annum before the introduction of the Act to $1.8 billion since its introduction. Exports have grown to more than $250 million in 2002–03. However, investment is expected to fall away in 2007 when the 2010 target of 9500GWh is reached.

4.10.2.2 Wider economic, social and environmental objectives

The Panel's report was supportive of the MRET in that it has contributed to employment growth in the renewable energy sector, has broad community support, has no specific adverse environmental effects and has made a small contribution to greenhouse gas abatement. However, the abatement is expected to increase once the MRET is reached in 2010. The Report noted that there has been some concern with respect to the visual impacts of wind energy, particularly along the Gippsland coastline. In fact, the Member for Gippsland introduced a motion in the Victorian parliament to place a 12-month moratorium on any further wind farm development so that: local councils can develop landscape overlays to the planning scheme; current wind farm guidelines be developed to enhance community participation; and the benefits of wind energy can be evaluated against other forms of renewable energies and fossil fuel energies to assess the economic, social and environmental benefits of wind power. This motion was introduced as a result of community concern about the impact of wind farms on landscapes and also their noise pollution impacts.[100]

4.10.2.3 Energy, environment and industry policy considerations

The Panel noted that the Parer Review of the National Electricity Market, discussed in Chapter 5, which recommended the abolition of the MRET scheme and

[99] See 'Renewable Opportunities: A Review of the Operation of the *Renewable Energy (Electricity) Act 2000*', September 2003, available at <http://www.mretreview.gov.au/report/index.html>.
[100] Council Proof, Victorian Parliament, 17 September 2003.

the establishment of a national greenhouse gas emissions trading market, led to renewable investment uncertainty. The Panel believed that the MRET scheme should be retained, even though it is not a least cost abatement measure, as there are sound policy reasons for its existence. These include the fact that renewable energy is likely to become a cost-effective way of abating greenhouse gas emissions in the longer term, and that a strong domestic market in renewables would provide a sound base for future exports. Although the increased penetration of renewables into the electricity grid will impose technical challenges for transmission and infrastructure, a gradual increase in the MRET will allow the operators of the National Electricity Market to address these challenges. For this reason, the Panel recommended the continuation of the MRET scheme beyond 2010, with significant improvements in research and development and the commercialisation of technology.

4.10.2.4 Refining the MRET measure

The Panel recommended a steady increase in the MRET between 2010–20 towards a target of 20,000GWh. This would maintain the momentum provided initially by the MRET scheme and provide ongoing certainty to the industry and to investors and the finance sector. The scheme should continue beyond 2020, however, as energy project financiers look to a minimum 15-year payback period for their investments. The Panel also stated that the shortfall charge of $40/MWh, payable by retailers which fail to meet their MRET liability, should be increased otherwise retailers may prefer to pay the charge rather than purchase RECs to discharge their liability. The Panel recommended that the charge be indexed to inflation from 2010–2020. These measures should produce a diverse range of renewable energy sources from which to meet future energy needs, while the impact on GDP would be relatively small. The refined MRET would contribute more than double the level of greenhouse gas abatement anticipated under the current target. The Panel did not recommend any changes to baselines, caps or portfolio approaches but would like to see improved transparency in the RECs market.

4.10.2.5 Eligibility and operational issues

The most important issue here is whether or not biomass fuelled by native forests should be a renewable energy source. The Panel found that the price of RECs generated by this type of biomass is likely to be discounted as purchasers of RECs may not want to support this type of generation. The Panel proposed two possible ways of overcoming this problem. These are to exclude wood waste from native forests as a renewable energy source, or to separate it from other eligible wood waste sources in a way that is transparent to all interested and affected parties. The Panel also recommended that plantation biomass be redefined under 'energy crops', while all biomass material diverted from landfill should be eligible under the 'municipal waste provisions' of MRET. Although the Panel did not recommend any other changes to Eligible Renewable Energy Sources, it did consider that some

changes are warranted with respect to the photovoltaic industry and that current regulations governing solar hot water heaters are too complex.

4.10.2.6 Other recommendations

Other recommendations include: that impediments to the inclusion of more renewable energy in the National Electricity Markets be investigated and that pre-existing generators and projects commissioned before the end of 2005 should receive RECs until 2020, after which they should be set new baselines. The Report also recommended that the Act be amended to enable publication by the Office of the Renewable Energy Regulator (ORER) of generators' baselines, total eligible generation for each year, total number of RECs created each year, total actual market liability for the year, total number of RECs surrendered to offset the liability, and individual shortfalls. It also recommended that the ORER provide 'provisional accreditation' to proposed generation projects where appropriate; that the ORER be required to assess accreditation applications within 6 weeks after submission of the application; and that the owner of any registered REC be allowed to surrender the REC to the ORER either voluntarily or against a registered liability.

4.10.3 Australian government response to MRET review

As we point out in Chapters 5 and 7, the Australian government has failed to offer any response to the MRET Review other than to refuse to increase the target or to extend the scheme beyond 2010.

4.11 Sustainable fuel initiatives

Although we focus primarily on electricity and gas in this book, it is worth mentioning the numerous initiatives that have been adopted by the Australian government to control the greenhouse gas emissions from fuel. The Australian transport sector accounts for one-fifth of Australia's greenhouse gas emissions. A Voluntary Code of Practice to improve fuel efficiency by 18% by 2010 has been adopted by the automotive industry. The new target for passenger vehicles will be 6.8 litres per 100 km travelled. The Code of Practice should contribute to a significant reduction in greenhouse gas emissions from the transport sector.[101]

4.11.1 Emissions from fuel

From a regulatory perspective, various targets for cleaner sources of fuel have been enacted under the *Fuel Quality Standards Act 2000* (Cth) which enables

[101] Minister for the Environment and Heritage, 22 July 2004.

the government to make mandatory national quality standards for fuel supplied in Australia. The standards are based on international standard vehicle and emission control technologies. Standards are set for petrol, diesel and liquefied petroleum gas. The main objectives of the Act are to regulate the quality of fuel to: reduce pollutants and emissions arising from the use of fuel that may cause environmental, greenhouse and health problems; facilitate the adoption of better engine and emission control technologies; and promote the more effective operation of engines. The Act has been relied upon to mandate that sulphur in premium unleaded petrol is limited to 50ppm from 1 January 2004, down from 150ppm. Sulphur in diesel formerly at 500ppm was cut to 50ppm on 1 January 2006 and capped at 10ppm from 1 January 2009.

4.11.2 Encouraging biodiesel and ethanol

Biodiesel is a renewable fuel derived from vegetable oils or animal fats through the process of esterification and is used in conventional diesel engines. In April 2004, the Commonwealth Parliament enacted the *Energy Grants (Cleaner Fuels) Scheme Act 2003* and *Energy Grants (Cleaner Fuels) Scheme (Consequential Amendments) Act 2003*. It has been enacted to give long-term security to the 'cleaner fuels' industry including ethanol, biodiesel, compressed natural gas (CNG), liquefied natural gas (LNG), liquefied petroleum gas (LPG), and methanol. These alternative fuel sources are expected to deliver significant reductions in the emissions of greenhouse gases from vehicles. They also provide a market for agricultural by-products so helping the economy in rural and regional areas of Australia. The Act delivers a longer excise-free period for alternative fuels giving them a longer adjustment period before the industry starts to pay fuel excise. The legislation extends the excise-free period to 2011 and will help the industry achieve the target of 350 million litres of biofuel production by 2010. This target was set by the government in 2001 under the *Biofuels for Cleaner Transport* policy document.[102]

The Scheme will work in the following way. Initially it will allow for the payment of a grant for the importation and domestic production of fuels containing biodiesel. From 18 September 2003 the grant offsets the excise and customs duty payable on biodiesel. The current effective excise rate of zero for 100% biodiesel will continue until 30 June 2008. The grant will also be payable on fuel blends containing biodiesel. Grants will also be provided to offset the excise and customs duty on the manufacture and importation of ethanol when the existing subsidy arrangement administered under contract by the Department of Industry, Tourism and Resources lapses on 30 June 2008. The grants payable under the Scheme for biodiesel and ethanol will be progressively reduced in five even annual instalments beginning 1 July 2008 and ending 1 July 2012 to arrive at a final effective excise rate for these fuels. Grants will also be paid to encourage

[102] Available at <http://www.liberal.org.au/documents/bio.pdf>.

the production of low sulphur fuels. Here the grants will apply for 2 years from 1 January 2006 to the importation and manufacture of premium unleaded petrol with less than 50 parts per million sulphur. A similar grant will be payable for diesel from 1 January 2007 where it has less than 10 parts per million sulphur.

The Energy Grants (Cleaner Fuels) Scheme Regulations 2004 now include biodiesel blend as a cleaner fuel, and prescribe matters necessary to enable importers and domestic manufacturers of biodiesel as a final fuel to access a Cleaner Fuel Grant, including methods for calculating the amount of grant to which a claimant would be entitled. Also, the date of 30 June 2015 is prescribed as the last day that provisional entitlements for a grant will arise for biodiesel blend. The start date of the Scheme has been set retrospectively at 18 September 2003.

The *Fuel Quality Standards Act 2000* (Cth) was also amended in 2004, to insert Part 2A relating to renewable fuel into the Act. Part 2A sets out a regulatory regime in relation to the inclusion of cellulosic biomass ethanol, and other renewable fuel, in fuel supplied for use in motor vehicles in Australia. It also establishes an office of Renewable Fuel Program Administrator and sets out the functions of that office. The Part sets out the requirements for the inclusion of cellulosic biomass ethanol or other renewable fuel and deals with reporting requirements under the Act.

Finally, a 2005 amendment to the *Fuel Quality Standards Act* inserted s 22A into the principal Act to establish the requirement for ethanol content. It states that the volume of cellulosic biomass ethanol which is to be included in motor vehicle fuel supplied for use in Australia is to be prescribed by the regulations. Cellulosic biomass ethanol is that derived from agricultural grain and sugar cane; wood and wood residues; plants; grasses; agricultural residues; fibres; animal wastes and other waste materials; or solid municipal waste. The Regulations must include a schedule setting out the different percentages to apply at different dates.

It must also include provision for the required volume percentage to be at least 4% from 1 July 2009, at least 7% from 1 July 2012 and at least 10% from 1 July 2015. Details of how the percentage required is to be measured and applied is to be prescribed by the Regulations. Before making the Regulations, the Minister must take into consideration the available supply of ethanol; any potential unfair effect on existing refineries; and any seasonal variation in the use of renewable fuels and the report of the Fuel Standards Consultative Committee. The Minister must also be satisfied that the Reid Vapour Pressure of the fuel will be at an acceptable level and, if appropriate, alternative blending, storage or other arrangements may be included in the Regulations. The Regulations may specify a different volume percentage of ethanol content to apply in respect of motor fuel in specific areas of the Commonwealth. However, they must not give preference to one State over another.

Refineries, blenders or importers of motor vehicle fuel may be given credits for the production or sale of motor vehicle fuel that contains a percentage of ethanol greater than the percentage required by the Regulation at the time of production, importation or sale. Credits received may be counted in assessing

compliance with the Regulations in the following financial year. They may also be transferred or sold to another person.

4.12 Energy efficiency and motor vehicles

The Ecologically Sustainable Development (ESD) Transport Working Group examined the relationship between the transport sector of the economy and the environment in detail in 1991.[103] Its Final Report[104] contained 40 separate recommendations designed to promote the concept of ecologically sustainable development in three separate areas. Three of these specifically advocate the following law reforms:

1 The introduction of fuel economy standards for all domestically sold passenger vehicles.
2 The establishment of a system of compulsory fuel consumption labelling for all new passenger cars and light trucks.
3 The creation of a system for fuel efficiency information to be included in all model-specific motor vehicle advertising.

Consistently with its policy of light-handed regulation, the Commonwealth government negotiated for many years with the vehicle manufacturing industry for the introduction of voluntary targets and agreements in these three separate areas.

No progress has been made in relation to the creation of a system of fuel efficiency information to be included in all model-specific motor vehicle advertising. This issue appears to have been abandoned.

In relation to fuel economy standards, the Commonwealth government stated in its 1997 greenhouse policy document, Safeguarding the Future, that it would seek a voluntary agreement with industry for a fuel consumption target 15% below business as usual outcomes by 2010. After lengthy negotiations, the government and the automotive industry agreed on a voluntary target of 6.8 litres per 100 km for petrol passenger cars by 2010. This represents an 18% improvement in the fuel efficiency of new vehicles between 2002 and 2010. This target is due to be expanded to include four-wheel drive and light commercial vehicles.[105]

Fuel consumption labelling has been fully implemented on a nationwide mandatory basis as from 1 January 2004.[106] The scheme was a key element in the Environment Strategy for the Motor Vehicle Industry as outlined in recommendation 5.10 of the National Greenhouse Strategy. Its purpose is to help reduce greenhouse gas emissions from transport and to raise consumer

[103] Nine ESD Working Groups were established by the Commonwealth government in August 1990 following the release in June 1990 of a Discussion Paper outlining the concept of ESD in Australia. The nine Working Groups were on agriculture, energy use, energy production, fisheries, forest use, manufacturing, mining, tourism and transport. Each Working Group produced a Final Report in late 1991.
[104] See Ecologically Sustainable Development Working Groups, *Final Report – Transport*, Canberra, AGPS, 1991.
[105] See <www.greenhouse.gov.au/transport/env_strategy.htm> (accessed 15 January 2005).
[106] See <www.greenhouse.gov.au/fuellabel/environment.htm> (accessed 15 January 2005).

awareness of fuel-efficient vehicles. It also allows consumers to make a more informed choice when purchasing vehicles.[107] The scheme was jointly developed by the Department of Transport and Regional Services, the AGO, and the vehicle industry and other stakeholders. Initially the scheme was introduced in January 2001 by Australian Design Rule (ADR) 81/00, which required all new passenger vehicles, off-road vehicles and light commercial vehicles up to 2.7 tonnes gross vehicle mass to carry a fuel consumption label on the windscreen at the point of sale.

The original design rule has been replaced by more comprehensive controls in ADR 81/01, Fuel Consumption Labelling for Light Vehicles. This applies to all vehicles up to 3.5 tonnes gross vehicle mass and requires the inclusion of carbon dioxide emission figures on the label in addition to fuel consumption figures. These figures are now calculated using the test procedure set out in the United Nations Economic Commission for Europe Regulation 101 (UN ECE R101). This replaces the old procedure specified in Australian Standard (AS) 2877–1986. The purpose of the change is to harmonise emission standards in Australia with those recognised internationally. The test cycle simulates an 11 km trip with an average speed of 33.6 km/hr. Approximately two-thirds of the test simulates urban driving conditions where the average speed is 18.8 km/hr and the other third simulates highway driving conditions with vehicle speeds of 100 km/hr.[108] The vehicle manufacturers and importers are responsible for carrying out the fuel consumption tests and monitoring compliance with the standard. Compliance is ensured by audits conducted by the Department of Transport and Regional Services.

The label is shown in Figure 4.1.

Further Commonwealth government initiatives in relation to fuel consumption efficiency are the establishment of a Fuel Consumption Guide Database, which provides comparative data on all vehicles manufactured in Australia since 1986,[109] and a Green Vehicle Guide, showing the environmental performance of all new vehicles sold in Australia.[110]

4.13 Clean coal technology

As we have mentioned elsewhere, 38% of Australia's greenhouse gas emissions are produced by using coal to generate electricity. In 2003 a new partnership, COAL21, was established. It is a partnership between the coal and electricity industries, unions, Federal and State governments and the research community. Its stated goal is to identify and realise the potential for reducing or eliminating greenhouse gas emissions from coal-based electricity generation in Australia. The formal objectives of COAL21 are to:

[107] See <www.greenhouse.gov.au/fuellabel/consumers.htm> (accessed 15 January 2005).
[108] Ibid.
[109] <www.greenhouse.gov.au/fuelguide/index.htm> (accessed 15 January 2005).
[110] <www.greenvehicleguide.gov.au> (accessed 15 January 2005).

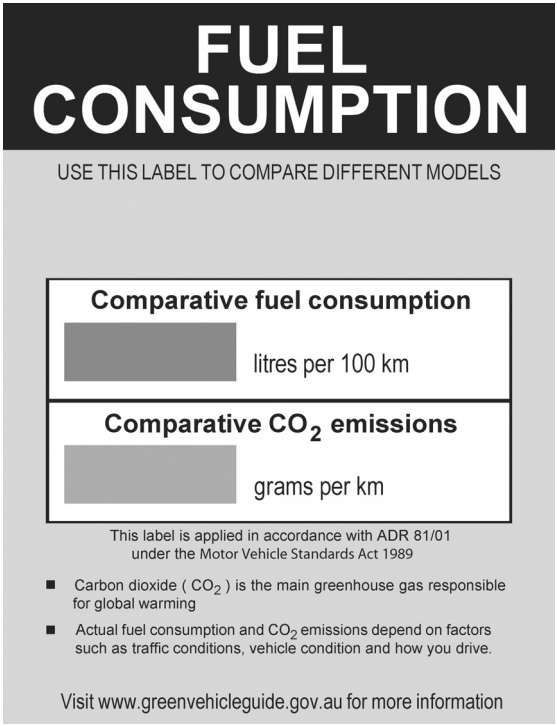

Figure 4.1 Fuel consumption label for light vehicles

- Scope, develop, demonstrate and implement electricity generation with near zero emissions to achieve major reductions in greenhouse gas emissions over time while keeping electricity prices low
- Facilitate the demonstration, commercialisation and early uptake of technologies
- Promote relevant Australian R&D so as to contribute to international R&D
- Foster greater public awareness of the role of coal and the potential for near zero emissions from coal-based electricity generation
- Provide a mechanism for effective interaction and integration with other international zero emission coal initiatives.

The Australian government has lent its support to the initiatives of COAL21. In 2004, the Federal Minister for the Environment and Heritage and the Minister for Industry also appointed an industry leadership group, from Australia's leading mining, energy and manufacturing companies, to explore options for low-emissions technology. The CEO Low Emissions Technology Advisory Group comprises 13 leading CEOs. The Group will be investigating Australia's potential to make use of cleaner energy options, the time frames needed to adopt them, the current state of Australian research and the short- to medium-term options for reducing industry emissions.

Incidentally, the Victorian government has recently released its *Victoria: Leading the Way* statement. Part of that statement contains a commitment to Clean Coal Technology, as 85% of Victoria's electricity is generated using brown coal which accounts for 55% of Victoria's greenhouse gas emissions. As such the government will increase its support for the Cooperative Research Centre for Clean Power from Lignite to $1.5 million per year from 2005–06.

4.14 Australia joins new Asia-Pacific Partnership on Clean Development and Climate

In a very recent development, Australia has joined the Asia-Pacific Partnership on Clean Development and Climate,[111] established on 28 July 2005 at the Association of South East Asian Nations (ASEAN) Regional Forum meeting. Member nations include the United States, Australia, China, India, Japan and South Korea, which together account for around 50% of the world's greenhouse gas emissions, energy consumption, GDP and population. The six countries will work together to: develop, deploy and transfer existing and emerging clean technology; meet increased energy needs and explore ways to reduce the greenhouse intensity of their economies; build human and institutional capacity; and seek ways to engage the private sector. The Parties have included the following areas for collaboration in the agreement: energy efficiency; clean coal; integrated gasification combined cycle; liquefied natural gas; carbon capture and storage; combined heat and power; methane capture and use; the development of next-generation nuclear power and the use of civilian nuclear power; fusion power; hydrogen energy distribution; geothermal energy; biotechnology; nanotechnology; rural/village energy systems; advanced transportation; building and home construction and operation; bioenergy; agriculture and forestry; hydropower; wind power; solar power; and other renewables.

The agreement stated that the partnership is consistent with efforts under the United Nations Framework Convention on Climate Change and will complement, but not replace, the Kyoto Protocol. Unlike the Kyoto Protocol, which imposes mandatory limits on greenhouse gas emissions, this pact permits participating countries to set their own goals for reducing emissions individually, with no mandatory enforcement mechanism.

Given the membership of the partnership, and the wide-ranging commitments to develop technologies to address greenhouse gas emissions, it is to be hoped that significant reductions are delivered. However, there has been some scepticism about the announcement. The Australia Institute, for example, has labelled the pact as nothing but a charade which conceals the Australian government's

[111] Office of the Prime Minister, 28 July 2005 and the Australia Institute, 28 July 2005 available at <http://www.pm.gov.au/news/media_releases/media_Release1482.html> (accessed 16 October 2005).

burgeoning greenhouse gas emissions and the abject failure of its policies. The Institute points to the fact that study after study shows that voluntary agreements do not produce any meaningful reductions in greenhouse gas emissions.[112] As the next chapter indicates, the authors are also critical of greenhouse gas emissions reduction schemes which rely solely on voluntary commitments.

[112] Available at <http://www.tai.org.au/> (accessed 16 October 2005).

5

Sustainable energy in the Australian electricity and gas sectors

The restructuring of electricity and gas markets is a worldwide phenomenon driven by broader programs of microeconomic reform. Since the 1970s, governments, driven by free market economics, have endorsed the introduction of competition in various sectors of the economy, including transport, telecommunications, water, gas, electricity, health services and prisons.

Extensive international research[1] indicates that electricity restructuring has had indisputably serious environmental consequences. These include measurable increases in air pollution from sulphur dioxide and nitrous oxide emissions, and a marked escalation in greenhouse gas emissions. In this chapter, the restructuring of the electricity market in Australia and its environmental implications are reviewed. The principal concern is the correlation between the restructuring of the electricity market and increased greenhouse gas emissions, as well as the legal measures that should be enacted to counteract this phenomenon. The current status of the gas market in Australia is assessed.

Given these well-documented environmental impacts, there is cause for concern about the future sustainability of the planet unless energy policies, including electricity restructuring, actively counteract these impacts. As mentioned in chapter 3, energy policy, which provides a framework for regulatory activity, cannot be developed in isolation. It must incorporate the principles contained in the international framework for ecologically sustainable development (ESD).

Given what is known about the environmental consequences of electricity restructuring, it is argued that it is impossible to develop energy policy, and

[1] See footnote 7 in this chapter for a sample list of sources which have the environmental impacts of electricity restructuring as their primary concern.

subsequent energy law frameworks, without reference to ESD. What is needed in Australia is a thorough overhaul of electricity restructuring policy to reflect the broader principles of ESD. Stationary energy sector policy has been, and still is, driven predominantly by National Competition Policy (NCP), without any attempt to integrate the process of restructuring and the principles of ESD. As demonstrated in the previous chapter, environmental issues are being dealt with separately by way of voluntary programs, policies and very little law. This is contrary even to the original intentions of NCP, which require that the principles of ESD be taken into account. Competition Policy as it applies to the electricity industry should be firmly integrated with the principles of ESD. A comprehensive array of legislative mechanisms should be enacted to deliver an ecologically sustainable electricity industry in Australia.

This chapter looks at the international experience of the environmental impacts associated with electricity restructuring. It then describes the Australian experience and provides an assessment of whether Australia's energy policy is ecologically sustainable. A crucial part of this discussion is the 2004 review and 2005 reforms of the National Electricity Market (NEM). To date, the reforms, like the initial restructuring of the energy market, have failed to address the links between restructuring and greenhouse gas emissions.

5.1 Restructuring Australia's electricity sector

5.1.1 Restructuring of electricity markets and environmental impacts: international experience

The electricity industry has been viewed traditionally as a 'natural monopoly', meaning that a single institution (usually the State) would undertake the tasks of generating,[2] transmitting,[3] and distributing[4] electricity. The notion is still widely held that transmission and, probably, distribution remain natural monopolies. However, support for the view that the electricity industry should operate as a vertically integrated monopoly is fading. In its place, several alternative models have emerged that would separate the operation, if not the ownership, of generating and transmissions assets. The separation is intended to ensure equal and competitive access to the electricity grid for all electricity generators.[5]

Restructuring of the electricity industry has occurred in a number of overseas jurisdictions, including the United States (US), many European Union (EU) countries (including the United Kingdom (UK), Norway, Sweden, Finland, Denmark

[2] Generation is the process used to create electricity.
[3] Transmission is the process of transporting electricity at high voltages from where it is generated, often over long distances, to groups of electricity consumers.
[4] Distribution is the process of transforming electricity to lower voltages and transporting it over a shorter distance to individual consumers.
[5] See Dallas Burtraw, Karen Palmer, and Martin Heintzelman, *Electricity Restructuring: Consequences and Opportunities for the Environment*, Resources for the Future, 2000, at 2–4.

and Germany), New Zealand and many Asian jurisdictions. In developing countries (the restructuring of utilities is often a cornerstone of any lending policy. In addition to the restructuring that has taken place within individual EU jurisdictions, the EU has issued a directive that introduces some competition into the electricity markets in member countries.[6]

A striking aspect of the restructuring processes in these countries is the considerable amount of academic comment that they have engendered. There is a vast literature written from multidisciplinary perspectives[7] on the serious environmental impacts of electricity restructuring, which leaves one in no doubt that a wide range of measures are needed to counteract the dangers.

Who is it that is devoting so much energy and research effort to uncovering the impacts of restructuring? The literature indicates that it is lawyers, geographers, public administrators, economists, prestigious think tanks, the US Congress, industry groups, environmental non-government organisations, and many others. They are all concerned that when restructuring electricity markets, governments have focused mainly on price, without dealing seriously with the consequent rise in air pollution and greenhouse gas emissions. It seems that governments may have failed to realise that '[l]ow-priced power may not be the same as low-cost power'.[8] It has been suggested that the question for governments should not be 'How can we obtain the cheapest power?' but 'How can we obtain low-cost, reliable power in ways that advance our national environmental goals?'[9] It is clear that all too often governments fail to provide effectively for

[6] *The Transmission of Electricity Through Transmission Grids* (90/547/EEC).

[7] See, for example, Burtraw et al, *Electricity Restructuring*; Brad Jessup and David Mercer, 'Energy policy in Australia: a comparison of environmental considerations in NSW and Victoria', *Australian Geographer* 32 (2001) 7; Rudy Perkins, 'Energy deregulation, environmental externalities and the limitations of price', *Boston College Law Review* 39 (1998) 993; Clive Hamilton and Richard Denniss, 'Generation emissions? The impact of microeconomic reform on the electricity industry', *Economic Papers* 20(3) (2001) 15; Rich Ferguson, 'Electric industry restructuring and environmental stewardship', *The Electricity Journal* July (1999) 21; Tim Woolf and Bruce Biewald, 'Efficiency, renewables and gas: restructuring as if climate mattered', *The Electricity Journal* January/February (1998) 64; Larry Parker and John Blodgett, 'Electricity restructuring: the implications for air quality', *CRS Report for Congress* (2001) <http://cnie.org/NLF/CRSreports>; John B Gaffney, 'What blight through yonder window breaks? A survey of the environmental implications of electricity utility deregulation in Connecticut', *Connecticut Law Review* 32 (2000) 1443; Michael Kantro, 'What States can glean from the environmental consequences of deregulating electricity in California', *William and Mary Environmental Law and Policy Review* 25 (2000) 533; David Mallery, 'Clean energy and the Kyoto Protocol: applying environmental controls to grandfathered power facilities', *Colorado Journal of International Law and Policy* 10 (1999) 469; Karen Palmer, *Electricity Restructuring: Shortcut or Detour on the Road to Achieving Greenhouse Gas Reductions?*, Resources for the Future, 1999; *Air Pollution Impacts of Increased Deregulation in the Electric Power Industry: An Initial Analysis*, Northeast States for Coordinated Air Use Management, 1998 <http://www.nescaum.org/archive.html>; Karen Palmer, Dallas Burtraw, Ranjit Bharvirkar and Anthony Paul, *Restructuring and the Cost of Reducing NOx Emissions in Electricity Generation*, Resources for the Future, 2001; Jens Hauch, 'The Danish Electricity reform', *Energy Policy* 29 (2001) 509–21; Edward A Smeloff, 'Utility deregulation and global warming: the coming collision', *Natural Resources and Environment* 12 (1998) 280; Mark Diesendorf, 'How can a "competitive" market for electricity be made compatible with the reduction of greenhouse gas emissions?', *Ecological Economics* 17 (1996) 33–48; Ann Berwick, 'Environmental implications of energy industry restructuring', *New England Law Review* 33 (1999) 619; Robyn Hollander and Giorel Curran, 'The greening of the grey: National Competition Policy and the environment', *Australian Journal of Public Administration* 60(3) (2001) 42–55; Ann Brewster Weeks, 'Advising nature: can we get clean air from the old dirties?', *New England Law Review* 33 (1999) 707; Michael Evan Stern and Margaret Stern, 'A critical overview of the economic and environmental consequences of the deregulation of the US electric power industry', *Environmental Lawyer* 4 (1997) 79; R Panasci, 'New York State's competitive market for electricity generation: an overview', *Albany Law Environmental Outlook* (2001) 25.

[8] Perkins, 'Energy deregulation', 993.

[9] Perkins, 'Energy deregulation', 1031.

the twin objectives of low-priced power and ESD. It seems that if microeconomic reform and protection of the natural environment are both concerned with the efficient use of scarce resources, there should be no distinction between the two. However, a distinction has been drawn where microeconomic reform has been interpreted as competition policy with a focus on the minimisation of costs.[10] As Hamilton and Denniss point out 'efficiency', whether allocative or dynamic, is never defined solely in terms of short-term cost minimisation. This is not to say that cost minimisation can never be allocatively efficient. However, this will only occur when markets are complete, information is perfect and externalities are absent.[11]

According to commentators, price has repeatedly failed to signal the full costs of generating and using electricity, and a market driven by price may guide investment and consumption in directions that damage the environment, thus increasing long-term costs. This is particularly so where consumers face the problem of information costs. It may take them a considerable amount of time to understand cost-saving alternatives in energy use, and in sustainable energy choices. Consumers who lack access to information about the market are not likely to focus on environmental problems, like global warming, which may not manifest themselves for decades. The real cost of purchasing electricity is probably ignored in making current purchases in a competitive environment.[12] It almost certainly goes without saying that the greatest risk associated with an electricity market focused on the cheap price of power is that demand will increase, therefore increasing generation and greenhouse gas emissions. Where demand increases, generators will also evaluate the relative costs of rehabilitating and using older, more polluting generating facilities, compared with constructing new, more sustainable, capacity.[13]

The other principal concern of these commentators is that renewable energy technologies have difficulty competing in a restructured competitive environment, where fossil fuel generators enjoy many advantages and subsidies. For example, arrangements for the transmission of electricity do not allocate the full costs of transmission according to the location of generators and users. Cogenerators are disadvantaged when transmission losses, incurred as a result of long-distance transmission, are averaged to the advantage of remote generators and consumers. This approach prevents the market from signalling that electricity generators should be located near their consumers, thereby reducing the cost of generation and reducing greenhouse gas emissions. Remote users also do not get the message that they should value more efficient use, or switch from grid supply to renewable remote area power supply systems.[14] This, it will

[10] See Hamilton and Denniss, 'Generation emissions?', 15.
[11] Ibid, 16.
[12] See Perkins, 'Energy deregulation', 1033–7; see also Kantro, 'What States can glean', 558.
[13] See Parker and Blodgett, 'Electricity restructuring', 6; see also Diesendorf, 'How can a "competitive" market', 41.
[14] Hamilton and Denniss, 'Generation emissions?', 22.

be remembered, is one of the key concerns raised at the World Summit on Sustainable Development. Various other existing barriers of entry to the market for renewables will be described later.

Other types of impediments to market penetration of renewable energy technologies include the expenses associated with development in the early stages, institutional, political and legislative barriers where the fossil fuel industry is favoured, and planning regulations which do not cater for the installation of renewable technologies. Where these barriers exist, legislation may be needed if other measures and incentives are to provide renewables with a level playing field.[15]

5.1.1.1 US Congress

At a Federal level, the US Congress has consistently attempted to achieve the twin goals of restructuring and the development of renewable energy sources.[16] Each State in the US has had a different experience with restructuring its own electricity industry. However, policy at the Federal level has been consistent. Restructuring began in 1978 when Congress passed the *Public Utility Regulatory Act 1978* (PURPA).[17] PURPA amended the *Federal Power Act*[18] by allowing independent power producers, known as qualifying facilities, to generate electricity with a specific goal of developing alternative electricity sources.[19] PURPA gave the Federal Energy Regulatory Commission (FERC) the power to require monopoly owners of transmission lines to allow qualifying facilities to use their transmission facilities.[20] In 1992, Congress passed the *Energy Policy Act*[21] to increase competition in the electricity industry, but also to conserve energy and encourage efficiency, [22] develop renewable energy resources[23] and address global warming.[24] The impact of this has been that qualifying facilities are no longer hampered by high costs of entry into the market as the industry is no longer regarded as a natural monopoly. In 1996, the FERC went further and promulgated Rule 888, which mandated the deregulation and restructuring of the electricity industry, in particular the separation of generation from transmission and distribution. Although the US Environment Protection Authority publicly voiced its concern about the impacts of restructuring on the environment, it is clear that the US Congress and the FERC have tried to promote restructuring while at the same

[15] See Annex I, Expert Group on the United Nations Framework Convention on Climate Change, *Penetration of Renewable Energy in the Electricity Sector: Working Paper No. 15*, Organisation for Economic Co-operation and Development, 1998, at 20.
[16] For a detailed discussion of the legal initiatives in the United States see Adrian Bradbrook and Alexandra S Wawryk, 'Government initiatives promoting renewable energy for electricity generation in Australia', *UNSW Law Journal* 25(1) (2002) 129–36.
[17] 16 USC 2601.
[18] PURPA inserts s 3(17)(C) into the *Federal Power Act* (16 USC 791).
[19] PURPA, s 201; see Kantro, 'What States can glean', 537.
[20] PURPA, s 203. The FERC may issue the order if it is in the public interest, would conserve significant amounts of energy, or would improve the reliability of the utility system.
[21] 42 USC 13201. [22] Ibid, Title I. [23] Ibid, Title XII.
[24] Ibid, Title XVI; see also Kantro, 'What States can glean', 538.

time attempting to reduce global warming and other environmental impacts. As a result, the US remains one of the world's leaders in renewable supply from wind, biomass, geothermal and solar sources.[25]

5.1.1.2 Denmark

In Denmark, the government has liberalised the market while at the same time ensuring that the market will not result in CO_2 emissions that are above Denmark's emissions reduction target under the Kyoto Protocol. A target has been set for CO_2 emissions from electricity generation. These targets will be achieved using a system of tradeable emissions permits for electricity producers. In addition, 20% of Danish demand for electricity must be satisfied by the renewable energy market. Generators of renewable energy are awarded green certificates according to the amount of renewable energy produced, and these must be purchased by distribution companies. In this way, producers of renewable energy are compensated through a market-based system for the extra costs associated with producing renewable electricity. Publicly guaranteed prices are paid based on the different renewable technology types.[26] Similar pricing arrangements apply in the German renewable energy market.[27]

The US and Danish examples demonstrate the difference between energy frameworks which are based squarely on a price-driven NCP, like Australia's, and those which attempt to integrate the goals of restructuring and ESD. It must be emphasised, therefore, that competition and ESD principles must be *deliberately* integrated into a sustainable energy policy.

What the research also reveals is the way in which many jurisdictions adopt a 'suite' of measures to counteract the greenhouse impacts of electricity restructuring.

These include: energy and carbon taxes; emissions trading schemes; clean energy tax incentives; national market-oriented emissions reductions schemes; effective Renewable Portfolio Standards; systems-benefits charges; demand-side management programs; energy efficiency standards; mandatory labelling of consumer bills; and feed laws. The strengths and weaknesses of each of these measures will be assessed in greater detail in Chapter 7, including whether they are consistent with a restructured electricity industry.

Suffice it to say that the case studies of restructuring in the US and Denmark provide a frame of reference against which to analyse the restructuring process in Australia. They highlight the fact that even after an extensive review and reform of the National Electricity Market in 2004–05, Australian legislation

[25] Ryan Wise, Steven Pickle, Charles Goldman, 'Renewable energy policy and electricity restructuring: A California case study', *Energy Policy* 26 (1998) 469.
[26] Hauch, 'The Danish Electricity reform', 509–10.
[27] See *Stromeinspeisungsgesetz für Erneuerbare Energien* 1991 (*Act on Feeding into the Grid Electricity Generated from Renewable Energy Sources*, referred to as *Electricity Feed Law*) and *Gesetz für den Vorrang Erneuerbarer Energien (Erneuerbare-Energien-Gesetz)* 2000 (the *Renewable Energy Sources Act*).

promoting restructuring fails to consider, or counteract in any way, the environmental impacts of restructuring.

5.1.2 The Australian experience of electricity restructuring

Based on the discussion in Chapter 3, it is clear that a sustainable energy policy and energy law framework for Australia cannot be developed solely within the context of liberalisation, or in accordance with NCP, as has occurred to date. More needs to be done to actively and deliberately integrate sustainable energy principles into the competition-driven energy policy framework. Greenhouse gas emissions from the stationary electricity sector need to be drastically reduced, renewable energy technologies need to be effectively integrated into the national energy market, and energy efficiency must be a firm goal of energy policy. As the international research discussed above indicates, unless this integration is *deliberately* pursued, there is little chance of the market delivering a sustainable energy future.

There is also no reason, constitutionally, that the Federal government should not proceed to develop a sustainable energy law framework. Given the international environmental law instruments governing energy and climate change, the Federal government would be quite within its constitutional powers if it enacted effective national measures consistent with the external affairs powers. It has already relied on this power to enact the *Renewable Energy (Electricity) Act 2000* (Cth), discussed in Chapter 4.

In Australia, the energy market reform process has been consistent with a broader microeconomic reform process which has taken place under NCP. NCP has its origins in the decision in 1992 by the Council of Australian Governments (COAG)[28] to commission an Independent Commission of Inquiry into National Competition Policy, chaired by Professor Fred Hilmer. Acting on the recommendations of the Hilmer Inquiry, COAG signed three agreements: the Competition Principles Agreement (CPA); the Conduct Code Agreement; and the Agreement to Implement the National Competition Policy and Related Reforms in 1995. The agreements were designed to improve the efficiency of the economy through competition, to remove regulatory impediments to productivity, and to ensure that public-sector businesses operate along the same market and profit-oriented lines as the private sector.

The reforms can be outlined as: the review and reform of all laws which restrict competition by the year 2000; the restructuring of public-sector monopoly businesses covering the electricity, gas, water and road transport industries; the introduction of competitive neutrality so that public businesses do not enjoy

[28] The Council of Australian Governments (COAG) is the peak intergovernmental forum in Australia. It comprises the Prime Minister, State Premiers, Territory Chief Ministers and the President of the Australian Local Government Association (ALGA). The Prime Minister chairs COAG. The Prime Minister, Premiers and Chief Ministers agreed to establish COAG in May 1992, and it first met in December 1992.

unfair advantages, and the extension of the operation of Part IV of the *Trade Practices Act 1974* (Cth) to government business enterprises; to facilitate access to nationally significant infrastructure services in order to promote competition in related markets;[29] and the extension of price surveillance to government business enterprises which retain a market monopoly.[30]

The adverse environmental impacts of competition are supposed to be taken into account under Clause 1(3) of NCP, where the merits of reform are considered. For example, Clause 1(3)(d) lists as relevant to this consideration 'government legislation and policies relating to ecologically sustainable development'[31] while 'the efficient allocation of resources' is made relevant by Clause 1(3)(g). Upon reviewing the restructuring of the electricity market and the introduction of competition into that market, these principles seem to have been forgotten.

Energy market reform began in Australia after the 1993 Hilmer National Competition Review and a decision by COAG in 1991 to improve competition in the energy sector. COAG decided to replace distinct State electricity markets with a National Electricity Market (NEM). The basic principles of reform were that generators should compete to supply electricity; there should be open access to the grid for new generation; and that customers should be able to choose their electricity supplier.[32] The States of New South Wales, Queensland, Victoria, the Australian Capital Territory and South Australia now participate in the NEM. Tasmania's participation is imminent once the Basslink, linking Tasmania to Victoria, is commissioned. At the time of writing, Basslink was complete and following the anticipated successful completion of testing is now gearing up for commissioning.[33] The physical market is operated by the National Electricity Market Management Company (NEMMCO).[34]

Quiggan[35] explains that the restructuring of the Australian electricity industry has been conceived of as comprising processes which are essentially independent, but mutually supportive: the establishment of the National Grid (via interconnectors) and the NEM; the corporatisation of the government business enterprises involved in the electricity industry; the restructuring of the industry resulting in a separation between generation, transmission, distribution and retail functions; the regulation of natural monopoly functions like transmission and distribution; and finally, the full privatisation of the industry.

[29] See Part IIIA of *Trade Practices Act 1974* (Cth), which gives a firm the right to require another firm to give it access to certain infrastructure it owns.
[30] National Competition Council, *National Competition Policy: Some Facts*, at 1, <http://www.ncc.gov.au> (accessed 6 March 2003).
[31] These would include the 1992 *National Strategy on Ecologically Sustainable Development* and the 1998 *National Greenhouse Strategy*.
[32] See Senate Environment, Communications, Information Technology and the Arts References Committee, *The Heat is On: Australia's Greenhouse Future*, 2002, at 152.
[33] See <http://www.nationalgrid.com.au/document.php?objectID=125> (accessed 16 October 2005).
[34] See Allen Consulting Group and McLennan Magasanik Associates, *Energy Market Reform and Greenhouse Gas Emission Reductions: A Report to the Department of Industry, Science and Resources*, Department of Industry, Science and Resources, 1999, at 11.
[35] John Quiggan, 'Market-oriented reform in the Australian electricity industry', *The Economic & Labour Relations Review* 12 (1) (2001) 127.

The restructuring process to date has seen the electricity industry broken into separate generation, transmission, and distribution and retail enterprises. Many integrated generators were reconstituted as a number of competing firms and distributors were given monopolies, or franchises, over discrete regions. Full privatisation has only taken place in Victoria and South Australia. In other States, privatisation of the electricity industry has been highly politicised, with the Tasmanian Liberal government being defeated in 1998 in an election fought on the issue. In the 1999 election, the New South Wales Liberal opposition was defeated largely over the issue of privatisation. However, full retail contestability (FRC)[36] in the electricity market has been introduced in New South Wales,[37] Victoria[38] and South Australia.[39] The Queensland government has decided not to introduce full retail contestability as it determined that the costs of FRC outweighed the benefits.[40]

5.1.2.1 Are COAG agreements constitutionally sound?

Before moving on to explain how the NEM actually works, it is necessary to mention that questions have been raised about whether agreements crafted by the Australian and State governments under the rubric of COAG are consistent with the Australian Constitution. The issue of constitutionality arises because COAG is essentially a policy-making body comprising the heads of the Commonwealth, State and Territory governments. It makes decisions collectively to achieve various outcomes on various issues, including natural resources management, water reform and the continuing reform of Australia's electricity market. Once decisions are made at a policy level, the governments agree to pass legislation in each of their jurisdictions to give effect to these reforms. Very often, the Australian government pays the States to implement these agreements. This model of law and policy-making is known as cooperative federalism. COAG allows for the States to agree that various national objectives need to be met, and to give the Commonwealth a role in achieving these goals.

There is concern that by acting in this way, COAG acts outside formal Constitutional processes, described in Chapter 4, and undermines the democratic process

[36] FRC means giving customers a choice of supplier among competing vendors.

[37] This was introduced on 1 January 2000 under the *Electricity Supply Amendment Act 2000* (NSW). The Electricity Supply (General) Regulation 2001 provides protections for small retail consumers of electricity. These protections include, among others, provisions relating to the discontinuance of electricity supply and the disconnection of customers from distribution systems, the establishment of customer consultative groups, requirements for standard form customer contracts, the operation of the electricity ombudsman schemes, and social programs for energy.

[38] This commenced on 13 January 2002 under s 23 *Electricity Industry Act 2000* (Vic). On 24 August 2005, the Victorian Essential Services Commission (ESC) released its *Energy Retail Businesses Comparative Performance Report*, which shows that household annual electricity bills have fallen in real terms from $927 in 2003 to $910 in 2004, while the average household reticulated gas bill rose 2.7%. Disconnections for domestic customers also decreased and amounted to only 0.87% of customers. The number of consumers switching energy retailers increased substantially in 2004. The annualised switching rate for electricity was 20% and 18% for gas. The ESC notes that the competitive energy market is beginning to make a significant impact on the buying decisions of household customers; available at <http://www.esc.vic.gov.au/attachmentviewer4149.html> (accessed 16 October 2005).

[39] This commenced on 1 January 2003 under Part 5A Electricity (General) Regulations 1997.

[40] See 'Report on the review of the costs and benefits of Full Retail Competition in the Queensland electricity industry', <http://www.energy.qld.gov.au/pdf/frc.pdf>.

within each State and Territory. Recently the High Court rejected the idea that cooperative federalism ought, as a general rule, to be fostered and encouraged.[41]

5.1.2.2 How the National Electricity Market works

The NEM was formally launched in December 1998. It was established to operate consistently with four principles: freedom of choice for consumers to trade with retailers and traders; open access to interstate interconnected transmission and distribution networks; no legislative or regulatory barriers discriminating against new participants in generation and retail supply; and no legislative or regulatory barriers discriminating against interstate and intrastate trade.[42]

Interregional trade between the participating jurisdictions is facilitated by interconnectors which transmit power between regions to meet energy demands which local generators cannot meet, or when the price of electricity in another region is sufficiently low that it displaces local supply.

The NEM was established by cooperative legislation in all participating States to set up the NEM and to provide for access arrangements.[43] The operation of the NEM is regulated under the *National Electricity Law* (NEL). NEM participants include generators,[44] market customers (electricity retailers and end-use customers),[45] network service providers who own, operate or control either a transmission (TNSPs) or distribution (DNSPs) system,[46] market network service providers (MNSPs),[47] and special participants who may be appointed by NEMMCO to perform various functions, such as taking responsibility for operations during power system emergencies.[48]

[41] See *Re Wakim: Ex parte McNally* (1999) CLR 511.
[42] See Ro Coroneos, 'The regulatory framework of the NEM: its impact on NSW distributors and opportunities for further reform', *Australian Journal of Administrative Law* 7 (1999) 7; see also Anne Rann, *Electricity Industry Restructuring – A Chronology*, Parliamentary Library Background Paper 21: 1997–98; and Quiggan, 'Market-oriented reform'.
[43] *Electricity (National Scheme) Act 1997* (ACT), *National Electricity (South Australia) Act 1996* (SA), *Electricity – National Scheme (Queensland) Act 1997* (Qld), *National Electricity (New South Wales) Act 1997* (NSW), *National Electricity (Victoria) Act 1997* (Vic).
[44] Generators produce and sell electricity. There are four categories of generators: market generators whose entire output is sold on the NEM spot market; non-market generators which sell their entire supply directly to a local retailer or customer; scheduled generators which have a capacity over 30MW and whose output is regulated by NEMMCO's dispatch instructions; and non-scheduled generators which have a generating capacity of less than 30MW, but which are still required to register with NEMMCO.
[45] Market customers comprise both electricity retailers and end-use customers. Retailers purchase wholesale electricity through the spot market, or from local generators who sell their entire output to them. The electricity is then sold to customers, increasingly within a contestable retail market. End-use customers purchase electricity directly from the spot market which they then consume.
[46] TNSPs control the high voltage transmission assets that carry electricity between generators and distributors, while DNSPs operate the low voltage substations and wires that transport electricity from these substations to customers. Distributors hold a franchise over the regions in which their poles and wires are installed but must also be given access to customers outside their regions by using rival distribution networks; see Rann, *Electricity Industry Restructuring*, at 3.
[47] MNSPs are entrepreneurial interconnectors, with a minimum capacity of 30MW, that offer their capacity to transport power into the market through a bidding process similar to that used by generators. Currently there is only one MNSP, called Directlink, which operates between New South Wales and Queensland. MNSPs are unregulated interconnectors whereas all other interconnectors are regulated, originally by State governments but increasingly by the ACCC. They receive a fixed rate of return that takes into account the value of their asset base and is reviewed every 5 years by the ACCC.
[48] *National Electricity Law*, para 2.6(a).

The NEM is essentially a continuous-time auction market that allows generators and users of electricity to enter half-hourly bids, indicating willingness to supply or demand electricity. Together, the bids form aggregate demand and supply schedules. Market clearing occurs every 5 minutes in recognition of the fact that available capacity and consumption can fluctuate. The dispatch price is determined at the intersection of the aggregate demand and supply schedules. Generator bids equal to or less than the dispatch price are accepted, as are user bids that are equal to or greater than the dispatch price. The spot price of electricity is determined when the dispatch prices are averaged over a half-hour period, and this is the price actually paid to generators by purchasers. Not all purchases occur in this way, however, as participants can enter into bilateral arrangements or trade electricity in a forward market. Based on the vagaries of supply and demand, the spot price for electricity can vary from $20MWh one day to $10,000MWh the next. However, $10,000 is the regulatory limit for the price of 1MWh of electricity.[49]

Under the NEL all market participants must be registered with NEMMCO, which operates the spot market and is empowered to take action for the security of the grid. In addition, State legislation may apply to NEL participants. For example, in New South Wales, since generation, transmission and distribution are corporatised, these functions are subject to the *State Owned Enterprises Act 1983* (NSW), which requires adherence to community services obligations.

Before the 2005 reforms of the NEM, discussed below, penalties for breaches of the NEC were imposed by the National Electricity Code Administrator (NECA). The National Electricity Tribunal was empowered to review the decisions of NECA and NEMMCO, to hear applications from NECA that code participants had breached the NEC, and to review the civil penalties imposed by NECA for such breaches. The Australian Competition and Consumer Commission (ACCC) monitors competitive behaviour in the NEM to ensure fair access to networks under Part IV of *Trade Practices Act 1974*, and also authorises the NEC and changes to it. The Australian Securities and Investment Commission (ASIC) ensures that all energy trades are conducted consistently with corporations law.

A recent case which illustrates the ACCC's potential powers is *Australian Gas Light Company (ACN 052 167 405) v Australian Competition & Consumer Commission* (No. 3).[50] On 3 July 2003, AGL and other members of a consortium agreed to purchase Loy Yang Power Station Business (LYP) from its existing owners. This would give AGL a 35% interest in a holding company whose subsidiary would acquire the shares in each of the companies operating the consortium. AGL is a major retailer of electricity while Loy Yang is a power station which generates electricity supplied to the NEM.

As required under Part IV of the *Trade Practices Act*, AGL approached the ACCC to seek an informal clearance in respect of the proposed acquisition. AGL

[49] See Quiggan, 'Market-oriented reform', 130.
[50] [2003] FCA 1525 (19 December 2003).

offered various undertakings under s 87B of the Act to try to satisfy the ACCC that it would not have any control or substantial influence over the way in which electricity from the power station would be made available, bid, dispatched or contracted on a day to day basis. The undertakings would also prevent AGL from gaining access to commercially sensitive information about retail competitors and their dealings with LYP or about LYP's bidding, dispatch and contracting strategies. However, the ACCC formed the view that the proposed acquisition raised substantial competition concerns pursuant to s 50 of the *Trade Practices Act*. The ACCC advised AGL that it might bring an action for contravention of s 50 of the Act, seeking the full range of available remedies including pecuniary penalties and divestiture.

AGL then commenced proceedings in the Federal Court seeking declarations to the effect that its proposed acquisition of LYP would not contravene s 50. Justice French found that the proposed acquisition was not likely to have the effect of substantially lessening competition in any relevant market.

5.1.2.3 What have been the environmental impacts of the NEM?

The most recent data available on emissions from the electricity sector is the 2002 National Greenhouse Gas Inventory (NGI). The Inventory reports that net emissions across all sectors totalled 550 Mt $CO_{2\text{-}e}$. Emissions in the energy sector totalled 68% of net national emissions (including stationary, transport and fugitive emissions). Stationary energy fuel combustion (from energy industries, manufacturing industries and construction, commercial and residential sectors, as well as fuel use in agriculture, fisheries, forestry and the military) produced 48% of net national emissions. *Electricity generation contributed 69% of all stationary energy emissions, representing 33% of net national emissions*. Fugitive emissions (like methane) contributed 5% of national emissions and coal mining was the largest contributor. Total emissions from the energy sector in 2002 were 1% higher than in 2001 and 30% higher than in 1990. Stationary energy emissions in 2002 were 1% higher than in 2001 and 34% higher than in 1990. *Emissions from electricity generation were 1% higher than in 2001 and 41% higher than in 1990*. (Emphases added.)

Hamilton and Denniss[51] argue convincingly that, although greenhouse gas emissions from the electricity sector have been increasing steadily since 1994, there was a 10.35% spike in emissions in 1998. This was the first year of the operation of the NEM. Their proposition has been supported by data released by the Australian Greenhouse Office.[52] Hamilton and Denniss point to the fact that the average prices charged to industrial and commercial users (which account for 70% of the market) fell by nearly 22% between 1991–92 and 1997–98.[53]

[51] Hamilton and Denniss, 'Generation emissions?', 18. See also Productivity Commission, *Greenhouse Gas Emissions and the Productivity Growth of Electricity Generators*, 2001 and National Competition Council, *National Competition Policy: Some Impacts on Society and the Economy*, 1999.
[52] See Australian Greenhouse Office, *Analysis of Trends*, 2000, at 18.
[53] Hamilton and Denniss, 'Generation emissions?', 19.

The fall in price led in turn to a 6.3% increase in demand, which exceeded the long-term average increase of around 2.5%. Hamilton and Denniss ascribe the large fall in the price of electricity to attempts by Victoria's privatised brown coal generators to win market share at the expense of Victoria's gas generators and black coal generators in NSW. They show that in 1998 around 3500GWh was exported from Victoria into NSW, while only 600GWh flowed in the other direction (excluding flows from the Snowy Mountains Hydro-Electric Authority). This net energy transfer of 2900 GWh northward is in sharp contrast with the pattern in preceding years which saw nearly equal northward and southward energy transfers.

Hamilton and Denniss state that although the fall in the price of electricity to contestable customers is seen as the 'jewel in the crown' of microeconomic reform in Australia, there is no doubt that this has been very damaging to the environment.[54] They conclude that '[a]s long as the impacts of economic activity on the environment are excluded from the definition of "economic efficiency" competition policy cannot guarantee improved welfare. Increased competition has the capacity to improve welfare in some situations, but only after significant market failures, particularly externalities, have been removed'.[55]

If one looks at the increase in emissions that has already occurred since the establishment of the NEM, it is clear that the market cannot continue to exist in an environmental policy vacuum driven principally by competition principles.

5.1.2.4 COAG agrees to review the NEM

It was with some optimism that environmental lawyers greeted the announcement of COAG that it would be reviewing Australia's energy policy. This seemed an opportune moment to thoroughly overhaul the policy and legal framework of the energy market, and move towards a sustainable energy framework. At its meeting on 8 June 2001,[56] COAG accepted that it needed to provide effective policy leadership to meet the opportunities and challenges facing the energy sector in Australia. Consequently, COAG agreed to establish a new Ministerial Council on Energy (MCE) and to provide it with a series of priority tasks for its consideration and resolution.

Priority issues for consideration were: identifying any impediments to the full realisation of the benefits of energy market reform; identifying strategic directions for further energy market reform; examining regulatory approaches that effectively balance incentives for new supply investment, demand responses and benefits to consumers; assessing the potential for regions and small business to benefit from energy market development; *assessing the relative efficiency and cost-effectiveness of options within the energy market to reduce greenhouse gas emissions from the electricity and gas sectors, including the feasibility of a phased introduction of a national system of greenhouse emission reduction benchmarks* (emphasis

[54] Ibid, 20. [55] Ibid, 27.
[56] See *COAG Communiqué 8 June 2001*, <http://www.coag.gov.au/meetings/080601/index.htm#energy> (accessed 3 February 2005).

added); and identifying means of encouraging the wider penetration of natural gas including increased upstream gas competition, value-adding processes for natural gas and potential other uses such as distributed generation, because it is an abundant, domestically available and clean energy resource. This marks the first occasion on which COAG identified greenhouse gas emissions as a challenge facing the energy sector in Australia.

The MCE appointed the Hon. Warwick Parer to conduct the review. His term of reference was to undertake a forward-looking, strategic study to facilitate decision-making by governments, focusing on those areas likely to generate the most significant benefits for energy market reform. Parer's report to the MCE, *Towards a Truly National and Efficient Energy Market* (known as the Parer Review), contained eight principal chapters, covering governance and regulatory arrangements; electricity market mechanism and structure; electricity transmission; electricity financial market development; demand-side participation and full retail contestability in electricity; increasing the wider penetration of gas; options to reduce greenhouse gas emissions; and rural and regional issues. It is not possible to reproduce the Review in full.[57]

With respect to governance arrangements, the Review recommended the creation of a National Energy Regulator (NER), a single independent regulator for all jurisdictions which would: replace the energy functions exercised by the ACCC, the State and Territory regulators and the NECA; be responsible for the NEC, National Third Party Access Code Gas Pipelines and other energy market codes; be responsible for the approval of code changes for gas and electricity; and have its decisions reviewable by the Australian Competition Tribunal (as are the decisions of the ACCC presently).

The Parer Review made a number of recommendations to assist embedded (renewable energy) generators to access the NEM given that they reported facing the following difficulties: problems with negotiating network connection agreements and costs, including the availability of network operation information; no explicit requirement that embedded generation be considered where augmentation of distribution networks is being contemplated; stringent distributors' technical and/or safety requirements to overcome problems associated with connecting embedded generators to the network; and perceived conflicts of interest in enabling third party proposed embedded generation projects where retailer and distributor businesses are commonly owned.

Consequently, the Review recommended that the newly formed NER introduce a mandatory code of practice governing arrangements between distribution companies and prospective embedded generators, which addresses issues such as information disclosure on network capacity, the timeliness of responses to queries regarding capacity, and a methodology for calculating the contribution of embedded generation to network reliability. It also concluded that price

[57] See <http://www.industry.gov.au/assets/documents/itrinternet/FinalReport20December200220040213110039.pdf?CFID=242389&CFTOKEN=11377123>.

caps, rather than revenue caps, be imposed for greater certainty in the treatment of investment in the asset base, which is expected to assist embedded generation. In addition, there should be improved locational price signals to benefit embedded generation sited close to demand centres. These should be introduced in two phases: Phase One (1 to 2 years) seeing the introduction of more regions in the NEM; and Phase Two (7 to 10 years) seeing the introduction of full nodal pricing throughout the NEM transmission network. The report noted that the benefits of nodal pricing included conceptual simplicity, enhanced management of local market power, and reconciliation of economic and social objectives.

With respect to counteracting the greenhouse impact of the NEM, the Review recommended the introduction of a national economy-wide greenhouse gas emissions trading scheme to replace the following existing government greenhouse gas abatement initiatives: the Commonwealth Mandatory Renewable Energy Target (MRET); the NSW Greenhouse Gas Reduction Scheme; the Queensland 13% Gas Scheme; generator efficiency standards; and the Greenhouse Gas Abatement Program – Stationary Energy projects (all discussed in Chapters 5 and 6). The Review also recommended greater penetration of natural gas into the national energy framework.

In 2003, the COAG MCE accepted a number of these recommendations.[58] What is remarkable, as the ensuing analysis demonstrates, is that so far no amendments have been made to the *National Electricity Law* to ensure that the NEM achieves the twin objectives of a restructured electricity industry and the reduction of greenhouse gas emissions. It seems almost inconceivable that such an opportunity could have been missed by the MCE.

5.1.3 Changes to the regulation of the NEM[59]

In June 2004, COAG signed the *Australian Energy Market Agreement* (the Agreement).[60] The Agreement provided a comprehensive response to the Parer Review with respect to regulatory arrangements for the NEM. Changes to the regulatory framework are given effect under the new *National Electricity Law* (SA) (the Law) and the new *National Electricity Rules* (the Rules), which replace the Code. Whereas the Code was previously regarded as a consensual agreement or Code of Conduct among participating States, the Rules have the force of law.[61] All

[58] See *Ministerial Council on Energy Communiqué*, Perth, 11 December 2003, <http://www.industry.gov. au/assets/documents/itrinternet/MCE-Dec03-Communique20031211171220.pdf?CFID=2495&CFTOKEN=81125836> (accessed 3 February 2005).
[59] This section draws heavily on the insights provided at Ministerial Council on Energy, *Energy Market Reform National Electricity Law and Rules Consultation Session*, 10 December 2004, Sydney.
[60] See Ministerial Council on Energy Standing Committee of Officials, *Intergovernmental Agreement and Legislative Framework* (Information Paper), <http://www.industry.gov.au/assets/documents/itrinternet/IGALegislativeframeworkfinal20040525161258.pdf?CFID=1658449&CFTOKEN=87460888> (accessed 3 February 2005).
[61] National Electricity Rules, ss 8.

participating jurisdictions will pass complementary legislation to bring this piece of legislation into effect in their jurisdictions. One of the essential features of the reforms is to separate rule-making functions from the enforcement function. Two new bodies, the Australian Electricity Market Commission (AEMC) and the Australian Electricity Regulator (AER), are established.

In addition to the omission of environmental considerations, a number of issues have not been covered in the current round of reform. These include national approaches to energy access and transmission; a national distribution and retail framework currently regulated by the States; community service obligation considerations; and whether/how the new regulatory framework will provide for merits review.

The Law introduces a new 'objective' of the national electricity market: to promote efficient investment in, and use of, electricity services for the long-term interests of consumers of electricity with respect to price, quality, reliability, safety and security. The objective does not mention the environment. This is curious since the 2001 COAG energy policy agreement, which initiated the current reform process, stated that one of the national energy policy objectives would be 'mitigating local and global environmental impacts, notably greenhouse impacts, of energy production, transformation, supply and use'. The AEMC, but not the AER, is required to take this objective into account when exercising its functions under the Law.

5.1.3.1 New regulatory bodies

Under the new regime, NEMMCO's functions remain unchanged; that is, under Part 8 of the Law it is vested with maintaining and ensuring the safety and security of the NEM. However, a number of key regulatory changes have occurred. The MCE has been given an important role in setting policy for the NEM. It has the power to issue Statements of Policy Principle to guide the decision-making powers of the AEMC.[62] The MCE is also authorised to request or direct the AEMC to carry out a review of any matter relating to the NEM.[63] The MCE may initiate any Rule change proposals, which may only be given effect if the procedures for changing rules are followed.[64]

The AER is a new Commonwealth body with powers vested in it by the Law.[65] It has two principal functions: the economic regulation of transmission,[66] and enforcement of the Law and the new Rules. The AER is not subject to the direction of the MCE. As the new economic regulator for transmission, the AER will now set transmission revenue determinations, rather than the ACCC. In order to exercise its enforcement powers, the AER is given monitoring, investigation and enforcement roles under the Law.[67] It can obtain search warrants and apply to

[62] *National Electricity Law*, ss 7, 42. [63] Ibid ss 39–43.
[64] Ibid s 90. [65] Ibid s 14. [66] Ibid s 14(f). [67] Ibid s 14.

court for orders to remedy breaches of the Law.[68] Part 6 of the Law sets out the Civil Penalty Regime.

The new AEMC now has responsibility for reviewing the Rules,[69] and may be directed to do so by the MCE.[70] However, the AEMC does not have the power to initiate a substantive Rule change.[71]

A 'person aggrieved'[72] by the decisions of the AEMC, AER and NEMMCO can make an application to court for judicial review of their decisions.

5.1.4 Criticism of the 2005 energy market reforms

In February 2005, the Total Environment Centre released a report that is highly critical of the reforms, entitled *COAG's Quandary: What to do with the Energy Markets Reform Program?* This report was written by Gavan McDonnell, an international electricity industry expert.[73] The criticisms are directed at three crucial issues: the constitutionality of the reforms; whether the reforms are economically sound; and the failure of the EMRP to include any environmental criteria. A theme of the report, relevant to all of these areas, is that the reforms and attendant legislation were rushed through the South Australian Parliament with unseemly haste and without proper processes of consultation.

The report first raises the question of whether the EMRP is constitutionally valid, and expresses some doubt as to whether it can be, given the concern raised above that COAG itself acts unconstitutionally. The report is also concerned that the Standing Committee of Officials (SCO), which is driving the EMRP, is an anonymous group that lacks transparency. This is exacerbated by the fact that the processes of public consultation have been abbreviated. For example, the exposure draft of the revised *National Electricity Law* and the Rules was released for comment on 10 December 2004, with submissions due on 24 December 2004. The authors share McDonnell's complaint about the inadequate public consultation procedures. These shortcomings contravene Principle 10 of the Rio Declaration, which emphasises the importance of public participation in decision-making and access to adequate legal remedies.

From an economic perspective, the EMRP is criticised in the report because the NEM has not delivered what it was initially set up to do: deliver a privatised electricity sector. There is still a preponderance of State ownership. Market arrangements have been declared by the Federal Court to be 'artificial' because retailers own the electricity used to satisfy the demand of customers over which they have no control. The pool auction and the financial hedges are operating as one market and economic methods for characterising and assessing the performance of the market are lacking. Moreover, monopoly networks provide a significant regulatory problem in the NEM, but these are not being addressed by the EMRP.

[68] Ibid s 20. [69] Ibid s 44. [70] Ibid s 40. [71] Ibid s 90(2). [72] Ibid s 68.
[73] See <http://www.aemc.gov.au/pdfs/elecreview/Total%20Environment%20Centre.pdf>.

5.1.5 How did the environmental impacts of the NEM fall off the agenda?

In this book, the authors neither advocate nor reject the concept of a fully privatised electricity market. They are concerned, rather, that if the electricity sector is privatised it should be done in a manner consistent with the principles of ecologically sustainable development, which require a thorough integration of economic, social and environmental objectives. Given concerns about the environmental consequences of a restructured market driven by economic policy, it is disappointing that the economic objectives of the market are not likely to be achieved even after the 2005 reforms.

Like the authors, the Total Environment Centre report is highly critical of the EMRP's total oversight of the significant environmental impacts of the NEM. The report states that there are a number of mechanisms which could have been used to address this. The pricing system excludes the externalities of the NEM, including the emissions of greenhouse gases. In this way, it subsidises fossil fuels. Also, important mechanisms such as demand management and energy efficiency, which curtail consumptions and so reduce greenhouse gases, have been ignored by the EMRP.

5.2 Restructuring Australia's gas market

Australia has abundant reserves of natural gas, which amount to more than 100 years' supply at current production levels. Gas prices are some of the cheapest in the world for industry and residential customers, although it is still at a price disadvantage to black and brown coal for electricity generation. Total gas consumption in Australia is expected to more than double by 2019–20. However, there is unlikely to be a significant change in the demand side of the market as 30% of the increase is projected to be in the manufacturing sector, with 75% of this demand coming from just four large projects. Consumption of gas is variously distributed across sectors and across States. In NSW, gas accounts for 38% of energy used for heating. In Queensland virtually all gas is used in the manufacturing, construction and electricity sectors. In South Australia 56% of electricity is generated using gas, with gas also being used in the manufacturing, construction and mining sectors. In WA, the manufacturing, gas and mining sectors account for 70% gas consumption and in the Northern Territory over 90% of gas consumption is for electricity generation.[74] In Victoria, the combined residential and commercial sector accounts for 44% of consumption but only a small proportion of the State's electricity is generated using natural gas. Due to Hydro Tasmania's use of hydro-electric power, Tasmania uses little or no gas.

[74] See ABARE, *Australian Gas Markets: moving toward maturity*, 2003, at 36.

One of the main problems with using gas is that most major accumulations are offshore and some distance from major markets. Gas pipelines play a significant role, therefore, in delivering gas to customers. Australia's gas pipeline infrastructure of over 90,000 km links about 3.5 million customers to gas supplies. Natural gas transmission and distribution pipelines are regarded as natural monopolies because one pipeline system can transport gas along a specific route more cheaply than two or more independent operators. Incumbent operators of pipelines can use their market power to deny third party access to the transportation services of the pipelines systems or impose terms and conditions on access. This can lead to the charging of high prices and inefficiencies in the gas market.

5.2.1 Reform of Australia's gas market

Reform of Australia's gas market began in the 1990s. Despite this, a number of recent reviews all conclude that the gas market is still in transition, or still emerging. As with the restructuring of the electricity sector, the gas reform process has been consistent with a broader microeconomic reform process which has taken place under NCP.

5.2.1.1 The Gas Access Regime and the Gas Code

NCP gas reforms are encapsulated in the *National Third Party Access Regime for Natural Gas Pipelines* (the Gas Access Regime), which applies to natural gas transmission and distribution pipelines, but only to those 'covered' under the regime. Pipelines are covered if they are listed in Schedule A of the Gas Code, or a service provider requests coverage and the relevant regulator approves the access arrangement, or, following a recommendation from the National Competition Council, the Minister decides to cover the pipeline. Once a pipeline is covered a service provider must apply to have an access arrangement approved by the ACCC or relevant State or Territory regulator.[75]

Guidelines for access are set out in the *National Gas Code*.[76] The Code, which has been introduced in all States and Territories, sets out principles for access to Australian natural gas transmission and distribution pipeline services. It allows third parties to negotiate access with owners of pipelines to use the spare and developable capacity in transmission and distribution pipelines. This facilitates competition in the upstream gas production and energy retailing aspects of the gas market as it enables gas users to directly contract for gas supply with an upstream producer of choice. Producers then use the pipeline network to deliver the gas to users.

[75] State access arrangements are regulated by the following bodies: Essential Services Commission (Victoria); Independent Pricing and Regulatory Tribunal (IPART, NSW); Queensland Competition Authority (QCA); Office of the Gas Access Regulator (OffGAR, WA); South Australian Independent Pricing and Access Regulator (SAIPAR); Office of the Tasmanian Energy Regulator (OTTER); ACT Independent Competition and Regulatory Commission (ICRC); and Utilities Commission (NT).

[76] Available at <http://www.coderegistrar.sa.gov.au/attachments2/codeC4.doc> (accessed 9 February 2005).

The access reforms have been supported by comprehensive structural reforms to break up the old vertically integrated gas utilities into separate transmission, distribution and retailing businesses. In addition, legislative and regulatory barriers to interstate and intrastate trade have been removed or are being phased out.

5.2.2 Recent review of the Australian gas market

The Review conducted by the Hon. Warwick Parer investigated how to encourage a wider penetration of gas into the energy mix. The Review made a number of key findings which are relevant to understanding the current role of gas in the market, and the further reforms that the sector is likely to undergo.

5.2.2.1 Australia's gas market is still emerging

The combination of new pipelines and new suppliers resulting from the reform of the gas market has undoubtedly brought more competition into the Australian gas market. However, the eastern gas market can best be described as still emerging. It is immature compared with the gas markets in the United Kingdom and United States. Supply competition is still weak. Competition is still restricted because of the small number of basins supplying gas to the market as well as the joint marketing of gas from those basins. There is still a high level of upstream ownership of gas and the Australian economy is relatively small. While regulatory regimes have freed up access to pipelines, they seem to be restricting new investment. The challenge for the gas industry will be to become more dynamic and flexible in order to meet the needs of a growing energy intensive economy, which nevertheless needs to move towards a lower carbon intensive energy mix.[77]

5.2.2.2 Perceptions of regulatory uncertainty

Concerns about regulatory uncertainty seem to be inhibiting the construction of new pipelines. Owners of, and investors in, gas pipelines claim that the National Gas Code exposes them to a number of regulatory risks. For example, there is often no binding determination on whether a proposed new pipeline meets the coverage criteria prior to investment decisions. There is also concern that the regulatory parameters are either uncertain or will change prior to construction or during the life of the project.[78]

5.2.2.3 Need to increase upstream competition

Although Australia has abundant gas resources, there is limited competition in the eastern States gas market. This is largely due to the long distances between

[77] Ibid para 190. [78] Ibid para 193.

supply sources and demand centres. Also, as mentioned above, there is a high concentration in ownership of supply compounded by joint marketing by producers within basins. The Review notes that sustainable competition is crucial if gas consumers are to reap the full benefits of the gas market reforms. To further stimulate competition, government must ensure that the development of pipelines is not impeded in any way.

More open access to gas production facilities should be granted to smaller explorers and developers of gas. In fact, numerous submissions were made to the Review stating that there is an urgent need for reform of the allocation or management of exploration and development leases to encourage upstream competition in the market.[79] Another problem identified is that most gas exploration is undertaken by joint ventures which necessarily lead to joint production and marketing arrangements. This is common where monopoly producers deal with monopoly buyers and vertically integrated businesses are the norm. The Review recommends a move towards separate marketing to help create competition and move towards a more mature market.[80]

5.2.2.4 Need for government facilitation of new gas projects

Australia's gas resources are developed by private companies. Given the remote location of gas fields, their development requires significant investment and may involve considerable investment risk. The Review notes that there may be circumstances where governments should provide incentives to encourage major projects to proceed, while ensuring that their actions do not distort the energy market.

5.2.2.5 Impact of greenhouse gas measures

The Review notes that all greenhouse gas emission reduction measures are likely to increase the penetration of natural gas, especially as a fuel for electricity generation. This will have the flow-on effect of requiring the expansion of existing pipelines, or even the construction of new pipelines, to areas where natural gas is not currently available.[81]

5.2.2.6 Removal of market distortions in the retail sector

The penetration of natural gas into the residential sector is not uniform across all States. The Review shows that domestic water heating systems account for 30% of household energy use and the same proportion of greenhouse gas emissions. Fifty-nine percent of all water heaters are electric, 35% are gas, and 4.8% are solar. Existing solar hot water assistance measures undermine consumer demand for gas. The Review recommends the removal of all distortions which deliberately or inadvertently result in undesirable market or environmental outcomes, and

[79] Ibid para 205. [80] Ibid para 199. [81] Ibid para 207.

proposes that a technology-neutral and transparent market-based approach be adopted to remove any discrimination against gas.[82]

5.2.2.7 Proposed solutions

The Review recommended that binding up-front coverage rulings be introduced; that a 15-year economic regulation-free period be offered for new transmission pipelines; that up-front regulatory arrangements be provided for new pipelines; that governance and regulatory arrangements be changed; that an independent review of the Gas Code be conducted; that a code of conduct be developed to cover non-covered pipelines in the interest of a competitive market; that greater competition be encouraged through separate marketing arrangements; that upstream competition be enhanced by promoting competition in acreage management regimes; and that a review be conducted of the industry's principles for access to upstream facilities.[83]

5.2.3 MCE accepts need for further penetration of gas into Australian energy market

In its 2003 *Reform of Energy Markets* report to COAG, following the Parer Review, the MCE agreed that there is a need for further penetration of natural gas in the national energy framework. In May 2004, the MCE provided an 'Expanded Gas Program' report as a supplement to its earlier report.[84] This report has made it clear that it agrees with the recommendations of the Parer Review as well as the 2004 Productivity Commission Inquiry Report *Review of the Gas Access Regime*.[85] The MCE has committed itself to forging a high-level agreement with the gas industry to encourage new market entrants, promote further efficient investment in gas infrastructure and provide effective management of supply and demand interruptions. In May 2005, the MCE announced that it is working to develop a new National Gas Law and Rules.

In September 2005, the MCE released *Statement of Approach – A New Legislative Framework for Gas*.[86] This paper seeks stakeholders' views on the proposed structure and content of the gas legislative package. As far as the gas market is concerned, the following matters are the most important for the reform of the gas market: improving governance of the energy markets to improve the climate for investment; improving the quality of economic regulation across energy markets and providing for a further penetration of natural gas to achieve various objectives, including the lowering of greenhouse gas emissions. The legislative framework for the gas market will comprise the National

[82] Ibid para 208. [83] Ibid para 209.
[84] Available at <http://www.mce.gov.au/assets/documents/mceinternet/GasSupplementtoMCEReportMay042004051912434520041129145543%2Epdf> (accessed 9 February 2005).
[85] Available at <http://www.pc.gov.au/inquiry/gas/finalreport/gas1.pdf> (accessed 9 February 2005).
[86] Ministerial Council on Energy, Energy Market Reform Bulletin No. 48, 13 September 2005 available at <http://www.mce.gov.au/index.cfm?event=object.showContent&objectID=4E3753A8-E4AA-F094-327AD5257295B257> (accessed 16 October 2005).

Gas Law, the National Gas Rules and statements of policy principle made by the MCE to the Australian Energy Market Commission, which is responsible for rule-making.

The following principles have been adopted with respect to developing this regulatory framework:

- Wherever feasible, alignment with the new electricity regulatory regime should occur
- The regulatory framework should be enshrined in the National Gas Law (NGL). Procedural and technical details will remain in the new Gas Rules
- The Rule change process will be enshrined in the NGL and will be sufficiently flexible to allow the details of the Regulation to be responsive to the needs of market participants
- General legislative principles which confer and determine the scope of functions, powers, rights and obligation should be included in the NGL.

These changes will require the current Gas Pipelines Access Law and the Gas Code to be divided up into the NGL and the National Gas Rules. Also the NGL will empower the South Australian Minister to make the initial National Gas Rules. The AEMC will subsume the current roles of the National Gas Pipelines Access Commission and the Code Registrar. It will also conduct a review of the gas market at the instance of either the MCE or independently. Although the NGL and the Natural Gas Rules will initially only relate to access issues to transmission and distribution pipelines, in future it will also include the development of a gas wholesale market and a nationally agreed distribution and regulatory framework. Further legislative amendments will cover these developments. The Australian Energy Regulator will take control of economic regulation/approval of access arrangements for gas transmission and distribution networks and for arbitration of access disputes, instead of the ACCC. The AER will also be the enforcer of the NGL and the Rules. The decisions of the AEMC and AER will be subject to judicial review but, as with the National Electricity Law, access to merits review is a matter that is being separately investigated by the MCE. Western Australia will enact complementary legislation.

5.2.4 Conclusion

The restructuring of the gas market in Australia and the deeper penetration of gas into the energy market have clear implications for a sustainable energy framework in Australia. As we have indicated elsewhere, natural gas is a feasible alternative energy source to fossil fuels and is far less polluting. Most importantly, since it produces fewer greenhouse gas emissions it is regarded as a transitional fuel between fossil fuels and renewable energy sources. The reforms now promised by the MCE will hopefully give natural gas a far more prominent role in the Australian energy mix.

5.3 Implications of the US/Australia free trade agreement for a sustainable energy sector

It is impossible to give a complete overview of the relevant trade law that is required to deal with the possible implications of the US/Australia FTA[87] here. The FTA came into force on 1 January 2005. However, since the FTA may well have implications for the structure of the Australian energy market, as well as environmental implications, it is necessary to refer briefly to its potential impact.

5.3.1 Investment and services

The investment provisions of the FTA provide a strong framework for continuing to promote two-way investment between the US and Australia. Reciprocal access to US and Australian markets has been enhanced for service suppliers such as providers of professional, business, educational, environmental, financial and transport services. Essentially this means that it will be easier for US and Australian service providers to operate in each other's jurisdiction. There has been some concern regarding the scope of these services, particularly with respect to essential services like water, energy and health.

Concern about the effect of the FTA with respect to services relates to the fact that it may undermine domestic environmental regulation controlling the activities of such utilities. The FTA reinforces Australia's obligations under article VI.4 of the General Agreement on Trades in Services (GATS). This article states:

> With a view to ensuring that measures relating to qualification requirements and procedures, technical standards and licensing requirements do not constitute unnecessary barriers to trade in services, the Council for Trade in Services shall, through appropriate bodies it may establish, develop any necessary disciplines. Such disciplines shall aim to ensure that such requirements are, inter alia:
> (a) based on objective and transparent criteria, such as competence and the ability to supply the service;
> (b) not more burdensome than necessary to ensure the quality of the service;
> (c) in the case of licensing procedures, not in themselves a restriction on the supply of the service.

The Australian Conservation Foundation (ACF) has voiced its concerns about this article, saying that if the US government were to challenge an Australian environmental law covering a services industry, Australia would have to overcome two hurdles. First, under article VI.4(a), the Australian government may have to prove that the regulation is 'objective' in the sense that it is intended to prevent harm which is scientifically ascertainable. It is difficult to reconcile this requirement with the precautionary principle which now underpins much

[87] See Department of Foreign Affairs and Trade Fact Sheets at <http://www.dfat.gov.au/trade/negotiations/us.html>.

of Australia's environmental law. Secondly, the 'necessity' test in article VI.4(b) will require Australia to adopt the regulatory approach that is least burdensome to the economic interests of US service providers.

The Department of Foreign Affairs and Trade (DFAT) has attempted to overcome these concerns by stating that 'both Parties retain the right to establish their own domestic environmental standards, and to adapt or modify their own laws' and that 'no changes to Australian environmental laws or regulations will be required'. Once again this statement is true only to the extent that the FTA itself does nothing to disturb these. The World Trade Organization (WTO) makes this clear by stating that: 'Member Governments will not have to submit regulations to the WTO for approval. Nor will they have to show that they are employing least-trade-restrictive practices, *unless asked to justify a specific regulation in the event of a dispute with another Government*'.[88] Thus, if there were to be a dispute between the US and Australian governments regarding environmental regulations, this comment seems to confirm rather than allay the concerns raised about the fate of domestic regulation under the FTA.

In addition, it is not clear exactly which services will be covered by the agreement. It seems that where energy services have already been privatised by State governments in Australia, these sectors will be subject to the FTA. However, where these services are provided solely by government will they be affected by the FTA? The position with respect to services which have been corporatised is even less clear. The FTA covers all services except those 'in the exercise of government authority' 'supplied neither on a commercial basis, nor in competition with one or more service suppliers'. Most corporatised utilities in Australia are required to operate as a successful business which may mean that the services are supplied 'on a commercial basis' and so may be caught by the Services provision of the FTA.

The FTA does include 'strong investor protection provisions' but does not include any provisions for investor–State dispute settlement. Domestic laws will apply to resolve disputes between foreign investors and government. So the dispute resolution mechanisms in the FTA will cover disputes between the US and Australian governments, although there is nothing to stop investors lobbying governments to bring actions, under the FTA, to protect their interests. The Dispute Resolution Body is likely to be similar to that established to resolve WTO disputes.

5.4 The need to design a sustainable energy market for Australia

This chapter has demonstrated a number of concerns about the environmental consequences of restructuring an electricity market. The overall conclusion is that

[88] World Trade Organization, *GATS: Fact and Fiction – Misunderstandings and Scare Stories: The GATS and Domestic Regulation* <http://www.wto.org/english/tratop_e/serv_e/gats_factfiction9_e.htm> (emphasis added).

it is difficult to refute international research which shows that the restructuring of the electricity industry will only be climate friendly *by design*. Although they may not have perfected the art, other countries undergoing electricity restructuring have attempted to achieve the twin goals of liberalisation and environmental protection.

The other crucial observation that must be made is that these twin goals have been written into *law*. The numerous provisions that appear in these countries' restructuring statutes suggest that policy-makers are alive to the fact that price, on its own, will not deal effectively with externalities, or steer the purchasing of power to ecologically sustainable resources.[89] The negative externalities of restructuring must be internalised through regulation, not voluntary programs. This is in spite of the fact that the regulation of a restructured market is counter-intuitive to the economic ideology which underpins the restructuring. However, to remain true to attempts to restructure the market, legal measures adopted to internalise the externalities should be congruent, as far as possible, with the restructured market. It is virtually impossible to avoid the calls made, both at the 2002 World Summit and in the literature, for the 'reregulation' of the electricity market.

5.4.1 The need for enforceable legal measures rather than voluntary programs

Despite the steps which have already been taken to reduce greenhouse gas emissions and to promote renewable energy technologies (described in detail in Chapters 4 and 6), Australian governments do not measure up to other jurisdictions in the suite of enforceable legal measures that could be adopted to develop a sustainable energy framework. This is because the 'no-regrets' policy is largely based on voluntary measures and government funding for various programs, and there is cause for scepticism that such measures will control the predicted escalation in greenhouse gas emissions. The authors of this book agree with Mills, who states:

> Where voluntary programs rely upon participating organisations to assess and monitor their own emissions reduction strategies, as is the case with Australia's Greenhouse Challenge, the integrity of the program may be undermined . . . The Greenhouse Challenge will encourage electricity utilities to reduce energy use in their own offices, but ignores the more important issue of the utilities' influence upon energy use throughout the nation . . . [V]oluntary programs are not capable of ensuring the achievement of substantial emissions reductions [and are] best suited to limited application, as one component of an overall strategy for emissions reductions.[90]

[89] Perkins, 'Energy deregulation', 1036.
[90] David Mills, 'Reducing Greenhouse Gas Emissions Through Electricity Industry Reform: A Market-Oriented Emissions Reduction Scheme', *World Resources Review* 12 (2000) 61–2.

In Chapter 6, examples are given of how the restructuring of an electricity sector should go hand in hand with legal measures to control the environmental impacts of the sector. When a comparison is made of the raft of legal measures that are adopted by overseas jurisdiction to control emissions from restructured electricity sectors, we find that the measures adopted in Australia are woefully inadequate.

6

State government initiatives on energy and the environment

In this chapter, the initiatives of State governments in Australia in curbing rising greenhouse gas emissions, promoting renewable energy technologies and establishing energy efficiency programs are reviewed. The chapter does not comprehensively cover all initiatives in every State and Territory but is rather indicative of the types of schemes being adopted by this level of government in Australia. One of the interesting dynamics which is emerging is that the State governments are adopting legal measures to move towards a domestic greenhouse gas emissions trading scheme, in the absence of any leadership from the Australian government. They have also all, to varying degrees, adopted greenhouse strategies, established greenhouse offices and sustainable energy agencies, and committed themselves to renewable energy strategies.

6.1 Greenhouse gas initiatives

6.1.1 Profile of State greenhouse gas emissions

In June 2005, the Australian Greenhouse Office (AGO) released a paper entitled *State and Territory Greenhouse Gas Emissions – An Overview*.[1] It is the latest available estimate of emissions from the States and Territories and figures are taken from the National Greenhouse Inventory documenting emissions for 2002. Total emissions in Australia amounted to 541.8 million tonnes. The breakdown is as follows:

[1] Available at <http://www.greenhouse.gov.au/inventory/stateinv/index.html>.

- New South Wales: 151.5 million tonnes (Mt) = 28%
- Queensland: 145.1 Mt = 26.8%
- Victoria: 117.0 Mt = 21.6%
- Western Australia: 70.4 Mt = 13.0%
- South Australia: 30.9 Mt = 5.7%
- Northern Territory: 17.7 Mt = 3.3%
- Tasmania: 7.2 Mt = 1.3%
- ACT: 1.3 Mt = 0.2%.

Emissions from the Stationary Energy sector, including production of electricity and other direct combustion of fossil fuels (other than transport), account for 48% of national greenhouse gas emissions. On a State and Territory basis this is broken down as follows:

- Victoria: 29.5% (67% of all emissions)
- New South Wales: 27.2% (48% of all emissions)
- Queensland: 22.5% (40% of all emissions)
- Western Australia: 13.2% (48% of all emissions)
- South Australia: 5.3% (45% of all emissions)
- Northern Territory: 1.5% (23% of all emissions)
- Tasmania: 0.9% (31% of all emissions).

The information indicates, not surprisingly, that the majority of emissions emanate from New South Wales and Victoria and that in those States emissions from the stationary energy sector are the most significant. As we demonstrate in this chapter, the States have focused primarily on this sector in order to reduce their greenhouse gas emissions.

6.1.2 States agree to establish a carbon emissions trading scheme

As mentioned in Chapter 3, the Australian government has indicated that it will not establish a domestic carbon emissions trading scheme in Australia. Nevertheless, in a March 2005 communiqué,[2] the State and Territory Premiers and Chief Ministers announced that a multi-jurisdictional greenhouse gas emissions trading scheme will be developed.

The group has agreed to rely on the following 10 key principles in developing a trading scheme. The scheme will be designed around a cap-and-trade approach,[3] and should be a national scheme using a sector-based approach to caps. Consideration must be given to the national emissions abatement target

[2] See <http://www.cabinet.nsw.gov.au/greenhouse/emissionstrading>.

[3] Under a cap-and-trade approach to emissions trading, a regulatory authority sets an aggregate cap on greenhouse gas emissions. The cap is then divided into a number of tradeable permits, also known as allowances. Each allowance authorises the discharge of a unit quantity of emissions. These allowances may be traded between entities which are more able and less able to meet the emissions reduction targets imposed by the cap; see Neil J Buckley, Stuart Mestelman and R Andrew Muller, *Baseline-and-Credit Emission Permit Trading: Experimental Evidence Under Variable Output Capacity*, McMaster Experimental Economics Laboratory Publications, May 2005, available at <http://socserv2.socsci.mcmaster.ca/%7Eecon/mceel/papers/varcaperc.pdf>.

(108% of 1990 levels between 2008–12) when setting the cap and allocating responsibility between sectors. Initially the scheme should apply to the stationary energy sector (including electricity, gas and coal) and cover all six greenhouse gases mentioned in the Protocol and allow offsets. Permits will be allocated both administratively and by way of auction, while the penalty for non-compliance should be set at such a level as to encourage compliance and set a price ceiling for the permit market. Adverse effects of the scheme as well as any need for structural adjustments need to be addressed. Finally, early abatement action by participants should be recognised and new entrants should be accommodated.

The group will now assess the potential impacts of the proposed scheme on costs of compliance; specific industries; regional impacts and associate labour market issues; consumer energy prices and small business; and macroeconomic impacts. A discussion paper was released on 12 September 2005[4] seeking public submissions on all of the issues associated with the establishment of the proposed trading scheme.

A key issue is whether or not the scheme will be able to link in with other international carbon markets. Currently, as discussed in Chapter 3, if a country has not ratified the Kyoto Protocol, domestic trading schemes cannot be linked either to an international or to the European Emissions Trading Schemes. However, Premier Steve Bracks has announced that Victoria will initiate a dialogue with a group of US States to establish whether or not there are opportunities for emissions trading between the two schemes. The US States which have established their own trading schemes are New York, Massachusetts, Connecticut, Delaware, Maine, New Hampshire, New Jersey, Rhode Island and Vermont. This program is known as the Regional Greenhouse Gas Initiative.

6.1.2.1 New South Wales Greenhouse Benchmarks Scheme

A baseline-and-credit,[5] as opposed to a cap-and-trade, greenhouse emissions trading scheme is already operating in New South Wales. In 1995, the NSW government made it a condition of licence for electricity retailers to adopt greenhouse gas emission benchmarks. A 2001 review of compliance[6] with the licence condition indicated that only two out of 22 retailers had complied with the condition. Consequently, in January 2003, the NSW government introduced an enforceable Greenhouse Benchmarks Scheme (the Scheme) for electricity retailers and large users of electricity by enacting the *Electricity Supply Amendment (Greenhouse Gas Emission Reduction) Act 2003* (NSW). The amending legislation inserted

[4] See <http://www.cabinet.nsw.gov.au/greenhouse/background.pdf>.

[5] Under a baseline-and-credit approach there is no explicit cap on emissions but an entity has a right to emit to a certain baseline of emissions. The baseline is typically derived from historical emissions. Firms create emissions reduction credits by emitting fewer emissions than those indicated in their baselines. Credits may be banked or sold to entities which exceed their baselines. Credits must be certified and registered before they can be traded, and in order to be registered, that emissions reduction must have already occurred. The effect of such a scheme is to limit aggregate emissions to an implicit cap equal to the sum of individual baselines; see Buckley et al, *Baseline-and-Credit Emission Permit Trading*.

[6] Independent Pricing and Regulatory Tribunal, *Electricity distribution and retail licences Compliance report for 2000/01 – Report to the Minister for Energy*, at 4.

Part 8A into the *Electricity Supply Act 1995* (NSW). In addition, the government has made the Electricity Supply (General) Amendment (Greenhouse Gas Abatement Certificate Scheme) Regulation 2003.

The Act requires participants to achieve a benchmark of 7.27 tonnes of carbon dioxide equivalent of greenhouse gas emission per head of State population by the calendar year 2007, which remains as a benchmark until the calendar year 2012.[7] This amounts to approximately a 25% reduction in emissions compared with business as usual. It also makes a broad range of benchmark participants subject to the benchmark, including electricity retailers (as well as generators retailing electricity), large electricity users, and projects of State significance.[8] In 2005, the definition of a 'large customer' was amended to mean 'a customer (other than a retail supplier) that on its own account, or together with one of more other such customers (who are related entities), uses 100GWh or more of electricity at a single site in NSW in any year, or 100GWh or more of electricity at more than one site in NSW in any year, at least one of which uses 50GWh or more of electricity in that year, or a related entity of a customer whether or not the entity is a customer'.[9] A 'related entity' of a customer has been defined as a related body corporate of the customer, joint venture partners, or an entity with which the customer has various relationships under the law of trusts. The Act establishes the NSW Independent Pricing and Regulatory Tribunal (IPART) as the regulatory body that will determine the liability of benchmark participants, and assess their compliance with the Scheme.[10] Benchmark participants are also required to lodge an annual greenhouse gas benchmark statement with IPART.[11]

The following activities[12] are recognised for the valid creation of a NSW Greenhouse Abatement Certificate (NGAC) equivalent to 1 tonne of CO_2eq abated: generation of electricity that results in reduced greenhouse gas emissions; reduction in electricity consumption; and carbon sequestration that results in reduced greenhouse gas emissions. Large retail electricity users may elect to be directly liable under the Scheme and create Large User Abatement Certificates (LUACs) from reductions in greenhouse gas emissions associated with reduced consumption.[13]

Participants will be liable for a civil penalty of $10.50 per tonne of CO_2eq target shortfall for the relevant calendar year (the penalty may be CPI indexed under the regulations).[14] Criminal penalties may also be imposed for failure to comply with the operation of the Scheme, including the failure to cooperate with IPART.[15]

The Greenhouse Gas Benchmark Rules[16] detail the methodology on how the Scheme will operate: for example, the calculations of the benchmark

[7] *Electricity Supply Amendment (Greenhouse Gas Emission Reduction) Act 2003* (NSW), s 97B.
[8] Ibid, s 97BB. [9] See *Energy Supply (Amendment) Act 2005* (NSW).
[10] Above *Electricity Supply Amendment (Greenhouse Gas Emission Reduction) Act 2003* (NSW), at s 97H.
[11] Ibid, s 97CB. [12] Ibid, s 97DA. [13] Ibid, s 97EC(4).
[14] Ibid, ss 97CA(2), (3). [15] Ibid, ss 97CB(5), 97DD(5), 97EF(7).
[16] For more details, see <http://www.greenhousegas.nsw.gov.au/legislative_framework.htm#rules>.

participants' targets and possible shortfalls. The Rules are very detailed and cannot be reproduced here but it is essential that they be consulted and applied in practice.

The Electricity Supply (General) Amendment (Greenhouse Gas Abatement Certificate Scheme) Regulation 2003 sets up the abatement certificate scheme under Part 8A of the Act. The Regulation sets the criteria for the following aspects of the abatement certificate regime. In order to be eligible to create a certificate, the participant must be accredited by the Scheme Administrator. Applications for the accreditation and the transfer of certificates must be made to the Scheme Administrator. A register of accredited Abatement Certificate Providers (ACPs) must be kept. IPART or the Scheme Administrator may at any time conduct or require audits to be conducted of ACPs in the creation of certificates, eligibility for accreditation and compliance with any condition of accreditation.

The approach adopted by the New South Wales government to reduce emissions from the energy sector is in marked contrast to that of the Federal government under the Generator Efficiency Standards program.[17] Under this scheme, generators using fossil fuels are *encouraged* to achieve best practice efficiencies in their power plants and so reduce greenhouse emissions. Standards apply to new electricity generation projects, significant refurbishments and existing generation. Performance against the standards is determined on a plant-by-plant basis according to a methodology set out in the Technical Guidelines for the measure.[18] The scheme is voluntary not mandatory and one wonders, given the previous lack of compliance with licence conditions under the NSW scheme, whether it will be able to deliver significant greenhouse emissions reductions.

Nevertheless, a recent analysis of the NSW Benchmarks Scheme 2003 compliance period has uncovered some weaknesses.[19] Most of the NGACs are derived from just a few types of projects with evidence of market concentration in the supply of and demand for NGACs creating the risk of market manipulation. Transparency in reporting on the Scheme is lacking while physical emissions may continue to increase even while the declining NSW per capita target is met. This is an inherent weakness in baseline-and-credit schemes where no firm targets are set. There is some doubt about the extent to which the Scheme will produce reductions in emissions that are 'additional' to those that would have occurred in

[17] The Federal standards apply to any power generating plant that uses fossil fuels, whether on-grid, off-grid or self-generating, which meet *all* of the following criteria: 30MW electrical capacity or above; and 50GWh per annum electrical output or more; and a capacity factor of 5% or more in each of the last three years; see <http://www.greenhouse.gov.au/ges/qa.html#standards> (accessed 26 February 2003).

[18] These are available on the AGO website at <http://www.greenhouse.gov.au/markets/ges/index.html>.

[19] See Rob Passey 'NGAC Registry Analysis 2003', presentation delivered at Workshop on the NSW Greenhouse Gas Scheme, Centre for Energy and Environmental Markets, University of New South Wales, 21 April 2005, available at <http://www.ceem.unsw.edu.au/documents/NGASseminar-rp_000.pdf>; and Iain MacGill 'An Assessment of NGAS performance to date, scenarios of its possible performance to 2012, and their policy implications', presentation delivered at Workshop on the NSW Greenhouse Gas Scheme, Centre for Energy and Environmental Markets, University of New South Wales, 21 April 2005, available at <http://www.ceem.unsw.edu.au/documents/NGASworkshop-ifmfnl_000.pdf> (accessed 13 October 2005).

any case. This, combined with the high transaction costs associated with administering the Scheme, means that its economic efficiency may be low.

6.1.2.2 ACT Greenhouse Benchmarks Scheme

The ACT government has enacted the *Electricity (Greenhouse Gas Abatement) Act 2004* which requires electricity retailers to source electricity from cleaner and greener sources. The Act must be read together with the Electricity (Greenhouse Gas Abatement) Regulation 2004. The legislation is expected to achieve a 193 kilotonne reduction per year in carbon dioxide emissions in 2008. The ACT government has imposed this obligation on benchmark participants in the ACT since the power generated elsewhere in Australia, and imported into the ACT, results in high emissions of carbon dioxide. In 2001–02, Canberrans used approximately 40% more electricity per annum than the national average.

The Act establishes the following greenhouse gas benchmarks:

- for the year 2005: 7.96 tonnes of carbon dioxide equivalent of greenhouse gas emissions per head of ACT population;
- for the year 2006: 7.62 tonnes per head;
- and for each of the years 2007 to 2012: 7.27 tonnes per head.[20]

These benchmarks are used to work out the individual greenhouse gas benchmark for electricity retailers, and large customers who have elected to be part of the scheme, who must meet the required benchmarks. In fact, compliance with the benchmarks is a condition of licence for retailers.[21]

Individual benchmarks are worked out by multiplying the ACT population for the year by the relevant annual greenhouse gas, then working out the proportion of the total electricity demand in the ACT for that year, and applying that proportion to the electricity sector benchmark for the year to work out the number of tonnes of carbon dioxide equivalent of greenhouse gas emissions that make up the benchmark for each participant.[22] Benchmark participants must submit an annual statement to the Regulator[23] by 1 March each year.[24] Greenhouse shortfalls up to 10% may be carried forward to the following year,[25] but otherwise a penalty must be paid for the shortfall.[26] The greenhouse penalty is $10.50 per tonne of carbon dioxide equivalent of greenhouse shortfall but is adjusted according to the Consumer Price Index.[27]

Participants will need to acquire and submit greenhouse gas abatement certificates, created by an accredited certifier, to the Regulator in satisfaction of the target.[28] These certificates can be traded.[29] Registers must be kept by the Regulator of accredited abatement certificate providers and abatement certificates.[30] All decisions made under the Act may be appealed against to the Administrative Appeals Tribunal.[31]

[20] *Electricity (Greenhouse Gas Abatement) Act 2004*, s 7. [21] Ibid s 15. [22] Ibid s 10.
[23] Ibid Part 8. [24] Ibid s 17. [25] Ibid s 12(6). [26] Ibid s 16.
[27] Electricity (Greenhouse Gas Abatement (Regulation) 2004, cl 12 and 13.
[28] *Electricity (Greenhouse Gas Abatement) Act 2004*, Parts 4 and 5.
[29] Ibid Part 6. [30] Ibid s 44. [31] Ibid s 58.

Renewable energy certificates (REC), derived under the *Renewable Energy (Electricity) Act 2000* (Cth), may be counted towards the greenhouse benchmark, although the rules for electricity retailers and large users (elective participants) are slightly different.[32] For retailers, this is acceptable if the REC has been surrendered, or has been offered for surrender; the retailer's greenhouse gas benchmark statement refers to such RECs; and the costs of deriving the REC have not been paid to the retailer by a large user of electricity, or otherwise passed on by the retailer to the large user. For large users' RECs to count, the rules are similar except that the large user must give evidence satisfactory to the Regulator, in its annual statement, that the costs of, or associated with, the REC have been borne solely by the user.

Significantly, the ACT scheme will be integrated with the NSW Greenhouse Gas Abatement Scheme creating a trading regime for the certificates between the two jurisdictions. This is intended to reduce compliance costs for industry and remove any regulatory inconsistencies across State borders. The ACT Scheme will be regulated by two different regulatory bodies. The government has reached an agreement with NSW Independent Pricing and Regulatory Tribunal, which administers the NSW Greenhouse Scheme, to also administer certain aspects of the ACT scheme. These include accrediting abatement certificate providers; administering the online Scheme registry, and auditing greenhouse abatement activities. The Scheme Regulator (the ACT Independent Competition and Regulatory Commission (ICRC)) will establish greenhouse gas benchmarks for each participant, monitor compliance with the benchmarks and impose penalties if necessary. This development may be seen as a first step towards a national emissions trading scheme in greenhouse gas abatement certificates.

6.1.2.3 Recognising a carbon sequestration right

As will be noted, the Greenhouse Benchmarks Scheme allows NSW Greenhouse Abatement Certificates (NGACs) to be created where carbon has been sequestered. The New South Wales government was the first to recognise a carbon sequestration right as a separate legal right under the *Carbon Rights Legislation Amendment Act 1998* (NSW). It did this in 1998, as a joint initiative between the New South Wales government and State Forests of New South Wales, when both parties expected that the world's first futures exchange in carbon would be launched on the Sydney Futures Exchange. Although this did not eventuate, the legislation recognises that a carbon credit derived from the planting of forests needs to be identifiable as a legal entity separate from the tree itself.

Consequently, the Act defines carbon sequestration and a carbon sequestration right as follows: 'carbon sequestration by a tree or forest means the process by which the tree or forest absorbs carbon dioxide from the atmosphere, and a carbon sequestration right in relation to land means a right conferred on a person by agreement or otherwise to the legal, commercial or other benefit (whether

[32] Electricity (Greenhouse Gas Abatement) Regulation 2004, cl 14.

present or future) of carbon sequestration by any existing or future tree or forest on the land after 1990'.[33] The Act amends the *Conveyancing Act 1919* (NSW) to recognise that rights associated with carbon sequestrated by trees and forests from the atmosphere may be a species of forestry right. This innovative piece of legislation has been mirrored in other States by *Forestry Act 1959 amended by Forestry and Land Title Amendment Act 2001* (Qld), *Forest Property Act 2000* (SA) and *Forestry Rights Act 1996* (Vic).

6.1.3 States develop greenhouse strategies

State governments have begun to develop greenhouse strategies to identify the threats of global climate change to their interests and to develop appropriate responses to mitigate these threats. The strategies are wide-ranging. For present purposes, we focus on the way in which strategies in a number of States attempt to deal with the greenhouse gas emissions from the energy sector. Since 99.8% of Tasmania's electricity is derived from hydro-electricity, which emits virtually no greenhouse gases, a discussion of Tasmania's Greenhouse Statement is not included.

6.1.3.1 NSW Greenhouse Strategy

In 2003, Premier Bob Carr established the NSW Greenhouse Office. It is a specialist policy office in the Cabinet Office reporting directly to the Premier. It coordinates and develops government policy for adapting to climate change and reducing emissions. It provides whole-of-government advice on climate change and participates in interstate greenhouse forums. It is guided by the NSW Greenhouse Advisory Panel and has responsibility for developing a Greenhouse Strategy for New South Wales.

The initial priorities of the NSW Greenhouse Office are to: develop a program for government to lead by example, including new standards for government buildings; develop a NSW Greenhouse Strategy that identifies opportunities for further action; progress a national emissions trading scheme, including how NSW companies can participate in such a scheme; establish a Greenhouse Innovation Fund to initiate greenhouse action in both the public and private sectors; promote sustainable agriculture and better waste management; encourage further adoption of power sourced from renewables and low-emission technologies; and promote investment in demand management.

The Greenhouse Office released a Greenhouse Strategy discussion paper[34] in May 2004 but it has not yet been finalised. It identifies the following priority

[33] The first forest dedicated to the reduction of greenhouse gases was planted on 10 October 2002. The forest is being established with the cooperation of Integral Energy, Planning NSW and State Forests of NSW. The 5 hectare site will slowly be transformed with the planting of 5000 native trees and shrubs. As the plants and shrubs grow they will soak in 50 tonnes of greenhouse gases each year during the forest's 40 year growth cycle. Each tonne can be converted into a carbon credit which could be traded and become of financial value to Integral Energy: see Media Release, NSW Minister for Forestry and Energy, 10 October 2002.

[34] Available at <http://www.cabinet.nsw.gov.au/greenhouse/linked_files/Discussion_Paper.pdf> (accessed 19 October 2005).

sectors in which reductions in greenhouse gas emissions must be achieved: stationary energy; transport; fugitive emissions; industrial processes; agriculture; land-use change and forestry; and waste. With respect to the stationary energy sector, the discussion paper acknowledges that this sector is the largest contributor to national emissions and is growing. The paper states the electricity consumed in NSW is expected to increase between 13%–26% between 2002 and 2011 because of a growing population and increased per capita consumption. The higher use of air conditioners, hotter summers and a demographic shift to Sydney's west is resulting in an increasing summer peak demand. However, the manufacturing sector still accounts for most stationary energy emissions, followed by the residential sector and the commercial sector. The paper highlights all the measures already adopted by the NSW government to curb emissions in this sector. These include the NSW Benchmarks Scheme, Green Power, and the BASIX regulatory framework, all of which are discussed below in detail. The paper asks for submissions on what further practical action could be taken to reduce greenhouse emissions from the energy sector while at the same time ensuring the security of electricity supply. It also calls for submissions on what further initiatives can be taken by the government to encourage energy efficiency in the residential and business sector.

The Greenhouse Strategy was expected to be finalised in early 2006.

6.1.3.2 Victoria's Greenhouse Strategy

The Victorian government's Greenhouse Strategy needs to be read together with a number of other relevant documents including the Victorian Greenhouse Strategy Action Plan Update 2005[35] and the Greenhouse Challenge for Energy.[36] Among the most significant aspects of the government's Strategy are the Environment Protection Authority (EPA) Greenhouse Program; The Centre for Energy and Greenhouse Technology; 5 Star ratings for new homes; and greenhouse sinks programs.

The EPA's Greenhouse Program is given effect under the Greenhouse Gas Emissions and Energy Efficiency in Industry (Protocol for Environmental Management)[37] established under Victoria's State Environment Protection Policy (Air Quality Management).[38] It requires businesses which are subject to EPA works approvals and licences to take action to reduce their energy use and greenhouse emissions. Action plans for all licensees will be completed by 2006 and will identify energy efficiency measures which must be taken, and are expected to result in between 3%–25% energy savings. Development applications also have to

[35] Available at <http://www.greenhouse.vic.gov.au/images/VicGreenhouse-ActionPlan.pdf> (accessed 28 April 2005).
[36] Available at <http://www.greenhouse.vic.gov.au/images/2168_Greenhouse_Challenge_Position_Paper.pdf> (accessed 28 April 2005).
[37] Available at <http://epanote2.epa.vic.gov.au/EPA/Publications.nsf/d85500a0d7f5f07b4a2565d1002268f3/a9c1e4da4c8b0124ca256b3c00111e13/$FILE/824.pdf> (accessed 4 May 2005).
[38] Available at <http://www.gazette.vic.gov.au/Gazettes2001/GG2001S240.pdf>.

indicate that best practice measures will be taken to increase energy efficiency and reduce greenhouse gases.

The Centre for Energy and Greenhouse Technology was established to identify and adopt best practice technologies in the generation and use of energy, as well as the abatement of greenhouse gas emissions. The Centre has developed partnerships with the investment community attracting investments for waste to energy; brown coal drying/efficiency; wind, tidal and sea generation; solar; and carbon dioxide capture.

The Victorian 5 Star energy efficiency standard, discussed in more detail below, came into effect on 1 July 2005 under the *Building Act 1993* (Vic) and ensures that new homes and apartments in Victoria are more energy efficient.

The establishment of greenhouse sinks, meanwhile, is encouraged under CarbonTender,[39] which is a $2.3 million program established by the Victorian Department of Sustainability and the Environment. It pays landholders to create carbon sinks on their properties. CarbonTender offers the potential for two new income streams to landholders: guaranteed establishment payments from the State government for 5 years; and future income opportunities from carbon trading. Participating landholders are required to permanently revegetate with native plants, preferably near existing bush to increase the resilience of existing ecosystems. The government reports that substantial greenhouse emissions reductions have been achieved as well as enhanced outcomes for biodiversity and salinity mitigation with the planting of sinks to sequester carbon.[40]

The Greenhouse Challenge for Energy: Driving investment and reducing emissions[41] indicates the Bracks government's intentions to reduce greenhouse gas emissions from the energy sector while maintaining a secure, efficient and affordable energy supply. The stationary energy sector contributes 72% of Victoria's greenhouse gas emissions and has experienced a strong growth in emissions of 32% between 1990 and 1999. The growth in emissions from electricity generation has been 41% over this period. Energy consumption is expected to grow strongly over the coming years.

The policy directions of the government include: implementing a policy framework to reduce greenhouse gas emissions from the energy supply sector; examining the experience in other States, especially NSW, with greenhouse gas benchmark schemes; facilitating investment in new generation capacity; increasing the share of renewables in Victoria's electricity supply to 4% by 2010; facilitating the development of 1000MW of electricity from wind power by 2006; and working with energy retailers to develop energy conservation strategies. The government is likely to use a range of measures to achieve these objectives.

[39] Available at <http://www.greenhouse.vic.gov.au/carbontender.htm> (accessed 28 April 2005).
[40] See *Victorian Government Annual Report 2004: An Effective Greenhouse Response*, available at <http://www.dse.vic.gov.au/dse/dsencor.nsf/fid/-AA3F5C92DE739C0ECA256F330007C11C/$file/Eff.pdf> (accessed 28 April 2005).
[41] Available at <http://www.greenhouse.vic.gov.au/challengeforenergy.htm> (accessed 3 February 2005).

6.1.3.3 Queensland's Greenhouse Strategy

In May 2004, the Queensland government released its Greenhouse Strategy (QGS)[42] which adopts a whole-of-government approach. The QGS is presented in two parts: Part A – Strategy and Part B – Sectoral actions. The QGS identifies the following objectives: to foster increased knowledge and understanding of greenhouse issues and climate change impacts; to reduce greenhouse gas emissions and facilitate carbon sequestration; and to lay the foundation for adaptation to climate change.

The QGS identifies the following sectoral actions that will be covered by the Strategy: energy; transport; rural; business and industry; residential; local government, and government. It includes a Summary of Queensland Government actions for each of the sectors covered by the strategy identifying the action, the responsible agency and the time frame.

With respect to energy, the QGS identified the following actions:

- A certificate-based scheme requiring electricity retailers, self-generators, and generators supplying electricity directly to customers to source 13% of their electricity from gas-fired generation from 1 January 2005
- Until 2004, rebates of up to $175,000 were offered to remote working properties to install renewable power systems
- Until 2004, a rebate of up to $150,000 for the replacement of diesel or electricity generation with renewable energy equipment
- Until 2005, a grant scheme administered by the Environment Protection Authority to commercialise energy efficient, renewable and pollution-abating technologies
- Assisting government agencies to be more resource efficient including use of energy
- Installing renewable and energy efficient technologies in schools and national parks
- Until 2005 providing a $750 rebate to home-owners to install solar hot water systems
- Demand-side approaches encouraged through Greenhouse Partnerships Programs with industry, local government and the building industry
- Establishment of a Centre for Low Emission Technologies.

6.1.3.4 South Australia's Greenhouse Strategy

A strategy to reduce South Australia's greenhouse gas emissions is being developed by six working groups, which include government agencies, private enterprise, and community groups. It was due for release by early 2006.[43] However, early indications are that the strategy will call for greenhouse gases to be reduced by 60% over the next 50 years to avert environmental disaster. [44] Furthermore,

[42] Available at <http://www.epa.qld.gov.au/publications/p01246aa.pdf/Queensland_Greenhouse_Strategy_PDF_version.pdf> (accessed 3 February 2004).
[43] See <www.environment.sa.gov.au/sustainability/greenhouse_effect.html> (accessed 1 May 2005).
[44] See *Three, Four, Five: Challenges, Principles and Actions*, available at <www.environment.sa.gov.au/sustainability/pdfs/rt_report.pdf> (accessed 2 May 2005).

the report from the Premier's Round Table on Sustainability[45] indicates that South Australia intends to achieve the following goals:

- reducing energy consumption in government buildings by 25% within 10 years
- leading the nation in wind and solar power generation by 2015
- increasing the use of renewable electricity to 15% of total energy consumption within 10 years
- A five-star energy rating for new housing built from July 2006
- A 4-year extension of the current solar hot water subsidy
- Leading Australia to solar power 250 schools by 2014
- Progressive installation of solar power to other key government buildings including Parliament House
- The planting of three million trees in city sites by 2014
- Adopting ecologically sustainable development technologies in all future greenfield developments
- The giving of preference for all new government office leases to buildings that meet at least a five-star energy rating from July 2006, and
- Leading Australia in wind power development.

South Australia's work on greenhouse is being coordinated by the Office of Sustainability in the Department for Environment and Heritage.

6.1.3.5 Western Australia's 2004–08 Greenhouse Strategy

In September 2004, the Western Australian government joined other State Premiers to criticise the Howard government's failure to ratify the Kyoto Protocol. Western Australia's Premier, Dr Gallop, said that a national approach is needed to contain greenhouse gas emissions.

The initiatives under the WA Greenhouse Strategy include:

- the establishment of a Greenhouse Unit in the Department of the Premier and Cabinet to coordinate greenhouse activities in the State
- A Western Australian Greenhouse Gas Inventory will be established in the Department of the Environment based on mandatory annual reporting of greenhouse gases by significant emitters
- A $200,000 Greenhouse Abatement Fund will be established over 2 years to hold certified carbon sequestration credits generated by government. This will encourage the development of an emissions trading marketplace
- The establishment of a Greenhouse Registry to certify and document carbon sequestration claims and emission reductions by industry and government
- Revegetation research to undertake a cost-benefit analysis of the value of revegetation and tree planting as a sequestering activity
- A comprehensive strategy will be developed to encourage the development of the bio-energy industry including biomass and biodiesel

[45] Available at <www.stateplan.sa.gov.au/home.php> (accessed 2 May 2005).

- Funds will also be made available to study the vulnerability of WA's biodiversity to climate change.

On 26 August 2005, the Western Australian government also appointed a Greenhouse and Energy Taskforce to advise government on greenhouse policy as it applies to power stations in Western Australia. The Taskforce will prepare an overall framework to enable the State's energy sector to meet the challenges associated with climate change. It will build on the WA Greenhouse Strategy. The key terms of reference are:

- Practical and economically feasible policies to manage greenhouse gas emissions from the stationary energy sector in the short term
- Longer-term policies to assist efforts to reduce greenhouse gas emissions
- The feasibility and implications of reducing greenhouse gas emissions by 50% by 2050
- Measures to prepare the State for any national emissions trading scheme and future integration with international emissions trading markets; and
- A proposed greenhouse offsets policy to provide clear ground rules for proponents of projects that will have significant greenhouse emissions.

6.2 Integrating planning, development assessment and greenhouse gas emissions

In addition to adopting greenhouse strategies, the States in Australia have developed legal and policy instruments, within the context of environmental planning and assessment, to counteract the greenhouse gas emissions associated with new developments.

6.2.1 New South Wales

Environmental planning and assessment is regulated in NSW under the provisions of the *Environmental Planning and Assessment Act 1979* (NSW). Under the Act various types of environmental planning instruments (EPIs) may be made to control development.[46] These may be State Environmental Planning Policies, Regional Environmental Plans, or Local Environmental Plans. EPIs are legally binding instruments. Development applications must be submitted under Part IV of the Act and, if the development is 'designated development', an environmental impact statement must accompany the application. However, a development may be identified as a 'State significant development' either in a SEPP, REP or by Ministerial declaration.[47] In this case, the Minister for Planning, Infrastructure and Natural Resources is the consent authority. The Act requires the consent authority to take into account a number of factors when deciding whether or not

[46] *Environmental Planning and Assessment Act 1979* (NSW), Part III. [47] Ibid, s 76A(7).

to grant development consent. These include all EPIs and the Regulations.[48] The government has made an EPI and Regulations to achieve various greenhouse and renewable energy outcomes. The government has indicated that it is in the process of developing a State Environmental Planning Policy on Stationary Energy to clarify permissibility of energy generating facilities across the State. However, to date a draft of the SEPP has not been released for comment.

6.2.1.1 Planning and sustainable buildings

The State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 requires all new housing in NSW to be designed and built to use 40% less mains supply water and produce 25% lower greenhouse gas emissions than average housing of the same type. The greenhouse gas target will rise to 40% from July 2006. Developments will effectively meet the target for greenhouse gas reduction if they include: an efficient hot water system and well designed buildings that make the most of natural cooling, heating and lighting. Good design will reduce the number of days and hours air conditioners need to be used and the required size of air conditioning systems. The SEPP prevails over any other environmental planning instrument to the extent of any inconsistency and ensures that the BASIX scheme is implemented in a consistent way throughout the State. The SEPP must be read in conjunction with the Environmental Planning and Assessment Regulation 2000.

The Regulation was amended by Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to incorporate BASIX provisions into the development assessment process. The Regulations require that a development application must be accompanied by a BASIX certificate, issued no earlier than 3 months before the date on which the application is made.[49] Together, these pieces of delegated legislation implement the NSW government's commitment to achieving sustainable energy and water outcomes.

The SEPP and Regulations apply across the State to a proposed 'BASIX affected building'. This was initially defined in the Regulation as: single dwelling houses built on a single allotment of land (whether attached or detached); dual occupancy (that is two dwelling houses, whether attached or detached) on a single allotment of land, including strata title dual occupancy; and a guest house, boarding house, lodging house or hostel (including a backpackers hostel), being a building with a gross floor area of less than 300 square metres. However, from October 2005, BASIX applies to alterations and additions to all homes. From 1 October 2005, BASIX also applies to multi-unit construction in the Sydney metropolitan area. However, the Minister for Planning has agreed to lower the BASIX energy target for high-rise residential buildings of six storeys or more. The target has been reduced from 25% to 20% for such buildings. The NSW

[48] Ibid, s 79C. [49] Environmental Planning and Assessment Regulation 2000.

government agreed to lower the target after extensive lobbying by the Property Council of NSW because of the continued high cost of compliance with BASIX for high-rise buildings. Applicants will now need to generate separate BASIX certificates for buildings six storeys and over, and for those that are five storeys and under. Multiple BASIX certificates may be lodged with a single development application in this instance.

From 2007, all homes sold will have to prove that they are either BASIX compliant, or that they have been fitted with water efficiency measures under Sydney Water's Retrofit program.

6.2.2 Victoria

6.2.2.1 Planning law

The planning and environmental assessment process in Victoria is governed by the *Planning and Environment Act 1987* (Vic). Under that Act, planning schemes may be made to further the objectives of planning in Victoria for a particular area.[50] If a planning scheme requires a permit to be obtained for the use of development of land in the area, application must be made to a responsible authority.[51] Although the Act does not specifically mention greenhouse gas emissions or energy, a responsible authority is required to consider any significant effects which the use or development may have on the environment.[52]

In *Australian Conservation Foundation v Minister for Planning*,[53] the Victorian Civil and Administrative Tribunal found that a planning panel, appointed to consider submissions to an amendment to a planning scheme under the *Planning and Environment Act 1987* (Vic), could not refuse to consider the emission of greenhouse gases resulting from the continued operation of a coal-fired power station. The appeal was made to VCAT by an alliance of environmental organisations.

The amendment to the planning scheme was proposed to allow the owner of the Hazelwood mine and power station, International Power Hazelwood (IPRH), to develop an additional brown coal field to allow the 40-year-old power station to continue to operate until 2031. Current availability of coal would only allow it to operate until 2009. The power station contributes about 22% of Victoria's base load electricity and has a nominal capacity of 1600MW. The Victorian government required IPRH to develop an Environmental Effects Statement which described and assessed the direct implications of the mining of coal on the emission of greenhouse gases. However, it did not describe nor address the production of greenhouse gases by the burning of coal, won from the additional coal field, and used to generate electricity after the year 2009. Upon appointing the panel, the Minister directed it not to consider the greenhouse impacts of burning the coal

[50] *Planning and Environment Act 1987* (Vic) s 5. [51] Ibid s 47.
[52] Ibid s 60. [53] [2004] VCAT 2029 (29 October 2004).

as this was to be assessed under a separate process. An alliance of environmental groups appealed against this decision.

VCAT found that, by not addressing this issue, the panel has failed to comply with its obligations under the *Planning and Environment Act*. In particular, it failed to consider submissions that the continuation of the Hazelwood Power Station may have had adverse environmental effects by reason of the generation of greenhouse gases. VCAT also found that the Minister had no power to issue terms of reference to a panel in relation to its duty to consider submissions about an amendment to a planning scheme as these are provided by the *Planning and Environment Act*. VCAT made an order preventing the adoption and approval of the amendment until the processes required by law had been carried out by the panel. The effect of the ruling was that the expert panel has to reconvene and consider the impact of the expansion on CO_2 emissions.

While the VCAT decision is important in deciding that greenhouse impacts should be considered in the planning context in Victoria, its decision seems to have had little substantive impact in this dispute. The independent panel upon making its final recommendations to the Victorian government recommended that the life of Hazelwood be extended to 2031. In April 2005, the Victorian government announced that it was seriously considering the recommendation. According to the Australia Institute,[54] this announcement has called into question the Victorian government's commitment to reducing greenhouse gas emissions. Hazelwood is Australia's largest single source of greenhouse gas emissions even though it is only the sixth-largest power station. In order to extend its life, the government would have to approve IPRH's application for access to a further 355 million tonnes of coal ('West Field Phase 2').

The extension of Hazelwood's operating life will result in the emission of 340 million tonnes of CO_2. It is estimated at present that the national energy efficiency standards and labelling requirements, recently adopted in Australia, will deliver 204 million tonnes abatement between 2005 and 2020. In effect, these reductions would be totally negated by the continued operation of Hazelwood. The Australia Institute reports that the alternatives to its continued use are more expensive but would generate far fewer emissions and could be distributed equally within and beyond Victoria.

6.2.2.2 Design and construction guidelines

The Victorian government has also developed the Environmentally Sustainable Design and Construction Guidelines.[55] These guidelines apply to the planning, design and construction processes for all new capital works. They provide a detailed methodology to ensure the integration of Environmentally Sustainable Design and Construction (ESDC) principles. State government departments are encouraged to utilise the guidelines in design and construction activities. To

[54] See, the Australia Institute, 'Victoria's Greenhouse Policy: The moment of truth', May 2005 available at <http://www.tai.org.au/> (accessed 16 June 2005).
[55] Available at <http://www.dse.vic.gov.au/dse/nrence.nsf/93a98744f6ec41bd4a256c8e00013aa9/50f990be90fcedc2ca256ee00027bd61/$FILE/ESDC%20Guidelines%20-%20Vers%201B%2020031210.pdf> (accessed 28 April 2005).

help determine the ecological impact of capital works, custom software has been developed by the Department of Sustainability and the Environment (DSE). The program – known as the Building Environmental Sustainability Targets (BEST) program – enables a comparative performance of new facility designs against over 180 existing DSE and Department of Primary Industries buildings. BEST benchmarks new capital works projects against these to quantify the reduction in ecological impact. The guidelines also specify that buildings are to be rated using an appropriate environmental rating tool, both in the planning and completion phases. The implementation of ESDC principles in building works will deliver on key government policy commitments and environmental management strategies. These include: Growing Victoria Together, The Sustainable State, Melbourne 2030, the Victorian Greenhouse Strategy, and Environmental Management Systems in Government.

6.2.3 Queensland

6.2.3.1 Sustainable housing initiatives

The Queensland government has adopted a policy measure known as 'Towards Sustainable Housing in Queensland'. Under this policy, the government is proposing the introduction of water and energy efficiency measures to achieve sustainable housing. It is proposed that measures be brought in on a staged basis. Stage 1 will be applied to detached and semi-detached houses as defined in the Building Code of Australia. This will address around 80% of new housing needs. Energy and water-saving measures were put in place in 2005. The new measures suggested under Stage I include: greenhouse efficient hot water systems; energy efficient lighting; AAA-rated shower roses; dual flush toilets; water pressure-limiting devices; and rainwater tanks. The regulatory options for implementation include no-regulation; State regulation; State regulations with local government discretion and using planning schemes to adopt sustainable housing measures. Stage II will explore further methods to improve water and energy efficiency measures and design aspects of social sustainability, including universal design, safety, security and occupants' health.

6.3 State governments commit to green power[56]

6.3.1 What is green power?

Green power schemes are designed to enhance the use of renewable energy resources in the production of electricity in order to improve the environment

[56] For further discussion of green power in Australia, see Adrian Bradbrook, 'Green Power Schemes: The Need for a Legislative Base' (2002) 26 *Melbourne U L Rev* 15; Alexandra S Wawryk, 'Green Pricing and Green Power Marketing: Demand-side Mechanisms for Promoting "Green Power" in Deregulated Electricity Markets', in Adrian J Bradbrook and Richard L Ottinger (eds), *Energy Law and Sustainable Development*, IUCN, Gland, Switzerland and Cambridge, UK, 2003.

and to reduce atmospheric carbon emissions. The schemes involve the payment of an additional premium by electricity consumers to their electricity supply company. This premium may take the form of an annual fixed payment or, more commonly, may involve an increase in the amount paid for electricity consumption per kWh. The premium is payable because the cost of generating electricity from renewable energy resources is currently higher than that produced from fossil fuel combustion. The premium gives the electricity supply company an additional income stream to offset the increased cost of producing electricity from renewable energy and acts as a form of sponsorship for such energy resources. In return for the premium, the electricity supply company undertakes to purchase additional electricity from a local producer of renewable energy to match the agreed amount of electricity in respect of which the premium was paid.

'Green power' is a logical extension of the system of eco-labelling, which has been in existence for many years.[57] Eco-labelling involves the creation of a set of requirements that products may or must satisfy, and the establishment of a certification or testing procedure whereby manufacturers and retailers can prove compliance with the relevant standards by displaying an approved label provided by a testing laboratory or other organisation.[58] The purpose of eco-labelling is to enable consumers to make an informed choice on environmental grounds between competing products, to provide an incentive to manufacturers to design more energy-efficient products, and to promote environmental awareness generally. While the various eco-labelling programs tend to differ, they normally have the following four elements in common:

- A government department or other authorised body selects and defines a product category.
- Environmental guidelines are prepared for each product as to the minimum performance and design characteristics to entitle the product to display an eco-label.
- Manufacturers who comply with the performance and design characteristics are licensed for a fee to use the eco-label for a specified period of time.
- Licence-holders are monitored at intervals to ensure continued compliance with the terms of the licence.[59]

While eco-labelling was developed outside the energy context, it has been adopted in recent years in this country by State legislation described below. It prescribes compulsory labelling for energy consumption for a variety of

[57] For a general discussion of green labelling, see D S Cohen, 'The Regulation of Green Advertising: The State, The Market and the Environmental Good' (1991) *25 U British Columbia L Rev* 225; OECD, *Environmental Labelling in OECD Countries*, Paris, 1991; G Israel, 'Taming the Green Marketing Monitor: National Standards for Environmental Marketing Claims' (1993) 20 *B C Environmental Affairs L Rev* 303; S Dawson and N Gunningham, 'The More Dolphins There Are The Less I Trust What They're Saying: Can Green Labelling Work?' (1996) 18 *Adelaide L Rev* 1; J A Grodsky, 'Certified Green: The Law and Future of Environmental Labelling' (1993) 10 *Yale J on Regulation* 147.

[58] W H Lawrence and J H Minan, 'The Role of Warranties and Product Standards in Solar Energy Development' (1981) 34 *Vanderbilt L Rev* 537 at 593.

[59] Cohen, 'The Regulation of Green Advertising', at 256–8.

electrical white goods, including refrigerators, freezers, washing machines, clothes dryers, dishwashers and air conditioners (with less than 7.5kW output cooling capacity).[60] Green power schemes are consistent with this development.

Green power schemes have emerged as a result of various studies which have shown that customers prefer cleaner energy and are prepared to pay more, if necessary, for energy produced from renewable resources.[61] The success of the program in attracting customer participation will, of course, depend on issues such as customer education, customer awareness and the marketing effort of the utility concerned.

Green power schemes have mushroomed and developed surprisingly quickly in Australia. Accredited programs are available in every State, and to 96% of the Australian population and all residents of New South Wales, Victoria, Queensland, the Australian Capital Territory, South Australia and Western Australia.[62] There is a range of different schemes which are offered to consumers. Each electricity supply company offers its own terms, which necessarily vary due to the existing power supplies used by the company and the cost and local availability of renewable sources of electricity. Some schemes are fixed and inflexible. An example of this is the scheme offered by Australian Inland, where customers contribute $40 per year to a fund, which is used to install new solar photovoltaic electricity stations.[63] Integral Energy's SunPower Program involves customers paying a regular contribution by rounding their bill up to the nearest dollar or by nominating a fixed amount per bill. Contributions are used to install solar photovoltaic systems on schools and other community buildings.[64] These schemes can be contrasted with that offered by Energy Australia. Under this scheme customers may purchase 25%, 50%, 75% or 100% of their electricity (excluding off-peak hot water) from renewable resources, including solar, wind, hydro and biomass generators. Customers pay a premium of between 0.94 and 3.6 cents per kWh for all 'green' energy purchased. Those customers who commit to 100% electricity from renewable resources pay a reduced premium of 3.35 cents per kWh, while those who commit to 100% from renewable resources for a 3-year period pay a premium of only 3.05 cents per kWh.[65] Similarly, under the Australian Gas Light Company (AGL) Green Energy scheme, the current advertised premiums are 0.55 cents per kWh for 10% green power, 1.1 cents per kWh for 25%, 2.2 cents per kWh for 50%, and 4.4 cents per kWh for 100%. AGL has calculated that the average household would pay between 62 cents extra per week for 10% green energy and $4.96 extra per week for 100% green energy.[66]

[60] For a discussion of this legislation, see A J Bradbrook, 'Eco-labelling: Lessons from the Energy Sector' (1996) 18 *Adelaide Law Review* 34.
[61] See, for example, B Farhar, *Willingness to Pay for Electricity from Renewable Resources: A Review of Utility Market Research*, National Renewable Energy Laboratory, Colorado, Report NREL/TP.550.26148, 1999. In other contexts, see also Dawson and Gunningham, 'The More Dolphins There Are'; M Burbury, 'Ecophobia Can Turn Away Sales', *Sydney Morning Herald*, 24 February 1994, at 34.
[62] See <www.greenpower.com.au/go/suppliers> (accessed 31 December 2004).
[63] See <www.aienergy.com.au> (accessed 31 December 2004).
[64] See <www.integral.com.au> (accessed 8 October 2001).
[65] See <www.energy.com.au> (site visited 8 October 2001).
[66] See <www.agl.com.au> (site visited 31 December 2004).

In Australia, consumers are safeguarded by the existence of independent green power accreditors, which ensure that the electricity purchased by the electricity supply company with the premium is truly 'green'. In New South Wales, a further safeguard is provided by the State government's Department of Energy, Utilities and Sustainability (DEUS) (formerly the Sustainable Energy Development Authority), which accredits schemes offered by electricity supply companies and authorises approved suppliers to display the 'green power' logo.[67] This logo consists of a green tick coupled with the wording 'green power' and 'government approved'. This scheme was launched in 1997 and now extends nationally due to joint collaboration with State government agencies in New South Wales, Queensland, Victoria, South Australia and the Australian Capital Territory. Collectively, these are known as the National Green Power Accreditation Steering Group (NGPASG), with DEUS acting as project manager.

The current development of green power programs in Australia compares favourably with that in the United States, where the idea first originated.[68] As at August 2000, 80 electric companies located in 28 States had offered or announced their intention to develop green pricing programs for their customers, amounting to just over one-third of all US consumers.[69] This has led by the end of 1999 to the installation of 72.43MW of new renewable energy capacity, with proposals for a further 120MW.[70] Of the newly installed 72.43MW of electricity, by far the largest contribution came from wind energy (74.6%), followed by biomass (20.6%) and solar energy (4.2%). A negligible quantity came from small hydropower.[71]

Price premiums vary between 0.4 cents and 20 cents per kWh for new renewable energy plant, with a median of 2.5 cents per kWh. The actual premium charged will vary based on a number of different criteria: the renewable energy resource used; the quality of the renewable energy resource; the scale of the projects; the financial position of the company; the availability of government subsidies or incentives; administrative and marketing costs; the electricity company's avoided cost of energy; the amount of renewables already used by the

[67] To achieve accreditation and the right to display the 'green power' logo, an electricity supply company must comply with the following requirements:

- Purchase electricity only from Green Power approved generators (solar, wind, biomass, hydro and geothermal);
- Source 80% of Green Power from 'new' renewable generators (generators commissioned or first sold after 1 January 1997);
- Ensure energy supply (bought from generators) meets energy demand (from Green Power customers);
- Provide quarterly status reports to track growth trends in customer numbers, energy sales and 'new' renewables investment;
- Not use any Green Power energy purchases to satisfy their legislative requirements under the *Renewable Energy (Electricity) Act 2000* (Cth);
- Make publicly available a yearly technical statement on their Green Power program to verify ongoing compliance with the Program.

See <www.greenpower.com.au/accredit.shtml> (accessed 19 October 2005).

[68] For a discussion of green power schemes in the United States, see B Swezey and L Bird, *Green Power Marketing in the United States: A Status Report*, National Renewable Energy Laboratory, Colorado, Report NREL/TP-620–28738, 5th edn 2000; <www.earthwatts.com.au> (accessed 7 April 2001). For a discussion of the green power programs in the Netherlands, see Lin Gan, Promoting Green Electricity Development from Industrial to Developing Countries: What Needs to be Done?, unpublished paper, 2001 (copy on file with author), appendix.

[69] Swezey and Bird, *Green Power Marketing in the US*, at 3. [70] Ibid, at 3. [71] Ibid, at 5.

company; and whether participating customers assume the full cost of the program.[72] Customer participation has been generally 1% or less, although occasionally as high as 4%. The greatest market penetration has been in California and Pennsylvania, where the level of participation is about 2%.[73]

6.3.2 Advantages of green power schemes

In many ways green power schemes represent a considerable success in the promotion of sustainable development. Such schemes have been introduced without legislation and political controversy. They have empowered proponents of sustainable energy development by enabling them to make a personal contribution to further the cause. They have also enabled industries and businesses that enter into a scheme to promote themselves in their publicity as environmentally friendly. Such schemes have proved to be popular where they have been introduced and have met or even exceeded the initial expectations of their proponents. Green power schemes are seen to be consistent with and a natural extension of other 'green' schemes introduced in the field of product labelling, packaging and advertising.[74]

Being voluntary in nature, such schemes are also consistent with the general approach in Australia of 'light-handed regulation' in environmental management and with the preferred approach of seeking voluntary agreements to resolve environmental problems.[75] This preference for voluntary agreements appears to be particularly true in the energy context. The most recent illustration is the 1999 agreement with the building industry, represented by the Australian Building Energy Council, to encourage voluntary best practices in energy efficient building design, construction and operation by way of a Code of Practice.[76] This approach can be contrasted with that in the United States, where environmental solutions are almost invariably imposed by legislation.[77]

Green power schemes can also be justified as a logical extension to privatisation of the electricity industry. As discussed in Chapter 5, privatisation is being pursued worldwide in the majority of developed countries, and Australia has been at the forefront of this movement.[78] The major purpose of privatisation

[72] Ibid, at 6. [73] Ibid, at 7–8.
[74] See Dawson and Gunningham, 'The More Dolphins There Are', at 18–22.
[75] See International Energy Agency, *Voluntary Actions for Energy-Related CO2 Abatement*, OECD, Paris, 1997.
[76] This voluntary agreement was coupled with compulsory minimum energy performance requirements, incorporated in the Building Code of Australia, to remove the worst cases of energy inefficient design. See <www.greenhouse.gov.au/energyefficiency/building/code.html> (accessed 13 April 2001).
[77] A useful illustration is the Corporate Average Fuel Economy Standards, enacted under the *Energy Policy and Energy Conservation Act* (49 CFR Ch V, Part 531–537), now re-enacted in the *Motor Vehicle Information and Cost Saving Act* (94 Stat 1821), Title V, whereby motor vehicle manufacturers were required to progressively improve the overall fuel consumption of their vehicle fleet each year over a specified 20 year timetable approved in the legislation. See J M DeCicco, *Savings from CAFÉ: Projections of the Future Oil Savings from Light Vehicle Fuel Economy Standards*, American Council for an Energy Efficient Economy, Washington, DC, 1992; A J Bradbrook, 'Regulating for Fuel Energy Efficiency in the Road Transport Sector' (1994) 1 *Australasian Journal of Natural Resources Law and Policy* 1.
[78] The literature on privatisation of the electricity industry is voluminous. Among the most interesting, from a legal perspective, are: P D Cameron, 'Reforming Energy Markets: A Review Article' (2000) 18 *Journal of*

is to provide a choice of electricity suppliers to customers in order to increase competition. The introduction of green power schemes goes one stage further and gives customers a choice as to how their electricity is generated. It also removes the monopoly power of electricity companies to control the development of renewable energy resources by determining how much (if anything) to invest in these resources on behalf of all their customers.

The other main advantage of the current voluntary green power schemes is that it enables considerable progress to be made and support to be given to the fledgling renewable energy industries on an issue where it would be politically difficult to obtain a consensus on the introduction of a compulsory scheme for promoting renewable energy resources. The current scheme can thus be viewed as a 'beachhead' for other possible measures supporting renewable energy resources in the future. Such measures may become more politically acceptable once the renewable energy industries become larger and more politically influential and once both governments and society in general become accustomed to the use of renewable energy resources. They are thus a good first step towards sustainable energy development and useful for building momentum towards more radical and fundamental change in the future.

6.3.3 Disadvantages of green power schemes

Despite these clear advantages and the universal, non-critical acceptance of green power schemes in Australia, there are some fundamental problems and difficulties associated with the current arrangements which need to be appropriately addressed.

The current schemes can be criticised conceptually in that they do not adequately recognise the 'public interest' associated with the introduction and promotion of sustainable energy solutions. The 'public interest' arises from the benefit to society as a whole which arises from the saving of the remaining reserves of fossil fuels for future generations, the reduction of global atmospheric pollution caused by the burning of fossil fuels that leads to climate change and acid rain, and localised air pollution in cities caused by motor vehicle exhausts.[79] The existence of a public interest in this context cannot be denied as there already exist international obligations requiring action to be taken in favour of sustainable energy,[80] and also Commonwealth legislation.[81] Once the notion of 'public interest' is accepted, it follows as a matter of equity and logic that all members

Energy and Natural Resources Law 353; G Zaccour (ed.), *Deregulation of Electric Utilities*, Kluwer Academic Publishers, Dordrecht, 1998; W Patterson, *Transforming Electricity: The Coming Generation of Change*, Royal Institute of International Affairs and Earthscan, London, 1999; *Electricity Market Reform: An IEA Handbook*, OECD/IEA, Paris, 1999.

[79] UNDP et al, *World Energy Assessment: Energy and the Challenge of Sustainability*, UN, New York, ch 3.

[80] United Nations Framework Convention on Climate Change ((1992) 31 ILM 849), art 4.1(c); Kyoto Protocol to the United Nations Framework Convention on Climate Change ((1998) 37 ILM 22), art 2.1; Energy Charter Treaty ((1995) 34 ILM 360), arts 19.1(d), 19.3; Protocol on Energy Efficiency and Related Environmental Aspects to the Energy Charter Treaty ((1995) 34 ILM 446), arts 3.2, 5, 8.2.

[81] *Renewable Energy (Electricity) Act 2000* (Cth); *Renewable Energy (Electricity) (Charge) Act 2000* (Cth).

of society should make a contribution, not simply those that are prepared to act voluntarily. The current situation enables the majority of persons and industries that do not subscribe to green power schemes to avoid making their fair contribution to resolving environmental problems and to 'pass the buck'. As every person gains from the adoption of sustainable energy solutions, it follows that everyone should make an effective and fair contribution.

Another major objection to green power schemes is that they do nothing to discourage the current wasteful patterns of electricity consumption. Many individuals and industries that currently participate in green power schemes continue to consume excessive quantities of electricity while feeling good about their contribution to sustainable energy solutions. While it is obviously preferable that renewable energy resources rather than finite reserves of fossil fuels are consumed, a better solution would be to focus on energy conservation and energy efficiency in order to reduce overall consumption. This solution is not promoted by green power schemes.

A further problem is that the priority of the green power schemes appears to be misplaced. While the replacement of fossil fuel-based power generators by renewable energy resources is of considerable importance, energy experts are agreed that in the Australian context the most urgent goal and the area where renewable energy resources can make the greatest contribution is in remote area power generation.[82] The areas to which the electricity grid does not extend constitute approximately 75% of the land surface of Australia. In these areas residents are forced to rely primarily on diesel fuel, which is very expensive and environmentally polluting. Renewable energy resources, in particular wind energy generators and photovoltaic solar energy systems, are capable of providing the vast bulk of electricity supplies needed in outback areas and minimising the future use of diesel fuel. Green electricity schemes do nothing to further this goal.

To these three major objections to green power schemes must be added a wide range of more minor difficulties. In light of the primary obligation of all businesses to maximise their profits for the benefit of shareholders, it is surely unreasonable and unrealistic to expect them voluntarily to reduce their competitiveness by agreeing to pay additional amounts for green electricity. What industries require is an assurance that they can compete with their competitors on an equal footing, and this can only occur if there is a compulsory scheme for all.

The current schemes create a 'ghetto mentality' for renewable energy resources in that they suggest that all such resources are uncompetitive and expensive in comparison with traditional fossil fuels. While this was largely true during the 1980s, and still applies to some of the more experimental types of renewables,[83] this is no longer the case in relation to some of the resources (particularly wind energy). This unfavourable economic image of renewables is

[82] See Chapter 4 for a discussion of the Australian government's incentives in this area.
[83] For example, ocean thermal energy conversion (OTEC), wave, tidal and marine current energy.

deleterious to their rapid adoption as a major source of electricity production. The other unfavourable aspect of the image of renewables is that they are still seen as largely experimental and unproved. The fact that they are supported only by a voluntary green power scheme rather than by a comprehensive legal management regime, as exists in the case of all fossil fuel resources,[84] tends to reinforce this negative image.

The existence of green power schemes places the onus of action in support of sustainable energy solutions on concerned individuals and industries rather than on the government and electricity companies. This onus is misplaced. The onus should more appropriately be on the government, as the guardian of the public interest, and on the traditional power companies, which have historically profited from the use of polluting and finite energy resources.

One of the major impediments in recent years in Australia to speeding up the wide-scale introduction of renewable energy resources has been the lack of adequate Federal and State government funding for research, demonstration and development. The emergence of green power schemes has taken the pressure off governments to increase funding levels by giving the impression that effective action in support of renewable energy resources already exists.

From the standpoint of the actual and potential voluntary participants in green power schemes, a weakness in the current system is the lack of consumer consultation or protection.[85] An electricity supply company which accepted money under a green power scheme from a customer and did not use the money for the agreed purpose would infringe the terms of either s 52 of the *Trade Practices Act 1974* (Cth), which penalises misleading or deceptive conduct, or s 53 of the same legislation, which declares illegal all false or misleading representations. Any doubt as to the application of the *Trade Practices Act* in this context is dispelled by s 4, which defines 'goods' as including electricity. Despite this safeguard, the customer has no say as to what counts as 'green energy' or which fossil fuels may be avoided by the schemes. While fact sheets and information are usually given to users of the schemes, in the absence of legislation underlying the schemes there is no effective way in which the actual use of the funds by the electricity companies can be challenged.

Another way to approach the equity of the current situation is to compare societal and governmental responses to other comparable major national environmental issues. In the Australian context, appropriate comparisons can be made with biodiversity, water quality, salinity and native vegetation preservation. In all these cases environmental solutions have been imposed by legislation, applicable to all individuals and industries.[86] No other comparable environmental issue has

[84] In respect of onshore petroleum, for example, the legal management regime is contained in State and Territory legislation: *Petroleum (Onshore) Act 1991* (NSW); *Petroleum Act 1923* (Qld); *Petroleum Act 2000* (SA); *Petroleum Act 1998* (Vic); *Petroleum Act 1967* (WA); *Petroleum Act* (NT).

[85] For a discussion of the problem of fraud, see Energy Information Administration, *Challenges of Electric Power Restructuring for Fuel Suppliers*, <www.eia.doe.gov> at 76 (accessed 8 October 2001).

[86] See eg *Environment Protection and Biodiversity Conservation Act 1999* (Cth); *Native Vegetation Act 2003* (NSW); *Native Vegetation Act 1991* (SA); *Water Management Act 2000* (NSW); *Water Resources Act 1997* (SA).

been tackled solely by voluntary measures which individuals and industries are able to ignore at their discretion. In light of the international obligations imposed on Australia to control and reduce carbon emissions and the other environmental issues associated with the burning of fossil fuels, energy solutions are clearly among the most important environmental issues affecting this country.

6.4 Other sustainable energy initiatives

6.4.1 Establishment of sustainable energy agencies at State government level

Most State governments have established sustainable energy agencies. The New South Wales government was the first to do so when it established the Sustainable Energy Development Authority under the *Sustainable Energy Development Authority (SEDA) Act 1995* (NSW). In 2004, the agency was disbanded and subsumed into the Department of Energy, Utilities and Sustainability. The Western Australian government has established the Sustainable Energy Development Office (SEDO) to deliver the State's sustainable energy policy, which focuses on non-transport related activities, while at the same time increasing jobs in related industries. Likewise, the Victorian government has also established a Sustainable Energy Authority to promote energy efficiency and to support and facilitate the development and use of renewable energy.[87] In Queensland, the Office of Energy is responsible for the development of renewable energy policies and initiatives, and provides advice on renewable energy issues. One of the key initiatives of the Queensland Energy Policy is the Gas Retail Licence Scheme which requires that at least 13% of electricity sold by electricity retailers in Queensland is generated from gas from 1 January 2005. This initiative complements the Commonwealth's 2% Mandatory Renewable Energy Target (MRET).[88]

6.4.2 State-based renewable energy legislation

6.4.2.1 Victoria gives legislative support to wind farms

In November 2004, the Victorian government enacted the *Electricity Industry (Wind Energy Development) Act 2004*. The purposes of the Act are to amend the *Electricity Industry Act 2000* (Vic) to facilitate the development and construction of wind energy generation facilities in the State, and require certain retailers to publish the prices at, and terms and conditions on, which they will purchase electricity supplied to them from wind generators.

A new Division 2A was inserted into the Act entitled Pricing for the Facilitation of the Development of Wind Energy Generation Facilities. The Division provides that the Governor in Council may, by Order published in the *Government Gazette*,

[87] See <http://.sea.vic.gov/renewable/index.html> (accessed 13 August 2002).
[88] See <http://www.energy/qld.gov.au/sustainable/renewableenergy.htm> (accessed 13 August 2002).

specify the principles to be applied by an operator of a relevant distribution system in determining connection charges for connection to, and use of, the relevant distribution system by a wind generation company for electricity supplied from its facility. The principles will also enable the operator to recover the capital costs incurred for any augmentation of the distribution system undertaken as a result of connecting the wind generation company to the system. The Governor may also specify a procedure for resolving any disputes between the operator of the distribution system and a wind generation company. The Victorian Essential Services Commission may be conferred with the power to resolve such a dispute.

The Governor may also, by order in the *Government Gazette*, specify pricing principles to be used by the Essential Services Commission when determining the charges for connection to and use of a distribution system.

A new section 23B inserted into the Act empowers the Governor, by order in the *Government Gazette*, to declare a wind generation company that generates electricity with an installed capacity of less than 100kW, and which is not a small wind energy generation facility, to be a 'relevant generation facility'. The section further provides that a retail licence is deemed to include a condition requiring the retailer to publish, in the *Government Gazette*, an offer comprising the prices at, and terms and conditions on, which the retailer will purchase non-pool electricity supplied from a relevant wind generation facility.

6.4.2.2 Victorian government enacts *Geothermal Energy Resources Act 2005* (Vic)

As part of its commitment to developing renewable energy sources in Victoria, the government has enacted the *Geothermal Energy Resources Act 2005* (Vic). The objectives and principles of the Act explain the reasons for its enactment and include: promoting sustainable, commercial exploration for and extraction of geothermal energy resources and geothermal energy; recognising the Crown's ownership of and wish to gain a return from the use of geothermal energy resources; encouraging the exploration for and extraction of geothermal energy resources by establishing secure title and efficient and effective allocation processes; providing transparent, fair and efficient land-use and environment planning frameworks including land access processes for the exploration for and extraction of geothermal energy resources; and ensuring that in planning for, authorising, operating and decommissioning geothermal operations the environmental, health and safety matters are adequately considered.

In making decisions about the utilisation of resources, the Minister and other officials may have regard to the following relevant matters: following a path of economic development that safeguards the welfare of future generations; intra- and intergenerational equity; the protection of biological and ecological diversity and integrity; recognising the need for an internationally competitive economy

which can provide resources for environment protection; the adoption of the polluter pays principle; the effective integration of long and short-term consideration of economic, environmental, social and equity issues; and the adoption of the precautionary principle.

The Act also contains the following Parts which cannot be discussed in detail here:[89] Part 2 – Exploration Permits; Part 3 – Retention Leases; Part 4 – Extraction Licences; Part 5 – Unit development; Part 6 – Provisions applying to authorities generally; Part 7 – Requirement before operations allowed on land; Part 8 – Compensation; Part 9 – Other obligations about conduct of operations; Part 10 – Rehabilitation; Part 11 – Information; Part 12 – Enforcement; Part 13 – Administration; Part 14 – Regulations; and Part 15 – Amendments and Transitional Provisions.

6.4.2.3 Queensland promotes geothermal energy

In May 2004, the Queensland government enacted the *Geothermal Exploration Act 2004* (Qld). Queensland contains significant resources of hot rocks with temperatures in excess of 200°C. Currently, the exploration for and the development of this resource is hampered by a lack of adequate legislation to govern the granting of permits to explore the resource. The policy objectives of the Act are to:

- Manage access to geothermal resources
- Encourage the efficient and responsible exploration of the resource
- Provide a regulatory system for geothermal exploration
- Enhance knowledge of the resource
- Ensure that geothermal exploration results in minimal land-use conflict
- Facilitate consultation with or compensation for people already impacted by geothermal exploration
- Encourage competition in geothermal exploration
- Encourage land care management when exploring for the resource, and
- Promote safety.

The Act also vests property in all geothermal energy in the State. It provides that a geothermal exploration permit can only be granted by way of competitive tender, and sets out the tendering process. The Minister is vested with the power to grant exploration permits. The rights of the holder of a geothermal exploration permit are also set out in the Act. Security must be provided to the State by the holder of a permit to ensure that any costs arising out of the exploration process are paid by the holder. Provision is also made for amendments, deferrals, cancellations, surrenders and transfers of permits. Access is granted to land to carry out exploration. The landholder whose land is damaged as a result of the exploration is entitled to seek compensation under the Act.

[89] For details, see <http://www.austlii.edu.au/au/legis/vic/consol_act/gera2005297/>.

6.4.2.4 NSW government regulates large-scale wind farms and burning biomass energy as renewable energy sources

As mentioned above, the NSW government has promoted the development of renewable energy technologies by recognising this as one of the activities which will attract a Greenhouse Abatements Certificate. The construction of renewable energy facilities is governed by Part 4 of the *Environmental Planning and Assessment Act 1979* (NSW). Most facilities will be assessed by local councils. However, in November 2004, the NSW Minister for Planning and Infrastructure declared large-scale wind farms in NSW to be 'State significant development'. They will be subject to Ministerial determination if they have: more than 30 towers; or an installed generating capacity of more than 60MW; or an installed generating capacity of more than 30MW and the towers are in more than one council area. The Minister has said that the scale and visual impact of large-scale wind farms need to be considered against broader public benefit considerations like reductions in greenhouse gas emissions.

The government has also attempted to mitigate some of the possible adverse environmental effects of biomass energy. As discussed in Chapter 4, the *Renewable Energy (Electricity) Act 2000* (Cth) regards the burning of fuel from plantations and native forests as a renewable energy source known as biomass energy. Consequently, the NSW government has enacted the Plantations and Reafforestation (Code) Regulation 2001 and the Protection of the Environment Operations (General) Amendment (Burning of Bio-material) Regulation 2003.[90]

The Plantations and Reafforestation (Code) Regulation 2001 provides guidance to plantation operators with respect to the establishment and management of future plantations. It has particular relevance to those intending to establish plantations to generate biomass energy as a renewable energy source under the *Renewable Energy (Electricity) Act 2000* (Cth). In particular, the Regulation deals with:

- General matters, including the authorisation of replanting, regeneration and coppicing on timber plantations as well as for progressive planting of plantations
- Obtaining authorisation for a plantation, including provisions relating to application forms
- Complying development standards for establishment operations including standards relating to the protection of soil and water, the protection of places and relics of cultural heritage, and the protection of biodiversity
- Regulation of management operations which provides for operational plans and records, roads and tracks, site management, buffer zones for the protection of places and relics of cultural heritage, managing progressive planting, and managing retained areas

[90] This amending Regulation inserts cl 57L-57R into the Protection of the Environment Operations (General)) Regulation. See also Guidelines for the Burning of Bio-material: Record Keeping and Reporting Requirements for Electricity Generating Facilities (January 2005), *NSW Government Gazette*, No 38, 1 April 2005, 1023–39.

- Regulation of harvesting operations which sets slope limits for harvesting operations, regulates the location of log dumps and landings, protects drainage features and places or sites of cultural heritage, and provides for the restoration of harvested areas
- Offences and penalty notices which may be issued for breaches of the Act.

Meanwhile, the Protection of the Environment Operations (General) Amendment (Burning of Bio-material) Regulation 2003 prohibits the burning of native forest bio-material for the generation of electricity on any premises. The Regulations must be read together with Guidelines for the Burning of Bio-material: Record Keeping and Reporting Requirements of Electricity Generating Facilities. The Regulation requires generators that burn any kind of bio-material to keep records of all fuel held at the premises. The report must be prepared in accordance with EPA guidelines and must include information on the use of the electricity-generating work, and the use of forest bio-material (other than native forest bio-material) as fuel for the electricity generating work. The report must be independently certified,[91] and made publicly available.[92] The penalty for infringement of the Regulation is $40,000 in the case of a corporation and $20,000 for an individual.[93] Providing false information to the EPA attracts a penalty of $20,000 for a corporation and $10,000 for an individual.[94]

6.4.2.5 South Australia regulates renewable energy facilities

Planning and development is controlled in South Australia under the *Development Act 1993* (SA) and the Development Regulations 1993 which are administered by Planning SA. Applications for development consent are generally considered by local councils and decisions[95] must be made consistently with Development Plans.[96] The legislation includes provisions relating to renewable energy, and especially wind farms. Renewable energy provisions have been inserted by the Planning Minister into all Development Plans in South Australia.[97] They have the following objectives:

- The development of renewable energy facilities, such as wind and biomass energy facilities, in appropriate locations, and
- Renewable energy facilities located, sited, designed and operated to avoid or minimise adverse impacts and maximise positive impacts on the environment, local community and the State.

The Principles of Development Control[98] covering renewable energy include also that renewable energy facilities should be located in areas that maximise

[91] Ibid cl 57N(2)(b). [92] Ibid cl 57O. [93] Ibid cl 57M. [94] Ibid cl 57P.
[95] *Development Act 1993* (SA) Part 4. [96] Ibid s 23.
[97] See Wind Farms Plan Amendment Report (PAR) which was approved on 24 July 2003, available at <http://www.planning.sa.gov.au/edp/pdf/windfarm.pdf> (accessed 2 May 2005).
[98] These Principles are included in the Minister's amendments to all Development Control Plans in South Australia; see the Wind Farms PAR.

efficient generation and supply of electricity. Such facilities, as well as all associated infrastructure (including substations, access roads, and connecting power lines) should not detract from the character, landscape quality, visual significance or amenity of the area. They should also not impact unnecessarily on native vegetation, fauna (such as birds and bats), conservation, geological formations, tourism or sites of built or natural heritage. As well, the developments should not affect the safety of water, ports and airfields. Hazards to nearby property owners from wind tower blades, noise, interference with television and radio signals should be minimised.[99]

Meanwhile, on 30 September 2005, the Essential Services Commission of South Australia (ESCOSA) released its Wind Generation Licensing Statement of Principles.[100] The ESCOSA took advice on the licensing of wind generators from the Electricity Supply Industry Planning Council. This Statement of Principles sets out minimum obligations which the Commission will require of wind generators to increase wind generation capacity while ensuring reliability issues. The following Principles have been developed:

- Licensing Principle 1 – before issuing a licence under the *Electricity Act* the ESCOSA must have satisfied the 'appropriate quality' provisions of the Act. In relation to wind generators it is now a condition precedent to the issue of a licence that a connection agreement between the proposed wind generator and a network service provider has been executed or fully negotiated.
- Licensing Principle 2 – the Commission will insert technical standards licence conditions in future electricity generation licences for wind generators with a nameplate rating of greater than 5MW with respect to: fault ride through capability; reactive power capability; and they must be able to supply the National Electricity Market Management Company (NEMMCO) with real time data on active and reactive power, wind speed and wind direction, and must be capable of remote control by NEMMCO.
- Licensing Principle 3 – for wind generators with a nameplate rating of greater than 30MW, the licensee must be classified as scheduled generators under the National Electricity Rules and, as such, must provide forecasts of expected generation output for incorporation into pre-dispatch, medium term and long-term PASA data.
- Licensing Principle 4 – For wind generators with a nameplate rating of greater than 5MW, the licensee must provide accurate and verifiable wind energy forecasting data and temperature data and other information, and must cooperate with the development and implementation of wind energy forecasting systems for use in the National Electricity Market.

[99] See, for example, Burnside (City) Development Plan, available at <http://www.planning.sa.gov.au/edp/pdf/BUR.PDF> accessed 2 May 2005.
[100] Available at <http://www.escosa.sa.gov.au/webdata/resources/files/050930-R-WindGenerationStatementofPrinciples.pdf> (accessed 16 October 2005).

6.5 State initiatives on demand-side management and energy efficiency

6.5.1 Demand-side management

Demand-side management (DSM) is a crucial policy strategy that can be adopted along with a range of other measures to reduce greenhouse gas emissions from the stationary energy sector. Essentially, it comprises strategies which encourage all users of electricity to reduce their consumption, thus reducing the demand for electricity services. The International Energy Agency[101] defines the goals of DSM as:

- Reduce peak demand especially when the utilisation of power comes close to its limits of availability
- Shift the loads between times of day or even seasons
- Fill the demand valleys to better utilise existing power resources
- Reduce overall demand (strategic savings) in the context of delivering the required energy services by use of less energy (not a reduction in services)
- Provide strategic growth especially to shift between one type of supply to another with more favourable characteristics, for example, in terms of environment.

In Australia, DSM has received attention from a number of quarters. As mentioned in Chapter 5, in 2003 the Ministerial Council on Energy appointed the Hon. Warwick Parer to conduct a review of the National Electricity Market (NEM). His report *Towards a Truly National and Efficient Energy Market*[102] identified a number of reasons why DSM is not being adequately utilised within the energy policy mix. These include that the NEM systems (including the information technology architecture) are supply-side focused, principally on generators which are the key system clients; the full value of what the demand side brings to the market cannot be realised; and residential consumers fail to respond because they do not receive any price signals.[103] In order to address these issues Parer recommended that a demand-side bidding system be introduced into the NEM; that the roll-out of interval meters for all consumers be mandated; and that within the next 3 years all retail price caps be removed while introducing full retail contestability into all markets.[104]

Despite these difficulties, we move now to discuss a selection of State initiatives to implement DSM.

[101] International Energy Agency, *Strategic Plan 2004–2009: IEA Demand Side Management Programme*, available at <http://dsm.iea.org/NewDSM/Work/plan/DSMStrategy.pdf> (accessed 4 May 2005).
[102] Available at <http://www.industry.gov.au/assets/documents/itrinternet/FinalReport20December20022004021311003 9.pdf?CFID=242389&CFTOKEN=11377123> (accessed 4 May 2005).
[103] Ibid at 173. [104] Ibid at 178.

6.5.1.1 DSM in NSW

In 2002, the New South Wales Independent Pricing and Regulatory Tribunal (IPART) released a report entitled *Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services*.[105] The key question posed by the Inquiry was whether demand management options, that meet customers' energy needs at a lower cost, as well as with lower environmental impact, are being ignored in favour of a strategy to continue to build new generation facilities. The Tribunal concluded that there are significant demand management strategies that are cost-effective but which are not being pursued. Importantly, IPART noted that the most significant barrier to DSM is that the full cost of energy is not reflected in the price.[106] One of IPART's recommendations is the establishment of a Demand Management Fund,[107] funded at least partially by a Special Benefit Charge, as discussed in Chapter 7.[108] The Fund would be used to facilitate sustainable generation and various energy efficiency programs. Similar initiatives have already been undertaken by at least 21 States in the United States as a fundamental part of the electricity restructuring process, where all of the energy efficiency programs are provided for by statute.[109]

IPART also recommended the setting of energy efficiency benchmarks for government and commercial buildings,[110] as well as monitoring the impact of the design of the National Electricity Market and market rules on demand management initiatives.[111] These initiatives would both reduce consumption and greenhouse gas emissions,[112] as well as enhance the capacity and reliability of the electricity network.

In line with this approach, IPART made a determination in June 2004 on *Treatment of Demand Management in the Regulatory Framework for Electricity Distribution Pricing*. IPART claims that demand management is an important strategy for reducing congestion in the network and also for reducing the need for additional network capacity. This could enable the DNSPs to avoid capital expenditure and operating costs for a period of time. Demand management could have other associated benefits, such as reductions in greenhouse gases as well as other air pollutants like sulphur dioxide and nitrous oxide. IPART does not see these associated benefits as the primary focus of its decision, however, as these are better regulated under schemes like the NSW Greenhouse Benchmarks Scheme.

[105] Independent Pricing and Regulatory Tribunal, *Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services*, October 2002.
[106] Ibid at 31. [107] Ibid at 40. [108] Ibid Appendix 8 at 118.
[109] See, for example, the District of Columbia which enacted the *Retail Electric Competition and Consumer Protection Act of 1999* as well as establishing a SBC known as the Reliability Energy Trusty Fund to protect low-income earners, promote energy efficiency and renewable energy technologies; for this and all other state initiatives see <http://aceee.org/new/dc.pdf> (accessed 6 March 2003).
[110] *Inquiry into the Role of Demand Management*, IPART, at 50. [111] Ibid at 98.
[112] IPART estimates that DM initiatives could reduce electricity consumption in NSW by 250MW (2%) and reduce emissions by 6000ktCO_{2-e} per annum (ibid at 29) and by 1634MW and 3462ktCO_{2-e} per annum, if renewables were fully operational (ibid at 30).

IPART recognises that the implications of its decision on demand management cannot be predicted. For this reason IPART has adopted an approach that includes:

- The cost building blocks on which DNSPs' notional revenue requirements are based will be established on the basis of pre-demand management cost projections
- DNSPs will be allowed to recover revenue forgone as a result of demand management activities
- The building block costs will exclude demand management costs but there will be a pass through to consumers of demand management costs, up to the avoided distribution costs of the project. IPART will develop broad principles to regulate the pass through and recovery of costs
- The recovery of forgone revenue and demand management costs will be calculated by way of adding a D-factor to the formula for determining the weighted average price cap. In other words, the D-factor would increase the amount by which DNSPs are permitted to increase their prices on average. It would be calculated each year as part of the annual price approval process, and would be calibrated to recover an amount to cover forgone revenue and pass through demand management costs, as approved by the Tribunal. This approach means that forgone revenue and demand management costs would be recouped on a retrospective basis, with a 2-year lag.[113]

IPART believes that its determination represents a generous approach to regulation. In future, it would expect that DNSPs' forward-looking expenditure profiles put forward, at the time of regulatory reset, would incorporate an appropriate mix of demand management and network build solution, representing the least cost approach to meeting expected demand. Then, the passing through of demand management costs and forgone revenue would not be permitted by IPART.

Many of IPART's findings seem to have been accepted by the NSW government with the passage of the *Energy Administration Amendment (Water and Energy Savings) Act 2005* (NSW). This Act changes the name of the *Energy Administration Act 1987* to the *Energy and Utilities Administration Act 1987*. It prescribes energy and water savings measures but here the focus is only on the energy provisions.

Part 6A is inserted into the Act and establishes 'designated energy users'. A designated energy user is any State agency or any other person prescribed by a savings order that uses energy. An Energy Savings Fund is established to provide funding to: encourage energy savings; address peak demand for energy; stimulate investment in innovative energy savings measures; increase public awareness and acceptance of the importance of energy savings measures; the development of cost-effective energy savings measures that reduce greenhouse gas emissions

[113] The Determination should be read together with IPART's *Guidelines on the Application of the D-factor in the Tribunals' 2004 NSW Electricity Distribution Pricing Determination* available at <http://www.ipart.nsw.gov.au/documents/Finaldemandmanagementguidelines-Introduction-28April 2005.pdf.PDF> (accessed 4 May 2005).

arising from the use of energy; and to pay for the contributions made by the State for the purposes of national energy regulation. The Fund will include payments made by contributions received from designated energy users; money advanced by the Treasurer for the Fund, money appropriated by Parliament, the proceeds of the investment of money in the Fund, money directed or authorised to be paid into the Fund under the Act or any other law; and all money received from voluntary contributions. Money may be paid out of the Fund, upon the approval of the Minister, to fund all or any part of the cost of any energy saving measures, the cost of administering the Fund, and the Minister's expenses associated with the Minister's functions under the Act. The Minister may also approve selection criteria to be applied to determine the kinds of energy savings measures that will be eligible for funding. A person applying for funding for an energy savings measure may be required to submit an energy savings action plan detailing the measures, and providing any other information requested by the Minister. In approving payments out of the Fund, the Minister may obtain advice from a committee established under the Act, or any other person the Minister thinks relevant.

The Minister may, by order published in the *Gazette*, require any one or more distribution network service providers to make an annual contribution for a specified financial year to the Energy Savings Fund. The same specifications apply to the Minister's powers to make this order as apply to the placing of an order on State water agencies.

Designated energy users are required to prepare draft energy savings action plans. A draft energy savings plan must include the following: a description of the designated energy user's current energy usage; a list of individual energy savings measures prioritised in terms of energy saved, cost-effectiveness and potential benefits; a statement concerning the energy savings measures included on that list that will be implemented in the 4-year period following the approval of the plan. The Minister may then approve the draft plans after consultation with the designated energy users, and may make such alterations as the Minister thinks fit. Notice of such approval must be given within 14 days. The plan comes into effect the day on which written notice is given and expires on the fourth anniversary of its commencement, unless revoked sooner by the Minister. The penalty for not submitting a draft savings action plan is $5000. Directors of the corporation are taken to have contravened the Act, and be personally liable, if they knowingly authorised or permitted the contravention. However, it is a defence to prosecution if the defendant can prove that it has a reasonable excuse for not preparing or submitting a plan. Also, the plans do not have to be implemented unless the designated energy users are directed to do so by the Minister by way of regulations. The Minister may establish standing or special committees for the purpose of advising the Minister.

The Minister may, by order published in the *Gazette*, require any one or more distribution network service providers to make an annual contribution for a specified financial year to the Energy Savings Fund. The Minister for Energy and

Utilities has now placed orders on utilities to make annual contributions to the Savings Funds. Distribution network service providers must make an annual contribution to the Energy Savings Fund for the financial year 1 July 2005. The contributions are as follows: Energy Australia – $18,973,999; Integral Energy – $12,050,000; Country Energy – $8,977,000. These contributions must be paid in quarterly instalments on first day of August 2005, November 2005, February 2006 and May 2006. Corporations using the most electricity in NSW have also been ordered to prepare energy savings plans.

6.5.1.2 Victoria's Essential Services Commission adopts DSM measures

The Essential Services Commission has approached DSM in two ways. It has published a Position Paper on *Electricity Distribution Price Review 2006–2010*[114] which incorporates recommendations on DSM.

In order to send price signals to customers, in July 2004, the Commission published its *Mandatory Rollout of Interval Meters for Electricity Customers*.[115] This requires interval meters to be installed for:

- All customers consuming more than 160MWh per year by 2008, with new and replacement installation commencing in 2006
- Small business and large residential customers (those using above 20MWh but less than 160MWh per year) by 2011 with off-peak metering or three phase metering, with new and replacement installation commencing in 2006
- Small business and residential customers (consuming less than 20MWh per year) with off-peak metering or three phase metering, with new and replacement installation commencing in 2006
- Small business and residential customers with single phase, non off-peak metering, with installation commencing in 2008.

The effect of this is that in the 7 years from 2006, up to one million large customers and customers with electric water heating will have their accumulation meters upgraded to interval meters; and over an extended period, when a new or replacement meter is required, all remaining meters (about 1.3 million) will be upgraded.

6.5.1.3 Demand management initiatives in South Australia

In September 2004, the Essential Services Commission of South Australia (ESCOSA) published a draft decision on *Demand Management and the Electricity Distribution Network*.[116] The principal recommendations of this decision are incorporated in the July 2005 *Electricity Price Distribution Review*. They include

[114] Available at <http://www.esc.vic.gov.au/apps/page/user/pdf/EDPR%20Position%20Paper.pdf> (accessed 4 May 2005).
[115] Available at <http://www.esc.vic.gov.au/apps/page/user/pdf/IMRO_FinalDecisionFinal9July04.pdf> (accessed 4 May 2005).
[116] Available at <http://www.escosa.sa.gov.au/resources/documents/040830-DemandMgmt_DD.pdf> (accessed 23 May 2005).

that an aggressive power factor correction program be implemented by ETSA Utilities, including mandatory kVA tariffs for large customers (consuming over 750MWh per annum) by mid 2008 with direct financial assistance to customers who opt to accept the new tariffs before 2008. The initiation of a standby generation pilot program with five large customers in North Adelaide is also required with standby generation equipment to identify ways in which it could provide network support services. Participating generators could be modified for commercial use by the end of 2007.

A direct load control pilot study involving 1000–2000 customers must be initiated whereby air conditioners, pool pumps and other suitable equipment can be automatically cycled on and off, or totally interrupted under the control of ETSA Utilities. In addition, a critical peak pricing trial must be undertaken on a voluntary basis with customers which already have interval meters installed, by December 2006. However, ESCOSA has not required an immediate rollout of interval meters but will review the operation of such a program in Victoria.

An investigation into the feasibility of Voluntary Load Control and Curtailable Load Control programs for businesses which have already installed interval meters to enable them to shed or shift loads to non-peak periods will be undertaken. Finally, ETSA Utilities must investigate the opportunities associated with becoming a demand management aggregator in South Australia. Here the Utilities would use a group of customers to create demand management opportunities if individually they would not be able to provide a demand-side response. They must also carry out a comprehensive load research project to underpin the development of demand management programs.

ESCOSA has approved an amount of $20 million as funding for demand management initiatives by ETSA Utilities over the 5-year regulatory period beginning in July 2005.

6.5.2 Energy performance standards and labelling requirements[117]

6.5.2.1 Appliances

It has long been recognised that there is considerable scope for improving energy efficiency in respect of electric and gas appliances in common domestic use. These include refrigerators, freezers, air conditioners, washing machines, dishwashers, space heating and cooling, water heating and lighting systems.

Two alternative forms of legislation have been introduced in a number of industrialised countries. First, there are mandatory labelling laws that require

[117] See generally Lloyd Harrington and George Wilkenfeld, 'Appliance Efficiency Programs in Australia: Labelling and Standards' (1997) 26(1) *Energy and Buildings* 81; Adrian Bradbrook, 'Eco-Labelling: Lessons from the Energy Sector' (1996) 18 *Adelaide L Rev* 35 at 36ff; Adrian Bradbrook, 'The Development of Energy Efficiency Laws for Domestic Appliances' (1990) 12 *Adelaide L Rev* 306. For a discussion of the history of the labelling program in Australia, see <www.energyrating.gov.au/history.htm> (accessed 22 January 2005).

the creation of an energy efficiency label showing the fuel consumption of the model concerned. The label can consist of a star-rating system or statistical information as to the energy consumption rates of the specified model in comparison with other models. Labelling systems assist in promoting consumer confidence in domestic appliances and are a form of consumer protection. They enable consumers to make an informed choice between various competing products, provide an incentive to manufacturers to design more energy efficient appliances, and promote energy conservation generally. The legislation establishing labelling schemes requires the compulsory display of the approved label on each appliance at the point of sale.

Secondly, appliance efficiency standards can be created by a provision prohibiting the sale of appliances that fail to comply with a prescribed efficiency standard, and allow the government to prescribe in the regulations minimum efficiency standards in respect of any appliances.[118] The legislative framework requires an inspection mechanism to ensure that the efficiency standards are complied with. This can be achieved by a system of government inspectors with wide-ranging powers to test appliances, or by a system whereby the manufacturer conducts its own tests and supplies the results to a government official with the power to conduct spot tests and withdraw the product from sale if it fails the test.

In Australia, the initial move towards labelling occurred at the Commonwealth level in 1983 when, pursuant to a decision of the Australian Minerals and Energy Council, the Coordinating Committee on Energy Conservation investigated the possible introduction on a voluntary basis of a labelling scheme for a variety of electric appliances, commencing with freezers and refrigerators. Discussions were held with various industrial associations for the adoption of a voluntary Australia-wide scheme, but broke down in 1984. An alternative proposal advanced for a phased reduction in the average energy consumption of specified appliances together with a program to educate consumers on the efficient use of appliances also failed to gain support.

In late 1985, the initiative was seized by the New South Wales and Victorian governments, which jointly advanced a proposal for a national appliance energy labelling law. This proposal formed the basis for legislation in those two States enacted in 1986 and 1987. South Australia introduced similar legislation in 1988 and Queensland followed suit in 1994. Later, an agreement was reached between the Commonwealth and States in the context of the Australian and New Zealand Minerals and Energy Council (ANZMEC) to adopt energy labelling laws for specified appliances country-wide, and as a result the remaining legislatures adopted similar labelling laws. The following products are now required to carry an approved label:

[118] The first country to introduce efficiency standards legislation for domestic appliances was the United States: *National Appliance Energy Conservation Act of 1987*, Pub L 100–12, 101 Stat 103, as amended by the *National Appliance Energy Conservation Amendments Act 1988*, Pub L 100–357, 102 Stat 671.

- refrigerators and freezers;
- clothes washers;
- clothes dryers;
- dishwashers; and
- air conditioners (single phase mandatory, three phase voluntary).[119]

In New South Wales, the relevant law is contained in the Electricity Safety (Equipment Efficiency) Regulation 1999, made pursuant to s 37(2) of the *Electricity Safety Act 1945*. The regulation establishes a mandatory system of energy efficiency labelling, and states that a person shall not sell any prescribed electrical article[120] in respect of which there is a registered label unless the label is displayed on the article in an approved manner (Reg 15(1)).[121] Application forms for approval of energy efficiency labels are specified (Reg 17(1) and Schedule 2). Each application must contain test reports ensuring that the appliance complies with the performance standards stipulated in the Regulation (Reg 7(2)). The Energy Corporation of New South Wales may refuse an application for registration of a label for an appliance if the applicant fails to comply with any of the terms of the Regulation or if the Corporation is in doubt as to the accuracy or reliability of either the report accompanying the application or the tests to which the report relates (Reg 8(2)). The Corporation may at any time require any electrical article to be tested to determine whether it complies with the requirements of the Act or the regulations (Reg 21(1)) and, for this purpose, may require the registration holder to provide a sample of the article or the energy efficiency label for the article (Reg 21(2)). The regulation prescribes a Register of Electrical Articles, which is open for public inspection (Regs 18–19). It is an offence to sell an electrical article on which an energy efficiency label is displayed unless the label is an approved energy efficiency label (Reg 15(2)). It is also an offence to exhibit a display front for an appliance unless an approved energy efficiency label is displayed on the article in accordance with Part 2 of the relevant standard (Reg 16(1)). A maximum penalty of 20 penalty units is prescribed for a breach of these provisions (Reg 16).[122]

In Victoria, Queensland and South Australia, roughly similar provisions are contained in ss 7 and 154 of the *Electricity Safety Act 1958* (Vic), the Electricity Regulation 1994, made pursuant to s 266 of the *Electricity Act 1994* (Qld), and the Electrical Products Regulations 2001, made pursuant to s 8 of the *Electrical Products Act 2000* (SA). Other jurisdictions have legislated as follows pursuant to the agreement with the Commonwealth government: Western Australia: Electricity

[119] See <www.energyrating.gov.au/man1.htm> (accessed 2 January 2005).
[120] Reg 3(1) states that the Regulation applies to dishwashers, refrigerators, freezers, refrigerator/freezers and air conditioners as defined in Schedule 1. Note that the Regulation does not apply to the sale of second-hand articles: Reg 3(2).
[121] In respect of an air conditioner that is sold in a package, the approved energy efficiency label may instead be displayed on the package: Reg 5(2).
[122] A penalty unit is $100: *Interpretation Act 1987* (NSW), s 56. Pursuant to Reg 16, it is also an offence pnishable by a maximum penalty of 20 penalty units for a person, in connection with any application or test report under the Regulation, to make any statement that the person knows to be, or ought reasonably to be aware is, false or misleading.

Regulations 1947, Regs 4 and 8, made pursuant to the *Electricity Act 1945*, ss 33E-33F; Tasmania: Electricity Industry Safety and Administration Regulations 1999, Reg 21, made pursuant to the *Electricity Industry Safety and Administration Act 1997*, s 59; Australian Capital Territory: Electricity Safety Regulation 2004, Reg 8, made pursuant to the *Electricity Safety Act 1971*, s 27.

A supplementary form of energy labelling, Top Energy Saver Award (TESAW), has been introduced throughout Australia by agreement between the State and Territory governments.[123] This system is designed to recognise the most efficient star-rated products in each category available for sale on the market. It applies to both electric and gas appliances that presently are required to carry a star-rated energy efficiency label. The award is updated each year. Its purpose is to help consumers identify easily the most efficient product available. Two labels have been created: the first is half the size of the normal energy efficiency label and is displayed adjacent to the normal label; the second is a modification of the normal label, whereby the award and the year of the award are indicated in a green bar on the bottom of the normal label. These labels are shown in Figures 6.1 and 6.2.

Uniform energy performance standards were agreed to by the Commonwealth and States under the Minimum Energy Performance Standards (MEPS) program. The following products now have regulated minimum energy efficiency standards:

- refrigerators and freezers (from 1 January 2005);
- mains pressure electric storage water heaters (from 1 October 1999);
- three phase electric motors (0.73kW to <185kW) (from 1 October 2001);
- single phase air conditioners (from 1 October 2004, revision 1 October 2007);
- three phase air conditioners up to 65kW cooling capacity (from 1 October 2001, revision 1 October 2007);
- ballasts for linear fluorescent lamps (from 1 March 2003);
- linear fluorescent lamps (from 1 October 2004);
- distribution transformers (11kV and 22kV with a rating from 10kA to 2.5MVA from 1 October 2004);
- commercial refrigeration (self-contained and remote systems (from 1 October 2004).[124]

The current minimum energy performance standards have been enacted into law and made mandatory as follows: New South Wales: Electricity Safety (Equipment Efficiency) Regulation 1999, Reg 5 and Schedule 2; Victoria: *Electrical Safety Act 1998*, ss 67–68 and Electrical Safety (Equipment Efficiency) Regulations 1999, Reg 6; Queensland: *Electricity Act 1994*, s 266 and Electricity Regulation 1994, s 130; South Australia: *Electrical Products Act 2000*, ss 5–6 and Electrical Products Regulation 2001, Schedule; Western Australia: *Electricity Act 1945*, s 33E and

[123] See <www.energyrating.gov.au/tesaw-main.htm> (accessed 15 January 2005).
[124] See <www.energyrating.gov.au/man1.htm> (accessed 2 January 2005).

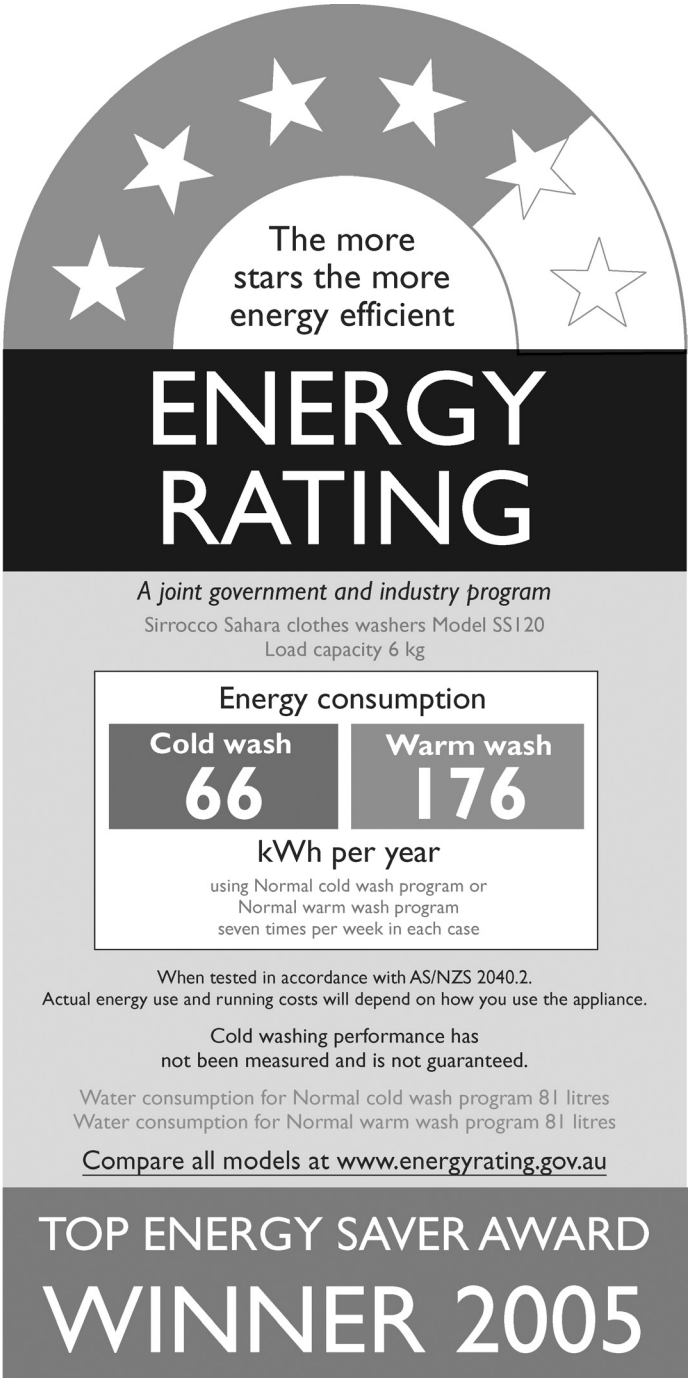

Figure 6.1 Top Energy Saver Award labels

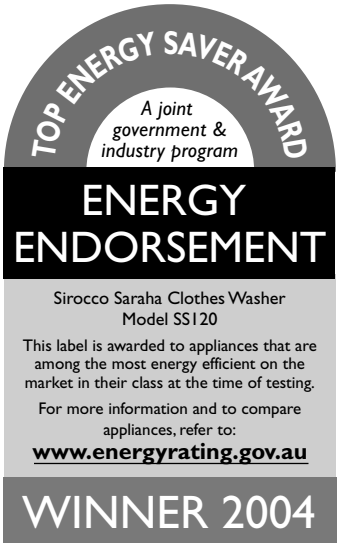

Figure 6.2 Top Energy Saver Award labels

Electricity Regulations 1947, Reg 10; Tasmania: *Electricity Industry Safety and Administration Act 1997*, s 58 and Electricity Industry Safety and Administration Regulations 1999, Part 8; Australian Capital Territory: *Electricity Safety Act 1971*, s 27 and Electricity Safety Regulation 2004, Reg 6.

6.5.2.2 Buildings

Due to Australia's mild climate, buildings have traditionally been constructed throughout the country with little regard for energy efficiency considerations. This has led to considerable energy wastage as a result of unnecessary heating in winter and cooling in summer. Because the Constitution does not specify legislative power over buildings in the Commonwealth, different building legislation has been developed by the six States and two Territories. The matter became even more complex as a result of some States delegating their building regulatory systems to municipal governments, which effectively enacted their own building regulatory controls by way of local council by-laws.[125]

The first attempt at national consolidation of the building regulations occurred in the early 1970s with the negotiations by the States and Territories of the Australian Model Uniform Building Code. As energy efficiency was of little concern at the time, this Code is essentially silent on this issue. This was based on the New South Wales model building legislation at the time, but numerous legislative differences still existed between the various Australian jurisdictions.

Further efforts towards national harmonisation of building regulations led to the creation in 1990 of the Building Code of Australia. An Australian Building

[125] <www.abcb.goc.au/dsp_document_view.cfm> (accessed 15 January 2005).

Codes Board was created in 1991 to oversee the Code. This Board recommended the introduction in 1996 of a new performance-based building code, which was adopted by the various jurisdictions at various dates during 1997 and 1998.

The move towards the inclusion in the new Code of energy efficiency measures was driven by a study undertaken by the Australian Greenhouse Office (AGO) in 1999[126] and a more detailed report the following year.[127] This study concluded that the Building Code should be amended to set new minimum energy performance standards for new residential and non-residential buildings. An Energy Efficiency Steering Committee was established by the Australian Building Codes Board to achieve this aim.[128] A BCA Energy Efficiency Project is also being undertaken in conjunction with the AGO to achieve this goal.

To date, new energy efficiency measures for detached and semi-detached residential dwellings (BCA classes 1 & 10) have been introduced as of 1 January 2003. Builders and designers are allowed to meet the standards in one of two ways:

- by following the 'deemed to satisfy' provisions in the Code;[129] or
- by achieving the required energy performance rating using an accredited software package.[130]

There are two alternative software packages in operation. One is the Nationwide Housing Energy Rating Scheme (NatHERS).[131] This was initially funded by the Australian and New Zealand Minerals and Energy Council (ANZMEC). The NatHERS system consists of a five-star grading system for all new residential buildings. Another form of grading system is the FirstRate House Energy Rating Software Package, which provides a method of assessing and improving the potential energy efficiency of new houses and house designs when information about the building is entered into the software program. FirstRate supplies points for the various energy-efficient elements contained in the actual or potential building and supplies the star rating based on these points.

The first mandatory system for energy efficiency in building design and construction was the insulation requirements contained in Victoria in the *Building Control Act*, which entered into force on 18 March 1991. These regulations were replaced by similar provisions for Class 1 buildings in the Victorian Additions to the Building Code of Australia 1996 Volume 2. These regulations were considered to be successful in reducing energy consumption and greenhouse gas emissions.[132] Similar compulsory controls were later introduced in the Australian Capital Territory. In these two jurisdictions new residential dwellings were

[126] Australian Greenhouse Office, *Scoping Study of Minimum Energy Performance Requirements for Incorporation into the Building Code of Australia*, AGO, Canberra, 1999.
[127] Australian Greenhouse Office, *Energy Research for the Building Code of Australia*, AGO, Canberra, 2000; available at <www.greenhouse.gov.au/energyefficiency/building>.
[128] <www.abcb.gov.au/dsp/committee_view.cfm> (accessed 15 January 2005).
[129] This means the agreed pre-packaged solutions to the performance requirements in the Building Code.
[130] <www.greenhouse.gov.au/buildings/code.html> (accessed 15 January 2005).
[131] <www.houseenergyrating.com/domestic.htm> (accessed 15 January 2005).
[132] See Australian Greenhouse Office and Victorian Sustainable Energy Authority, *Impact of Minimum Energy Performance for Class 1 Buildings in Victoria*, AGO, Canberra, 2000.

required to rate at least four stars out of a maximum of five stars. In the remaining jurisdictions the system was advisory only.

All jurisdictions have recently introduced legislation making compulsory the energy efficiency building controls for detached and semi-detached residential dwellings contained in the Building Code of Australia.[133] In Victoria from July 2004 all new homes must now achieve a five-star rating using the FirstRate software. This is provided for in the Victorian Building Commission's Practice Notes *Residential Sustainability Measures*.[134] In Western Australia, since July 2003 buildings must achieve a four-star rating using either FirstRate or NatHERS. The same rule applies in South Australia, Tasmania and the Northern Territory with effect from January 2003, and in Queensland with effect from September 2003. In the Australian Capital Territory houses must obtain a four-star rating using FirstRate; further, all houses offered for sale must have an energy rating performed and the result of that rating must be disclosed in all advertisements for the sale of the premises.[135] For the position in NSW, see the BASIX provisions, discussed earlier.[136]

In relation to buildings other than private dwellings, the BCA does not yet contain Minimum Energy Performance Requirements. However, the timetable for introduction is: Class 2, 3 and 4 buildings (residential buildings other than houses) – May 2005; commercial and public buildings (classes 5–9) – May 2006. In addition, the introduction of five-star minimum energy performance standards for houses is under consideration for adoption nationwide during 2006.[137]

[133] For a discussion of the various State and Territory requirements, see <www.houseenergyrating.com/assessor.htm> (accessed 15 January 2005).
[134] Issued in July 2004. Available at <http://www.buildingcommission.com.au/asset/1/upload/Residential_Sustainability_Measures_1_July_04.pdf> (accessed 28 April 2005).
[135] *Energy Efficiency Ratings (Sale of Premises) Act 1997* (ACT), s 7.
[136] See section 6.2.1.1 above.
[137] <www.ipe.nt.gov.au/whatwedo/ems/strategies/buildingcode.htm> (accessed 15 January 2005).

7

A sustainable energy law future for Australia

This final chapter focuses on major energy policy statements made by the Australian government which give an insight into the way in which energy and policy law in Australia is likely to develop. A critical analysis of these policy pronouncements is offered and ways are indicated in which the energy policy dialogue needs to shift in order to secure a truly sustainable energy law future for Australia. In undertaking this analysis, a comparative analysis of the initiatives which have been adopted by various overseas jurisdictions is offered, and the question asked: why is it that similar progressive paradigms for energy are not being adopted in Australia? Other desirable international, national or State law reform measures that could be introduced on energy-related issues are considered, which would significantly enhance the goal of sustainable development.

7.1 Where is the Australian government going with energy: *Securing Australia's Energy Future*?

In 2004, the Prime Minister released the long-awaited Australian government policy on energy. This was seen as the Prime Minister's opportunity to respond to the MRET Review, the Parer Review and to set the strategic energy policy framework for Australia's future. The major initiatives announced in *Securing Australia's Energy Future*[1] are: a complete overhaul of the fuel excise system to remove $1.5 billion in excise liability from businesses and households in the period to 2012–13; a $500 million fund to leverage more than $1 billion in private investment to develop and demonstrate low-emission technologies; $75 million for

[1] See <http://www.dpmc.gov.au/publications/energy_future/>.

Solar Cities trials in urban areas to demonstrate a new energy scenario combining solar energy, energy efficiency and vibrant energy markets; $134 million to remove impediments to the commercial development of renewable technologies; new requirements for business to manage their emissions wisely; and a requirement that larger energy users undertake, and report publicly on, regular assessments to identify energy efficiency opportunities. Essentially, the policy continues to commit Australia to a carbon intensive energy future.

7.1.1 Fuel excise reform

Although we have not dealt with fuel as a source of energy to any great extent, it is important to mention fuel excise reform as part of the new energy policy. Under the new arrangements, from 1 July 2012 all off-road business use of all fuels will be effectively excise free. This measure will be introduced by the government in stages, with a credit of half of the fuel excise incurred in all currently ineligible off-road activities available between 1 July 2008 and 1 July 2012, and a full credit from 1 July 2012. Excise relief will be provided to a range of commercial activities for the first time (for example, to manufacturing and construction, and to all aspects of quarrying) and other major beneficiaries include primary producers, miners and commercial power generators. The off-road business use of petrol (for example in utility vehicles and four-wheel motorcycles) will be effectively excise free for the first time.

From 1 July 2006, the on-road credit paid to users of diesel in on-road vehicles weighing over 4.5 tonnes GVM will be extended to users of all excisable fuels – benefiting the operators of around 57,000 heavy petrol vehicles – and the metropolitan boundaries governing eligibility for this credit will be abolished – making all journeys in these vehicles eligible for the credit. The partial excise paid on fuels used in heavy vehicles will be declared an official, non-hypothecated road-user charge from 1 July 2006 (this charge will be set consistent with future determinations of the National Transport Commission). In addition, all private and business use of all fuels for electricity generation will be effectively excise free from 1 July 2006. The excise currently levied on burner fuels – such as heating oil and kerosene – will be effectively removed from 1 July 2006, reducing the excise burden on up to 90,000 households and a range of businesses.

To implement these changes, the government will introduce a new business credit system. This system will replace all existing rebates and subsidies. Businesses will be able to claim their fuel excise credits through their Business Activity Statement in the same way as they claim their GST credits.

Environmental measures under the scheme will commence on 1 July 2006 and include: firms receiving more than $3 million in business credits will be required to participate in the government's Greenhouse Challenge Program; heavy on-road vehicles will be required to meet one of five emissions-performance criteria designed to show they are not a high polluter; and alternative fuels will remain free of excise until 1 July 2011 after which it will be increased in five equal annual steps to the new discounted rate on 1 July 2015. These arrangements provide a

transition path that allows existing industries (like LPG) time to adjust and new fuels (such as biodiesels and compressed natural gas) time to establish a presence in the market.

The reforms will coincide with the introduction of new fuel standards for petrol and diesel, which are likely to reduce air pollution in Australia's capital cities. It has also been agreed with the automobile industry to reduce the average fuel consumption of new vehicles sold in Australia from 8.43 litres per 100 km to 6.8 litres per 100 km in the period to 2010.

7.1.2 Energy efficiency

The government is committed to implementing a range of energy efficiency measures. These include: $75 million Solar Cities trials; government agencies to improve their own energy efficiency; and firms using more than 0.5 petajoules of energy a year will be required to undertake energy efficiency opportunity assessments every 5 years. The assessments will be conducted in accordance with strict standards and will be reported publicly.

In April 2005, the Australian government released the *Programme Guidelines for Solar Cities*.[2] It is anticipated that the first critical infrastructure components and market arrangements for Solar Cities will be in place in 2006–07. The impacts will be monitored, analysed and reported through to 2012–13. The Prime Minister has announced that Adelaide will be the first Solar City while others will be located in at least three other urban centres.

To be eligible for consideration against the selection criteria the organisation responsible for implementing the Solar City project must be an incorporated body located in Australia (including Government Business Enterprises) or a local government body or a statutory authority. The proposal must be technically feasible in the sense that it uses substantially proven technology and must integrate photovoltaic technologies; smart metering technologies; energy efficiency measures and load management measures. It must focus on existing buildings but may include urban renewal or greenfield sites, and all consortium proponents must be financially viable.

The core selection criteria are the extent to which the proposal demonstrates use of photovoltaic technologies as well as the potential for the project to have an impact on future supply and demand profiles especially during peak loads. The potential of the project to defer investment in future electricity infrastructure is also important. The proposal must use the key technologies and measures mentioned above and must be suitable for widespread commercial application. Pricing arrangements must optimise the benefits of solar technology and properly reflect the real costs of electricity consumption at the time of use and there must be community support for the proposal. The ability to get real-time measurements and monitoring of energy data is important as is the impact of the project on future energy use and greenhouse gas emissions over the full period of the project.

[2] Available at <http://www.greenhouse.gov.au/solarcities/guidelines.html>.

The proponent must demonstrate a commitment to effective risk management, consumer education, community engagement and exit strategies. The project must be capable of ready deployment into existing building stock and have the ability to deliver the proposed project on time and within budget and acceptance of legal principles as set out in the Guidelines. Funding from other sources should be available since the Australian government intends to leverage 50% of the total costs associated with each project.

Once Expressions of Interest have been received, an expert panel will assess the proposals and recommend a shortlist to the Ministers for the Environment and Heritage and Industry, Tourism and Resources. Successful consortia were invited to develop a detailed business case as part of the tender phase by September 2005, for which financial assistance was available. The expert panel will assess the business cases and make recommendations to the Ministers, whose decisions will be final. The successful consortia will enter into legal arrangements with the Commonwealth prior to receiving Solar Cities funding. Implementation must be undertaken in accordance with the funding agreement and consortia must report regularly and publicly on their progress. The results will be monitored in 2013.

7.1.3 Providing energy security

Australia has sufficient stationary energy sources to meet its electricity and heating needs for hundreds of years, significant petroleum resources, and good access to imported petroleum products. While Australia has potentially large reserves of alternative fuels, the energy policy states that these are more expensive to use and will not replace conventional sources.

With respect to infrastructure, the Australian government will continue to pursue energy market reform for electricity and gas (as mentioned in Chapter 5). In addition, the government has a number of strategies in place to respond to disruptions. These include: the Liquid Fuels Emergency Response Plan; arrangements being developed by the Critical Infrastructure Advisory Council to protect energy assets from intentional disruptions; and emergency response protocols for the gas sector being developed by the Ministerial Council on Energy.

7.1.4 Energy and climate change

As already mentioned, the Australian government will not establish an emissions trading scheme. However, it will adopt a range of measures to reduce greenhouse gas emissions including establishing a $500 million fund to demonstrate low-emission technologies to reduce greenhouse gas emissions, including primarily geosequestration (i.e. sequestration of carbon dioxide underground). Geosequestration (injecting carbon dioxide into geological formations underground) is an important part of the Howard government's energy policy. It has also been adopted as a research priority by COAL21, the partnership between the coal mining industry, the coal-fired electricity generation industry, and Commonwealth and State research bodies such as the CSIRO, mentioned in Chapter 1.

The government will provide an additional $100 million to target strategic research, development and commercialisation of smaller-scale renewable energy technologies. It will also maintain support for MRET through to 2020 but with no increase in the target beyond the existing 2% by 2010. It will provide $230 million to continue projects like the Renewable Remote Generation (RRG) and Greenhouse Gas Abatement programs (GGAP), and provide $34 million to remove specific barriers to the deployment of renewable energy like wind forecasting, improved electricity storage options and better grid connection rules.

The commitment to geosequestration as a principal policy response to Australia's greenhouse gas emissions has been called into question in a number of quarters. The Australia Institute, for example, released a report entitled *Geosequestration: What is it and how much can it contribute to a sustainable energy policy for Australia?*[3]

The Australia Institute report comprises five parts: Introduction; What is being proposed?; What will it cost?; Comparison of CO_2 Capture and Storage (CCS) and other abatement options to 2030; and CCS, greenhouse gas emissions and energy policy. In summary, the report finds that geosequestration is a very complex process. First the carbon dioxide has to be captured and then transported to the geosequestration site and then injected into the formation. Capturing carbon dioxide from existing power stations would require the use of large and expensive equipment and the use of large amounts of energy, thereby reducing overall power station efficiency. The transport of the carbon dioxide will be energy intensive and require large investment in pipeline infrastructure. At present there are no identifiable sites within 500 km of 39% of Australia's current net emissions of carbon dioxide from electricity generation. The main barriers to a large-scale application of CCS are the immaturity of the technology, the energy penalty and the cost of capture. The earliest date for the operation of a pilot project is 2014–15.

The report states that it is clear that coal-fired generation with CCS will be more costly than a number of other low-emission electricity generation options including natural gas-fired combined cycle gas turbines, gas-fired cogeneration, wind and many types of biomass, especially as many of these technologies are already commercially proven. For this reason, the use of currently available technologies will reduce emissions much sooner and at lower cost, and make any abatement task for CCS easier.

As to whether geosequestration is good energy policy, the report concludes that in the absence of any changes to the present policy, Australia will exceed the Kyoto target by 2009 and emissions will keep growing. Modest energy efficiency improvement plus CCS may slow emissions but not reverse the growth from about 2020 onward. Current energy policy will not shield Australia from the risk of economic and diplomatic international pressure to reduce emissions before 2020. It will also put Australia on an unnecessary high-cost path to reducing emissions.

[3] See the Australia Institute, Discussion Paper Number 72, September 2004.

However, on 25 September 2005, the Intergovernmental Panel on Climate Change (IPCC) released a comprehensive report on CCS[4] entitled *Special Report on Carbon Dioxide Capture and Storage* which is more ambivalent about the strengths and weaknesses of the technology. The report begins by describing CCS, its characteristics, how it could contribute to mitigating climate change, the current status of the technology and the geographical relationship between the sources and storage opportunities for CO_2 (hereafter carbon). The report then addresses the following matters:

- *What are the costs for CCS and what is the technical and economic potential?*
  Since neither Natural Gas Combined Cycle, Pulverised Coal nor Integrated Gasification Combined Cycle systems have been built at a full scale with CCS, it is difficult to estimate the costs of these systems with confidence. Also the costs of any technology vary from country to country in absolute and relative terms. Costs could be reduced by research and technological development and by economies of scale.
- *What are the local health, safety and environment risks of CCS?*
  In areas with low population density the risks of CCS are low. However, in high-density areas there could be immediate dangers to human life and health if carbon was suddenly released from pipelines in a concentration of 7–10% by volume in air. So pipeline transport would require careful monitoring in terms of route selection, overpressure detection, leak detection and other design factors. The leakage of carbon from natural reservoirs carries substantial risks. While there is limited experience with CCS, closely related industrial experience and scientific knowledge could serve as a basis for appropriate risk management, including remediation. Leakage from storage sites in the ocean could increase acidity and cause the mortality of ocean organisms.
- *Will physical leakage of stored carbon compromise CCS as a climate change mitigation option?*
  For well-selected, designed and managed geological storage sites, the vast majority of the carbon will be immobilised over time and could be retained for millions of years, and for hundreds of years in the ocean. With non-permanent storage options, the studies imply that CCS is only an acceptable measure if there is an upper limit on the amount of leakage allowed.
- *What are the legal and regulation issues for implementing carbon storage?*
  The process and impacts of CCS may be managed under mining, oil and gas, pollution control, waste disposal, drinking water, treatment of high-pressure gases and subsurface property rights law.
- *What are the implications of CCS for emissions inventories and accounting?*
  The IPCC guidelines on inventories and accounting do not yet provide specific methods for estimating emissions associated with CCS. These are expected to be provided in the 2006 guidelines.

[4] Available at <http://www.ipcc.ch/activity/ccsspm.pdf> (accessed 16 October 2005).

- *What are the gaps in knowledge?*
  The IPCC recognises that there are gaps in knowledge regarding CCS and the uncertainties will be reduced with increasing knowledge and experience.

7.1.5 Industry responses to *Securing Australia's Energy Future*

There have been mixed reactions to the Federal government's new energy policy. As may be expected the industry groups which depend on the use of fossil fuels, or which benefit in some other way, are supportive of the policy. The National Association of Forest Industries welcomed the release of the policy and reiterated the importance of biomass as a renewable form of energy. The Australia Petroleum Industry stated that the policy stresses the importance of competition, investment and technology in maintaining high levels of supply reliability at a reasonable cost to the consumer, while meeting community expectations on environmental performance. The Energy Supply Association of Australia welcomed the greenhouse gas abatement aspects of the policy especially the Low Emissions Technology Development Fund which is open to the fossil fuel and renewable energy sectors. The Business Council of Australia, which has been opposed to ratification of the Kyoto Protocol, believes that the policy strikes an appropriate balance between Australia's energy needs and protecting Australian jobs and welfare.

By distinction there was considerable disappointment from the renewable energy industry and various political parties. Pacific Hydro, Australia's leading renewable energy company, is disappointed that the government has not increased the MRET and states that the government should not be subsidising the coal industry to 'clean up its act'. The Australian Business Council for Sustainable Energy (BCSE) described the policy as 'Black to the Future' which fails to increase the MRET, makes diesel fuel cheaper and undermines solar for powering remote communities, and also lacks mandated minimum energy performance standards. The Australian Democrats described the policy as a massive handout to the fossil fuel industry especially considering the $1.5 billion rollback of the excise tax on diesel. The Democrats have expressed their disappointment at the failure of the government to increase the MRET. The Victorian government, meanwhile, described the policy as a 'dud' stating that the government should expand MRET, encourage energy efficiency measures, establish an emissions trading scheme and ratify the Kyoto Protocol.

7.1.6 Senate Environment, Communication, Information Technology and the Arts References Committee responds to *Securing Australia's Energy Future*

In May 2005, the Senate Environment, Communication, Information Technology and the Arts References Committee published *Lurching forward, looking back* – its review of the budgetary and environmental implications of the government's Energy White Paper (EWP). The Committee received submissions from a number

of government departments, organisations and individuals and held three public hearings in Canberra. The Committee expressed a number of concerns about the EWP and has made the following recommendations:

- That the government, in consultation with energy interest groups and the energy industry, develop CO_2 emission reduction targets for the years 2010, 2020 and 2030 resulting in ultimate reductions of at least 60% by 2050
- That projects seeking funding through the Low Emissions Technology Development Fund (LETDF) should be subject to abatement time frames and stricter abatement targets
- That the government recognise the inherent difficulties associated with geosequestration and: ensure that a greater proportion of the LETDF be made available to technologies that reduce emissions in the short term; fund only cost- and abatement-effective R&D on the basis of the polluter pays principle; and extend the Life of the LETDF to cover the time frame of reducing emissions by 60% by 2050
- That the government provide incentives to encourage national energy efficiency initiatives by adopting programs like the NSW BASIX scheme
- That the Photovoltaic Rebate Program receive continued funding and that targets be set for the installation of stand alone (RAPS) Photovoltaic (PV) energy systems and for grid-connected PV energy systems
- That the government review the MRET and set the target at 5% by 2010, 10% by 2020 and 50% by 2050 or else provide infrastructure grants for renewable energy development
- That the government drop the proposed reductions in excise on diesel and petrol in the EWP (for fear that these encourage use and waste), unless the decision to impose excise on biofuels and gaseous fuels by 2012 is reversed
- That stronger market incentives to invest in energy efficiencies be given within a comprehensive policy framework, which also mandates standards for CO_2 abatement in accordance with specific, quantifiable and meaningful targets
- That the government review its own activities with respect to energy efficiency and CO_2 abatement before 2010
- That the government either introduce or support the States' effort to establish a carbon trading scheme to achieve a reduction of 60% in emissions by 2050
- That the government consider a carbon tax as a tool to reduce emissions in the industrial sector.

The members of the government on the Senate Committee rejected these recommendations.

7.1.7 Summary and comment

The Australian government remains committed to fossil fuels, including coal, diesel and petroleum. Funding for low-emissions technology is likely to be

devoted primarily to geosequestration, rather than the renewable energy industry. Indeed, already the renewable energy industry has expressed its disappointment with the White Paper, especially with respect to the government's failure to increase the MRET target. Any mention in the White Paper of the Greenhouse Challenge, the GGAP and RRG programs, already administered by the Australian Greenhouse Office (AGO), should be regarded in light of their rather serious shortcomings identified by the Commonwealth Auditor-General in 2005. However, the government is to be commended for its $75 million funding for the Solar Cities trials, as well as the various other energy efficiency measures mentioned. The fuel quality program is also likely to improve air quality in Australian cities.

To date, none of the recommendations of the MRET review have been accepted or adopted by the Australian government.

7.2 Inspiration for a sustainable energy framework from overseas jurisdictions

7.2.1 Energy and carbon taxes

It is generally agreed among economists that social welfare can be improved by imposing a tax on a good where the production or the consumption of the good results in negative externalities.[5] Many Scandinavian countries have used energy and carbon taxes to limit the negative externalities stemming from the use of fossil fuels. These have included taxes on the energy content of the energy source; carbon taxes based on the carbon content of the fuel, sulphur and nitrogen taxes on the sulphur dioxide and nitrous oxide content of the fuels, as well as an excise on electricity production and consumption. Estimations of the impact of these taxes indicate decreases in carbon dioxide of between 3% and 15%.[6] Carbon taxes have not been used more widely, however, due to a fear that they might reduce national competitiveness through increasing costs to industry. Other policy and legal measures, described below, have been favoured.[7]

7.2.2 Clean Energy tax incentives

In the United States, the *Maryland Clean Energy Incentive Act 2000* offers a set of tax incentives for energy efficiency and renewable energy products and services

[5] Paul Ekins and Terry Barker, 'Carbon Taxes and Carbon Emissions Trading' (2001) 15 *Journal of Economic Surveys* 325 at 328.
[6] See Jarmo Vehmas, Jari Kaivo-oja, Jurki Luukkanen and Pentti Malaska, 'Environmental taxes on fuels and electricity – some experiences from the Nordic countries' (1999) 27 *Energy Policy* 343 at 345, who indicate reductions in greenhouse gases of 3–4% in Norway, 4.7% in Denmark, 1.5% in the Netherlands, 15% in Sweden (including investment support for renewables), 4–5% in Finland. See also Anwar Y Al-Abdullah, 'The Carbon-tax Debate' (1999) 64 *Applied Energy* 3; Ekins and Barker, 'Carbon Taxes'; Andrea Baranzini, Jose Goldemberg and Stefan Speck 'A future for carbon taxes' (2000) 32 *Ecological Economics* 395.
[7] Vehmas et al, 'Environmental taxes', at 346.

to Maryland residents and businesses. These include sales tax exemptions for purchases of a wide range of Energy Star® household appliances that meet specific energy efficiency guidelines. Excise tax reductions apply to electric and hybrid-electric vehicles, while income tax credits of 15% of the installed cost of a solar or photovoltaic system apply. Credits are also awarded for using biomass fuel, such as cellulosic byproducts, wood trimmings, and chicken guano, to produce electricity. In an innovative measure, to promote purchases of Energy Star® appliances, the Maryland Energy Administration (MEA) works with the Comptroller's Office to inform retailers of the tax exemption through mailings and the Comptroller's monthly newsletter to retailers.

Energy incentives written into tax legislation are, in the authors' view, a preferable mechanism for directing consumer behaviour than schemes like the Federal government's Photovoltaic Rebate Program (PVRP). As mentioned in Chapter 4, the PVRP simply encourages the long-term use of photovoltaic technology by granting subsidies for the use of solar hot water systems.[8]

7.2.3 National market-oriented emissions reductions schemes for the electricity sector

A market-oriented emissions reductions scheme is precisely the type of scheme introduced by the *Electricity Supply Amendment (Greenhouse Gas Emission Reduction) Act 2003* (NSW). The difficulty with this scheme is that it does not apply nationally. By distinction, the Danish government has introduced a national scheme under the *Act 376 on CO2 Quotas for Electricity Production* which came into force on 15 July 2000.[9] The scheme lays down a quota of 23 million tonnes of CO_2 in 2000 for electricity, which represents a radical reduction of 24% on 1994–98 levels. It is binding on producers of electricity, as opposed to retailers under the NSW scheme. Emissions allowances are allocated to existing electricity producers according to their historical emissions,[10] and are traded as the need arises.

Such a scheme is regarded as providing a theoretically optimum means of internalising environmental costs in a competitive electricity market. The reason for this is that all liable parties in the competitive market, be they electricity retailers or generators, face the same requirement for reducing the greenhouse gas content of their energy supply. Competition is created when liable parties determine the most cost-effective means of reducing their greenhouse gas emissions. Such means will include advocating the most appropriate emissions reduction strategies to household and industrial users of electricity. Market-oriented

[8] See *Senate Hansard*, 11 February 2003, at 224.
[9] See <http://www.ens.dk/sw1086.asp> (accessed 6 March 2003); see also Sigurd Lauge Pedersen, 'The Danish Emissions Trading System' (2000) 9(3) *RECIEL* 223; Ekins and Barker, 'Carbon Taxes'.
[10] See Pedersen, 'The Danish Emissions Trading System', at 227.

emissions reductions schemes thus provide market-based drivers for the development of energy sources that are less greenhouse intensive. They also produce price signals that encourage an optimal mix of greenhouse sensitive energy services at the lowest cost to consumers.[11]

7.2.4 Participation in international or national emissions trading schemes

Ratification of the Kyoto Protocol would allow Australia to meet its target through an international emissions trading scheme,[12] which would present Australia with a low-cost abatement option.[13] However, as noted in Chapter 4 the Federal government is not pursuing this option. The State governments have yet to finalise arrangements for an inter-jurisdictional emissions scheme.[14] Overseas experience shows that domestic and regional emissions trading schemes may be developed in advance of an international emissions scheme under the Kyoto Protocol.

For example, the European Parliament voted in October 2002 to establish an ambitious new scheme for trading greenhouse gas emission rights throughout the EU. The scheme is mandatory but includes a proviso that Member States should have limited rights to exempt individual installations as appropriate. For the period 2005–12, 15% of the permits will be sold and the rest allocated free under a grandfathering system. A cap will be placed on the number of permits issued to each Member State. The Parliament has agreed that the EU will only recognise third countries' trading schemes if they are subject to the Protocol. Member States will not be allowed to use credits earned from projects that involve carbon sinks or nuclear energy sources.[15]

7.2.5 Will we ever have a domestic carbon emissions trading scheme in Australia and what might it look like?

Some of the groundwork for an inter-jurisdictional trading scheme in Australia has already been completed. In response to a request for input, the AGO prepared a report *Pathways and Policies* which provides a comprehensive consideration of design issues and approach for a national emissions trading system:

[11] See David Mills, 'Reducing Greenhouse Gas Emission Through Electricity Industry Reform: A Market-Oriented Emissions Reduction Scheme' (2000) 12 *World Resources Review* 58 at 72.
[12] See also Jennifer Yelin-Kefer, 'Warming up to an International Greenhouse Gas Market: Lessons from the US Acid Rain Experience' (2001) 20 *Stanford Environmental Law Journal* 221.
[13] GDP is likely to be 0.11% ($875m) per year lower than business as usual in the first commitment period but without ratifying GDP is likely to be 0.26% ($2b) lower; see generally NSW Cabinet Office, *Report of the Kyoto Protocol Ratification Advisory Group: A Risk Assessment*, 2003.
[14] See also the discussion in next section.
[15] See <www.europarl.eu:int/press/index_publi_en.htm> (accessed 11 March 2003).

- combustion related and other readily estimated and attributed emissions (such as gas leakage from gas pipelines and emissions from chemically stable manufacturing processes), covering around 65% to 70% of Australia's emissions output, would represent the foundation for a simple, workable and efficient trading system
- simple phasing options that promote flexibility and adjustment within the economy while delivering a modest and consistent emission price that would contribute to national greenhouse objectives
- there is likely to be a need for supplementary measures that:
  - address market impediments
  - promote incentives for abatement and innovation
- once accepted, an emissions trading system could be introduced within 2.5 to 3 years
- a possible approach to permit allocation could be as follows:
  - a 'tailored' approach to permit allocation, possibly involving a process of intensive analysis and negotiation, could be adopted for large individual players with a high greenhouse exposure and few opportunities to absorb or pass on costs
  - for less affected entities, a more generic allocation may be appropriate – such as a permit auctioning arrangement with revenue recycled through adjustment assistance or tax relief
- recent modelling analysis commissioned by the Commonwealth suggests that the carbon price of a domestic system would be comparable with an international carbon price in the range of $7–13 per tonne of carbon dioxide for the 2008–12 period
- possible features to help trade exposed industries on a path towards lower greenhouse emissions without threatening their competitiveness are as follows:
  - subsidising affected industries to restore their trade competitiveness
  - exempting affected industries from carbon costs in line with their trade exposure
  - making a permit allocation to affected industries to compensate them for additional competitive pressures
- (for imports) implementing border adjustment arrangements aimed at providing equivalent carbon treatment for imports from countries not subject to agreed carbon constraints.

7.2.6 Effective Renewable Portfolio Standards

A Renewable Portfolio Standard (RPS) is the type of measure introduced by the *Renewable Energy (Electricity) Act 2000* (Cth). As is clear from the Act, an RPS scheme typically requires retailers to purchase a proportion of their electricity from renewable energy sources. Renewable energy credits (RECs) are

created which may then be traded between those retailers which have difficulty in meeting their legal obligations, and those which have the capacity to produce excess credits.[16] RPSs are a common measure for promoting the commercialisation of renewable energy. The standard set in various countries is as follows: the Netherlands – 10% by 2020,[17] Denmark – 20% by 2010,[18] the United States – 10% by 2019,[19] and the United Kingdom – 10.4% by 2010.[20]

Despite the popularity of an RPS, the real question is whether or not an RPS scheme is consistent with a competitive electricity market. The reason that it is favoured by regulators is that, by creating a tradeable market in RECs, it seems to require a minimal amount of government interference, and this is consistent with the economic theory underlying a restructured market. However, it is arguable that an RPS is not administratively simple. One has only to consider the role of the Renewable Energy Regulator under the *Renewable Energy (Electricity) Act 2000* (Cth) to realise that the Regulator's task in verifying RECs, ensuring compliance with the scheme and assessing penalties for breach of the Act is quite complex.[21]

Also there is a legitimate debate about whether an RPS is competitively neutral when existing renewables are considered. Those utilities with an existing high level of renewables will be less severely impacted by an RPS than others.[22] In fact suppliers with excess renewable energy credits may see rate reductions as they sell their excess credits to other suppliers, whose rates increase. If competitive neutrality is a concern, it may be possible to limit the RPS to new renewable energy generation.[23]

Others note that the system gives renewable energy technologies an unfair market advantage in that customers and the market should select the types of electricity that are used, rather than being forced to select one source over another.[24]

[16] See generally Tim Woolf and Bruce Biewald, 'Efficiency, Renewables and Gas: Restructuring as if Climate Mattered' (1998) January/February *The Electricity Journal* 64; Karen Palmer, *Electricity Restructuring: Shortcut or Detour on the Road to Achieving Greenhouse Gas Reductions?*, Resources for the Future, 1999; Sebastian Crawford and Jeff Angel, *Green or Black? Renewable Energy Policy in Australia*, Total Environment Centre, Sydney, 2002; Steven L Clemmer, Alan Nogee, Michael C Brower, Paul Jefferiss, *A Powerful Opportunity: Making Renewable Electricity the Standard*, Union of Concerned Scientists Publications, Cambridge, 1999; Mills, 'Reducing Greenhouse Gas Emission'; Annex I, Expert Group on the United Nations Framework Convention on Climate Change, *Penetration of Renewable Energy in the Electricity Sector: Working Paper No 15* (Organisation for Economic Co-operation and Development: 1998) at 20; Ryan Wise, Steven Pickle, Charles Goldman, 'Renewable energy policy and electricity restructuring: A California case study' (1998) 26 *Energy Policy* 465; Simone Espey, 'Renewable portfolio standard: a means for trade with electricity from renewable energy sources' (2001) 29 *Energy Policy* 557.

[17] *Dutch Electricity Act 1998*.

[18] *Energy 21*; see also Jens Hauch, 'The Danish Electricity reform' (2001) 29 *Energy Policy* 509–21.

[19] *Energy Policy Act 2002*.

[20] The Renewables Obligation Order 2002 No. 914 made under the *Utilities Act 2000* (UK); for a detailed discussion of the scheme, see also Adrian Bradbrook and Alexandra S Wawryk, 'Government Initiatives Promoting Renewable Energy for Electricity Generation in Australia' (2002) 25(1) *UNSW Law Journal* 124 at 142–4.

[21] *Renewable Energy (Electricity) Act 2000* (Cth) ss 11–16, 41, 48–50, 52, 58–59, 69, 71–73, 102–105, 135–141; see also Wise et al, 'Renewable energy policy', at 471.

[22] This has certainly been a concern in the Australian context where existing hydro-electricity generators were able to surrender the highest number of RECs in the first year of the operation of the *Renewable Energy (Electricity) Act 2000* (Cth); see Bradbrook and Wawryk 'Government Initiatives', at 150.

[23] Wise et al, 'Renewable energy policy', at 472.

[24] See Bradbrook and Warwyk, 'Government Initiatives', at 133.

7.2.7 Systems-benefits charge/public benefit funds

A systems-benefits charge (SBC) is used to collect funds from customers to support various public benefit policies, including renewable energy programs. Under most SBC schemes, a volumetric fee is imposed on the use of electricity which is intended to be non-bypassable and competitively neutral.[25] The funds derived from SBCs are often used to support the development of higher-cost emerging technologies, research and development, consumer education, green marketing and manufacturing incentives. As such they are likely to play a critical role in supporting emerging technologies.[26] Bradbrook and Wawryk point to the California Public Utilities Code, as amended by the *Assembly Bill 1890 of 1996*,[27] as a good example of a SBC. Under that large, privately owned utilities are required to collect revenue based on a rate of 0.37% to 0.45% per kW charged to customers. They report that US$540 million has been collected over 4 years to be spent on renewable energy technologies, and that the scheme has been extended to 2012.[28]

The establishment of a fund under the *Energy Administration Amendment (Water and Energy Savings) 2005* (NSW) described in Chapter 6 to develop energy efficiency programs is a good example of a public benefit fund.

7.2.8 Demand-side management programs

As mentioned in Chapter 6, demand-side management (DSM) refers to technologies, products and programs that involve deliberately reducing buyer demand for electricity by substituting conservation on-site for fuel use. DSM programs cover a variety of policies under which utilities have been directed to subsidise or otherwise encourage customers to install appliances that use less electricity to perform their functions. This will conserve fossil fuels, limit the environmental externalities caused by their use, and limit the need to build new power plants.[29]

It is the authors' view that legally binding energy efficiency standards are an important mechanism for overcoming the market barriers that block cost-effective energy savings, including lack of awareness and uninformed consumers.[30] This view is reinforced by the fact that there have been recent initiatives in Australia to set national energy efficiency standards.[31] For example, the National Appliance and Equipment and Energy Efficiency Committee (NAEEEC), consisting of representatives from Commonwealth, State, Territory and New Zealand governments, has set Minimum Energy Performance Standards, requiring the labelling of household appliances.[32] The Standards must be implemented

[25] See Wise et al, 'Renewable energy policy', at 468. [26] Ibid.
[27] Cal Stat ch 854 (1996). [28] Bradbrook and Wawryk, 'Government Initiatives', at 136–7.
[29] See Timothy J Brennan, *Demand-side Management Programs Under Retail Electricity Competition*, Resources for the Future, Washington D.C., 1998.
[30] Ibid at 22. [31] See Chapter 6.
[32] See <http://www.greenhouse.gov.au/energyefficiency/appliances/naeeec/index.html> (accessed 6 March 2003). Note that there the addition of more appliances to this standard has been recommended

at the State level.[33] This brings Australia in line with other jurisdictions like the USA, where the *National Appliance Energy Conservation Act of 1987* establishes standards for a dozen appliances.

7.2.9 Mandatory labelling of consumer bills

There is strong support in the literature[34] for legally requiring retailers and wholesalers to disclose the fuel mix and the CO_2, NOx and SO_2 emissions associated with electricity generation in a standard format on customer bills. As electricity markets open to competition, retail consumers are increasingly gaining the ability to choose their electricity suppliers. It is crucial in a contestable market that consumers have access to information about the price, source, and environmental characteristics of their electricity. As at August 2002, more than 20 States in the United States have environmental disclosure policies in place, which legally require electricity suppliers to provide information on fuel sources and, in some cases, emissions associated with electricity generation.[35]

Such a measure was proposed at the time that provisions of the *Renewable Energy (Electricity) Act 2000* (Cth) were being debated. It was ultimately rejected by the Federal government. The authors believe that it is a mechanism which is consistent with the establishment of a contestable retail electricity market and that it should be written into legislation at the Federal and State levels in Australia. Not only would it inform customers about the sources of energy but it would go towards counteracting one of the principal barriers to DSM, mentioned above, which is the lack of consumer awareness.[36]

7.2.10 'Feed laws'

Consistent with assessing various options for internalising the externalities of a restructured electricity industry, it is important to also consider whether Australia should adopt 'feed laws'. There have certainly been calls for the adoption

under the *National Appliance and Equipment Energy Efficiency Program; Work Plan and Project for 2002–2004* available at <http://www.isr.gov.au/library/content_library/NAEEEP.pdf> (accessed 6 March 2003).

[33] In New South Wales, for example, they are implemented under the *Electricity Safety Act 1945* (NSW) and the Electricity Safety (Equipment Efficiency) Regulation 1999.

[34] See Dallas Burtraw, Karen Palmer, and Martin Heintzelman, *Electricity Restructuring: Consequences and Opportunities for the Environment*, Resources for the Future, Washington D.C., 2000, 2–4; Rudy Perkins, 'Energy Deregulation, Environmental Externalities and the Limitations of Price' (1998) 39 *Boston College Law Review* 993 at 1037; John B Gaffney, 'What Blight Through Yonder Window Breaks?: A Survey of the Environmental Implications of Electricity Utility Deregulation in Connecticut' (2000) 32 *Connecticut Law Review* 1443 at 1457; Michael Kantro, 'What States can Glean from the Environmental Consequences of Deregulating Electricity in California' (2000) 25 *William and Mary Environmental Law and Policy Review* 533 at 543; Mark Diesendorf, 'How can a "competitive" market for electricity be made compatible with the reduction of greenhouse gas emissions' (1996) 17 *Ecological Economics* 33 at 43; Crawford and Angel, *Green or Black?*, at 7; Mills, 'Reducing Greenhouse Gas Emission', 9.

[35] For a full discussion of these measures see <http://www.eere.energy.gov/greenpower/disclosure.shtml> (accessed 6 March 2003).

[36] Note that the Victorian Minister for Environment and Water announced that electricity retailers are required to disclose to customers the amount of greenhouse gas that is being emitted as a result of their electricity consumption. The information is detailed on the bill as a graph; Media Release, Australian Labor Party Victorian Branch, 23 January 2003.

of such laws to overcome barriers to grid access within the National Electricity Market.[37] These laws have been adopted in Germany, Denmark and Spain, whereby an electricity utility is obliged to let independent producers of renewable power 'feed' their electricity into the grid against a guaranteed payment of a certain fee. In these three European countries, national legislation has been adopted to implement the scheme. Espey claims that '[i]t is owing exclusively to the national legislation of these three countries that the European Union witnessed the emergence of a wind turbine manufacturing industry which offers cutting-edge technology in the world market today'.[38] Based on this experience, it may be wrong to assume that the introduction of minimum price systems hampers productivity. The 'feed laws' have stimulated an efficient industry with considerable export opportunities, which has created jobs for over 20,000 people in Germany alone.[39]

The German feed laws operate under the *Act on Feeding into the Grid Electricity Generated from Renewable Energy Sources* (Electricity Feed Law; *Stromeinspeisungsgesetz für Erneuerbare Energien 1991*) as well as the *Renewable Energy Sources Act 2000* (Germany) (*Gesetz für den Vorrang Erneuerbarer Energien (Erneuerbare-Energien-Gesetz)*). The Electricity Feed Law regulated the purchase and price of electricity generated exclusively from hydropower, wind energy, solar energy, landfill gas, sewage gas or biomass by public electricity utilities.[40] Electricity utilities were obliged to purchase the electricity generated from renewable energies in their supply area and to pay for the electricity fed into the system.[41] However, the compensation rates stipulated under the Law were not sufficient to stimulate a large-scale market introduction of electricity generated from sources other than wind and hydro, especially photovoltaic cells and biomass. For this reason, the compensation rates have been modified in the *Renewable Energy Sources Act*, which replaces the Electricity Feed Law, in order to promote large-scale generation of electricity from all kinds of renewable energy sources.[42] The Act also equalises the costs for paying the rates among all transmission grid operators.

The purpose of the *Renewable Energy Sources Act 2000* (RESA) is to facilitate the sustainable development of energy supply in the interest of managing global warming and protecting the environment. It is also to achieve a substantial increase in the percentage contribution made by renewable energy sources to power supply, in order to at least double the share of renewable energy sources in total energy consumption by the year 2010.[43] RESA deals with the purchase of and the compensation to be paid for electricity generated exclusively from various renewable energy sources by utility companies which operate grids for public power supply (grid operators).[44] The different compensation rates[45] to

[37] See Crawford and Angel, *Green or Black?*, at 10. [38] Espey, 'Renewable Portfolio Standard', at 559.
[39] Ibid. [40] *Stromeinspeisungsgesetz für Erneuerbare Energien 1991*, s 1. [41] Ibid s 2.
[42] Note that the German Bundestag and the German Federal government have had to counter claims that the *Renewable Energy Sources Act* constitutes 'state aid' granted by a Member State or through state resources as defined in Article 87 of the *Treaty Establishing the European Community*.
[43] *Renewable Energy Sources Act 2000* s 1. [44] Ibid s 2 [45] Ibid ss 5–9.

be paid to the generators of different types of renewable energy, specified in the RESA, have been determined by means of scientific studies.[46] The purpose of this pricing regime is to bring renewable energy sources closer to conventional energy sources in terms of their competitiveness. The compensation rates will decline over time and remain in effect for a limited period of time. The fact that the rates will be reviewed every 2 years guarantees that they will be updated continuously and at short intervals to reflect market and cost trends.[47] The costs associated with connecting the electricity derived from renewable energy sources to the technically and economically most suitable grid connecting point are borne by the renewable energy generators.[48] Transmission grid operators are obliged to record any differences in the amount of energy purchased and compensation payments and to equalise such differences among themselves.[49]

7.3 Other international, national or State law reform measures

7.3.1 International law

As discussed in Chapter 3, in relation to issues of sustainable development concerning energy, the current state of international law is clearly unsatisfactory. There is no comprehensive international law regime designed to promote sustainable development in this context. There are simply miscellaneous provisions in the Energy Charter Treaty[50] and its accompanying Protocol on Energy Efficiency and Other Related Matters,[51] the Kyoto Protocol to the United Nations Convention on Climate Change,[52] and the Johannesburg Declaration on Sustainable Development.[53] In spite of the increased global concerns about greater environmental protection and greater integration of environmental concerns into the energy sector and economic decision-making, and in spite of a considerable potential for international consensus on global policy guidelines in this field, no universal 'code of conduct', 'guideline', 'action plan' or other form of soft law has yet been established, let alone a convention or protocol agreed upon.

Energy is clearly an area of international law that is likely to see further development in the near future. The advancement of the international law regime in this area is on the agenda for discussion at the 14th Session of the Commission on

[46] See Explanatory Memorandum. [47] Ibid. [48] *Renewable Energy Sources Act 2000* s 10(1).
[49] Ibid s 11(1). How this works is that by 31 March of each year, the transmission grid operators must determine the amount of energy purchased in accordance with the Act and the percentage share which this amount represents, relative to the overall amount of energy delivered to final consumers either directly by the operator or indirectly via downstream grids. If transmission grid operators have purchased more energy than this average share, they are entitled to sell energy to and receive compensation from the other transmission grid operators, until these other grid operators have purchased a volume of energy which is equal to the average share mentioned above (s 11(2)).
[50] (1995) 34 ILM 360. [51] (1995) 34 ILM 446.
[52] (1998) 37 ILM 22; UN Doc FCCC/CP/1997/L.7/Add.1.
[53] See <www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/POI_PD.htm> (accessed 28 July 2005).

Sustainable Development in 2006–07. Ideas will shortly be put forward within the United Nations system for consideration for inclusion on the agenda.

What is required is a further international law instrument specifically devoted to promoting sustainable development in the international context. This instrument could take the form of either a soft law, non-binding United Nations General Assembly Declaration or a new binding convention or protocol. In light of the highly contentious nature of energy in the international sphere and the difficulty of achieving agreement in this area at the Rio Summit in 1992 and the Johannesburg Summit in 2002, the most obvious means of progressing the energy issue would be by way of a Declaration. While conventions and protocols form the core of binding international law, the world community has always recognised the value of achieving consensus in the formulation of non-binding principles and universal policy guidelines through which policy issues of international concern can be addressed.[54] This approach has been adopted in recent years in other parallel contexts as the preferred solution. Perhaps the best example is the Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests, agreed to at the UNCED conference in 1992.[55] Such documents have been drafted informally by non-governmental organisations and others in the energy context,[56] but have to date been largely ignored. On the other hand, a binding document can be justified because of the urgency of the climate change problem and because of the overwhelming importance of the energy issue to its resolution. If a hard law approach is preferred, rather than adopting a new convention, it would be possible to introduce a new protocol to the United Nations Convention on Climate Change.

The authors include in this book, as Appendix A and Appendix B respectively, a draft of a possible model Declaration and Protocol on Energy Efficiency and Renewable Energy that could serve as a starting point for debate on the provisions that should be included in any new international law instrument.[57]

7.3.2 National or State law

As can be seen in the earlier chapters, in Australia the current legislation designed to support sustainable development in the energy context consists of a mixture of

[54] The use of such principles and guidelines has its origin in 1948 in the Universal Declaration of Human Rights (UNGA Res 217A (III); UN Doc A/810), probably the best-known and most frequently cited soft law document.

[55] (1992) 31 ILM 881.

[56] See, for example, the Global Energy Charter for Sustainable Energy Development, prepared by the World Sustainable Energy Coalition (Switzerland) at the 1st Clean Energy Conference, Geneva, November 1991. This Charter is discussed in A J Bradbrook, 'Environmental Aspects of Energy Law – New Means of Achieving Reform' (1993) 10 *Environmental and Planning LJ* 185.

[57] Appendix A is a modified version of an earlier draft soft law instrument discussed in A J Bradbrook and R D Wahnschafft, 'A Statement of Principles for a Global Consensus on Sustainable Energy Production and Consumption' (2001) 19 *Journal of Energy & Natural Resources Law* 143. Appendix B is a modified version of an earlier draft of a binding international instrument discussed in A J Bradbrook, 'The Development of a Protocol on Energy Efficiency and Renewable Energy to the United Nations Framework Convention on Climate Change' (2001) 5 *New Zealand Journal of Environmental Law* 55.

State and Commonwealth laws, with no overarching statute, but rather a piecemeal approach. In this regard Australia lags significantly behind many other countries in the Asia-Pacific region. Comprehensive national legislation has recently been introduced in China. China's *Renewable Energy Law*, enacted in 2004,[58] contains eight separate chapters, of which the most important are: a survey of renewable resources and a development plan (chapter 2), industry guidance and technology support (chapter 3), promotion and application of renewable resources (chapter 4), price management and fee sharing (chapter 5), economic incentives and supervisory measures (chapter 6) and legal responsibilities (chapter 7). Comprehensive legislation in this field also exists in the Russian Federation (*The Federal Law on Energy Saving 1996*), Thailand (*National Energy Conservation Promotion Act 1992*),[59] Uzbekistan (*Law on the Rational Use of Energy 1997*), Republic of Korea (*Rational Energy Utilization Act 1995* (as amended)),[60] and Japan (*Law Concerning the Rational Use of Energy 1979* and Enforcement Ordinance for the Law Concerning the Rational Use of Energy 1984 and 1993).[61]

It is sometimes argued that the Commonwealth government lacks the ability to introduce similar, comprehensive legislation as a result of the fact that there is no specific head of power given to the Commonwealth in relation to energy issues under s 51 of the Constitution. However, as already mentioned, a strong argument can be made that comprehensive national legislation in relation to sustainable development and energy can be justified by the trade and commerce power (s 51(i)), the corporations power (s 51 (xx)), and the treaties power (s 51 (xxix)). A similar argument has been used in relation to the restructuring of the electricity industry.[62] The authors believe that the Commonwealth should use its constitutional powers to a maximum in this area as there is no justification for having different laws in the States and the Territories in relation to sustainable development issues. The only alternative is to negotiate uniform State legislation. While the States and Territories have already cooperated in this regard in relation to the legislation concerning the restructuring of the electricity industry,[63] and also now in the proposed establishment of an inter-jurisdictional trading scheme, the authors regard this as a second-best arrangement.

Whether in future there is simply Commonwealth legislation in this field or a combination of Commonwealth and State laws, it is clear that in order to introduce an adequate system of controls and incentives to encourage sustainable development in energy, a range of legislative measures will be required rather than simply one or two key reforms. The law should mandate minimum

[58] The official English language version is available at <www.renewableenergyaccess.com/assets/download/China_RE_Law_05.doc> (accessed 28 July 2005).
[59] B. E. 2535 (1992).
[60] Act No 4891, Jan 5 1995; amended by Act No 5230 (December 30 1996) and Act No 5351 (August 22 1997).
[61] English-language versions of these laws are cited in full in United Nations Economic and Social Commission for Asia and the Pacific, *Energy Efficiency: Compendium of Energy Conservation Legislation in Countries of the Asia and Pacific Region*, United Nations, New York, 1999, Part Four. See also R Ottinger, N Robinson and V Tafur (eds), *Compendium of Sustainable Energy Laws*, Cambridge University Press, New York, 2005.
[62] See A J Bradbrook and A S Wawryk, 'Constitutional Implications of the Restructuring of the Australian Electricity Industry' (1996) 3 *Australasian J Natural Resources L & Policy* 239.
[63] See Chapter 5 generally.

environmental improvements and encourage manufacturers and producers to go beyond the minimum. This necessitates a use of regulation, fiscal incentives and educative measures.

The actual content of future legislative reforms will depend in large measure on the likely future mix of renewable energy resources in Australia. On this point, the opinions of commentators naturally differ. In the authors' opinion, the most likely mix will involve the increased use of cost-effective renewable energy options (particularly wind energy, solar energy, geothermal energy, biomass and (in the long term) hydrogen), the increased use of energy efficiency and clean coal technologies. The authors believe that in light of environmental objections no more large-scale hydro-electric developments are likely to occur in Australia, and that there is considerable uncertainty about whether nuclear energy will ever form part of Australia's energy mix. Although nuclear energy has become increasingly newsworthy recently as a possible means of increasing energy supply without increasing atmospheric carbon emissions, the costs of development of this technology are enormous and the electricity markets in Australia are not sufficiently large to make the introduction of nuclear energy profitable in Australia. On this probable scenario, the legislative reforms listed following will be required.

7.3.2.1 Solar energy

The major issue here to be addressed is the need to guarantee access to the direct solar rays for solar panels.[64] To put the matter simply: why would a property owner purchase and install a solar device if at any time the effectiveness of the device could be compromised by the erection by a neighbour of a building or a tree which would shade the solar panels during the middle of the day? This problem was officially recognised in Australia nearly 30 years ago but has still not been adequately addressed. In 1977 the Senate Standing Committee on Natural Resources stated in its Report on Solar Energy:[65]

> The Committee considers there is a need for the Commonwealth and State Authorities to investigate the need for legislation to define the solar rights, right to solar energy or sunshine rights of individual property owners and the implications for current town planning and building regulations. The need for such legislation arises because with every solar installation the nature and position of structures such as walls, fences, roofs of adjacent buildings and trees can affect the performance of the solar installations. This is a matter for State concern.

While in some States (particularly New South Wales) some local councils have been proactive in encouraging the use of solar devices through the use of their

[64] See A J Bradbrook, 'Australian and American Perspectives on the Protection of Solar and Wind Access' (1988) 28 *Natural Resources J* 229; A J Bradbrook, *Solar Energy and the Law*, Law Book Co, Sydney, 1984. See also Chapter 2 above.

[65] Senate Standing Committee on Natural Resources, Report on Solar Energy (1977), at 83–4.

delegated powers, the approach has been piecemeal and on an ad hoc basis.[66] More comprehensive and consistent legislation is required.

Legislation is also required to ensure that all existing legal barriers to the use of solar energy devices are abolished. Past studies have shown that such barriers may include restrictive covenants as to the type of authorised building materials, building regulations and health and safety laws.[67] In all cases such barriers were originally established for other objectives and purposes but have the effect of catching solar devices within their scope unintentionally.

7.3.2.2 Wind energy

The issue of wind energy development has proved to be controversial in recent years. While environmentalists approve of the resource in light of its relative absence of all forms of pollution, its visual impact on open areas, particularly in coastal regions, has aroused a lot of local opposition. It is unfortunate that because of the need to maximise the wind resource to each generator, wind farms usually have to be located in prominent positions in order to attract the wind of greatest velocity.

To date the battle has been re-fought in numerous different localities where wind farms have been proposed, and each case has turned on individual circumstances and the terms of local planning controls. The greatest degree of market penetration of wind energy to date has occurred in Victoria and South Australia, where the development assessment and approval procedure is controlled by the terms of the *Planning and Environment Act 1987* (Vic) and *Development Act 1993* (SA), respectively, together with the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). The processes have been analysed and explained by Dr Alex Wawryk in two recent articles.[68]

7.3.2.3 Geothermal energy

In terms of the methods and processes for exploration and development, geothermal energy closely resembles oil and gas. Both are high-risk activities requiring very large sums of private investment. However, whereas the exploration and development of oil and gas, both onshore and offshore, has long been subject to comprehensive legislation in Australia establishing a comprehensive legal management that provides legal certainty to developers, such legislation has not been enacted in relation to geothermal resources. This is perhaps the reason why historically so little development has occurred in relation to this resource.

[66] For a detailed discussion of the position in New South Wales, see J Goudkamp, 'Securing Access to Sunlight: The Role of Planning Law in New South Wales' (2004) 9 *Australasian J Natural Resources L & Policy* 59.
[67] See, for example, A J Bradbrook, 'The Role of Restrictive Covenants in Furthering the Application of Solar Technology' (1983) 8 *Adelaide Law Review* 286.
[68] A Wawryk, 'Planning for Wind Energy: Controversy Over Wind Farms in Coastal Victoria' (2004) 9 *Australasian J Natural Resources L & Policy* 103; A Wawryk, 'The Development Process for Wind Farms in South Australia' (2002) 19 *Environmental and Planning LJ* 333. See also M Power, 'Windmills on the Horizon of the Great Ocean Road' (2004) 15 *Australian Dispute Resolution J* 90. For a discussion of the law elsewhere, see D Newman, 'Empowering the Wind: Overcoming Obstacles to Wind Energy Development in the United States' (2003) 5 *Sustainable Development L & Policy* 5.

As discussed in Chapter 6, in New South Wales, Victoria, Queensland and Tasmania the issue of legal ownership of geothermal resources has been resolved in recent years by legislative amendment extending ownership to the Crown in right of the State.[69] Except in Queensland, this has been achieved by way of amendments to the States' minerals legislation. In the remaining States and Territories the issue of ownership of the resource will depend on whether geothermal resources can be argued to be contained within the definition of 'minerals' in the legislation of each jurisdiction.[70]

What is required is comprehensive Commonwealth legislation, along the lines of the Victorian legislation. In the absence of such legislation, except in Victoria the legal uncertainties associated with the developers' rights will likely render the large-scale development of geothermal resources unlikely.

7.3.2.4 Energy efficiency in industry

To introduce new and more exacting energy efficiency requirements, the Commonwealth government has preferred to engage in voluntary agreements with industry rather than to regulate.[71] The most recent example of this is the *Energy Efficiency Opportunities Bill 2005* (Cth) introduced into the Commonwealth Parliament in September 2005. The object of the Act is to improve the identification and evaluation of energy efficiency opportunities by large energy-using businesses, but the taking of any action is left entirely to the discretion of corporations. The Act requires them to undertake an assessment of their energy efficiency opportunities to a minimum standard to improve the way in which opportunities are identified and evaluated; and to report publicly on the outcomes of their assessment to demonstrate to the community that their energy use is being effectively managed.

Corporations which use more than half a petajoule of energy per year must register on the Register of Corporations for the Energy Efficiency Opportunities Scheme. The Act distinguishes between a holding company which is a body corporate, and a controlling corporation which is a constitutional corporation which does not have a holding company registered in Australia. Registered corporations are required to submit assessment plans (AP) every 5 years. The AP must: set out a proposal for assessing the opportunities for improving energy efficiency; and set out a deadline for doing all of the action set out for assessing energy efficiency opportunities.

The Regulations may set out requirements relating to the carrying out of the proposal to better assess opportunities for improving energy efficiency opportunities. They may include requirements for communication of objectives about

[69] *Geothermal Energy Resources Act 2005* (Vic), s 12; *Geothermal Exploration Act 2004* (Qld), s 11; *Mineral Resources Development Act 1995* (Tas), s 3 (in respect of geothermal substances heated to over 40°C); Mining Regulations 2003 (NSW), Reg 3 (in respect of geothermal substances heated to over 100°C).

[70] The relevant legislation is the *Mining Act 1971* (SA), s 6; *Mining Act 1978* (WA), s 8(1); *Mining Act* (NT), s 4(1). For a discussion of this issue, see A J Bradbrook, S V MacCallum and A P Moore, *Australian Real Property Law*, Thomson Law Book Co, 3rd edn 2002, at 602ff.

[71] See generally International Energy Agency, *Voluntary Actions for Energy-Related CO2 Abatement*, OECD/IEA, Paris, 1997.

energy use; the measurement and analysis of energy use; and the identification and evaluation of opportunities for improving energy efficiency.

A registered corporation must report publicly on the way in which the corporation has carried out the proposal in its AP for assessing the opportunities to improve energy efficiency. It must also report on the results of carrying out the proposal and how the corporation has responded to the results.

Inspectors are given powers under the Act to inspect and monitor activities under the Act. Civil and criminal penalties apply to a breach of the Act. However, as mentioned above, the corporations will retain the decision whether to pursue the opportunities that have been identified based on a commercial assessment of the options.

In some instances voluntary agreements have proved to be effective, but the result of trenchant resistance of certain industries to reforms in this area has led to much delay in implementing reforms and to the watering down of a number of important reforms. The classic illustration of this is the voluntary agreement between the Commonwealth and motor vehicle manufacturers in relation to voluntary targets for the fuel consumption of all new motor vehicles. Negotiations were commenced in the early 1990s and did not reach a conclusion until 2004. The targets eventually agreed upon are generally regarded by environmentalists as weak. Legislation imposing mandatory fuel consumption requirements, as adopted in the United States[72] and Canada,[73] could have achieved at least as effective a result, and much faster.[74]

As discussed in Chapter 2, many energy efficiency reforms have been adopted in States and Territories in recent years in relation to building thermal efficiency and the energy efficiency of domestic appliances. The most obvious areas of deficiency at present are in relation to industrial plant and motor drives. Improvements achieved here can readily be implemented by introducing Australian Standards and then adopting the standards as law by way of the *Trade Practices Act 1974* (Cth), ss 65C, 65D and 65E.[75] These sections establish consumer product standards, which have been described as 'agreed-upon statements of minimally acceptable characteristics of materials, products, systems or services'.[76] Sections 65C and 65D divide product standards into product safety and product information standards. Section 65C, which deals with product safety standards, provides, *inter alia*, that a corporation must not, in trade or commerce, supply goods in respect of which there is a prescribed consumer product safety standard and which do not comply with that standard, or goods in respect of which

[72] *Motor Vehicle Information and Cost Savings Act*, US Code 1982, Title 15, ss 1901, 2001-12; PL 96-425; 94 Stat 1821.
[73] *Motor Vehicle Fuel Consumption Standards Act*, Stats Can, 1980-81-82, c 113.
[74] See A Bradbrook, 'Regulating for Fuel Energy Efficiency in the Road Transport Sector' (1994) 1 *Australasian J Natural Resources L & Policy* 1.
[75] See further A Bradbrook, 'Eco-Labelling: Lessons from the Energy Sector' (1996) 18 *Adelaide L Rev* 35, at 44–5.
[76] W Lawrence and J Minan, 'The Role of Warranties and Product Standards in Solar Energy Development' (1981) 34 *Vanderbilt L Rev* 537 at 568.

there is in force a notice under s 65C declaring the goods to be unsafe goods (s 65C(1)).

Regulations made under the Act may, in respect of goods of a particular kind, prescribe a safety standard consisting of requirements as to, *inter alia*, packaging, design, construction, and performance of the goods, and as to the form and content of markings, warnings or instructions to accompany the goods as are reasonably necessary to prevent or reduce risk of injury to any person (s 65C(2)).[77] Failure to comply with s 65C is an offence against the Act and subjects the offender to a fine (s 79). In addition, it may give rise to an action for damages under s 82 or an application for an injunction under s 80. Section 65D operates in a similar fashion in relation to product information standards.[78]

The existing energy efficiency laws could be expanded so as to include other types of appliances not currently subject to energy efficiency controls. Many other types of appliances could be labelled at the point of sale. A further deficiency is that the use of standby power for electrical equipment needs to be regulated. As argued above, the States' controls in this area could be assumed constitutionally by the Commonwealth government and then extended by using the *Trade Practices Act*, as illustrated above.

7.3.2.5 Hydrogen

The legal issues associated with the introduction of large-scale use of hydrogen have never been examined in Australia. In the United States, the issues were considered comprehensively for the first time at the JB and Maurice C Shapiro Conference, held at the George Washington Law School, Washington, DC, on 11 June 2004.[79] The legal issues related to the development and use of hydrogen technologies were summarised in a paper presented at that conference by Debra A Jacobson. She identified various legal issues concerning securities law, intellectual property, tort liability and risk allocation, which are outside the scope of this book. In relation to energy and the environment, the author listed the following issues:

- uncertainty about the potential environmental impacts resulting from increased hydrogen production and use;
- the impact of the existing legal framework on atmospheric emission standards on hydrogen production and use;
- impact on environmental impact assessment requirements;
- potential legal barriers to the use of fuel cell technologies;
- hazardous waste issues;
- potential application of existing or modified product efficiency standards (for example, appliance efficiency standards, vehicle efficiency standards)

[77] For illustrations of the operation of s 65C, see *BMW Australia Ltd v ACCC* (2004) ATC 42–012; *ACCC v Monza Imports Pty Ltd* (2001) ATPR 41-843; *Miller v Cunningham's Warehouse Sales Pty Ltd* (1994) ATPR 41-321; *Gardam v Splendid Enterprises Pty Ltd* (1987) ATPR 40-779.
[78] For an illustration of the operation of s 65D, see *Hamlyn v Mark Foy's Pty Ltd* (1982) ATPR 40-316.
[79] The materials, including the agenda and presentations, are available at <http://www.law.gwu.edu/shapiro/>.

on hydrogen and fuel cell technologies and the relative impact of alternative regulatory options in reducing greenhouse gas emissions;
- adverse impact of restrictions on utility participation in the electricity generation business (including distributed generation) on the use of stationary fuel cells;
- impact of regulatory barriers (for example, restrictive interconnection, net metering or utility pricing policies, export controls, fire regulations, electricity codes, building codes) on the use of stationary hydrogen and fuel cell technologies;
- development of policies governing easements for hydrogen pipelines and other infrastructure;
- potential barriers at public international law to the development of new hydrogen and fuel cell technologies;
- potential trade barriers caused by differing regulatory or testing requirements in different countries;
- potential unfavourable tariff treatment for hydrogen technologies as opposed to energy sources in the form of raw materials (for example, coal); and
- potential trade barriers arising from the United Nations Framework Convention on Climate Change and its Kyoto Protocol.[80]

These issues are unlikely to be considered in detail until such time as the hydrogen economy looks likely in the near future. At this time, considerable law reform measures will be necessary at the national level, as the list above indicates.

7.3.2.6 Clean coal, oil and gas measures

As discussed in Chapter 1, the development of clean coal technologies is a priority for the Australian government and also the COAL21 partnership. While the exploitation of coal and, to a lesser extent, oil and gas, is responsible for substantial quantities of atmospheric carbon emissions and other forms of pollutants, technology exists which could substantially diminish the environmental impact of these resources. The most promising of these clean coal technologies include coal liquefaction, coal gasification, integrated combined-cycle generation, fluidised-bed combustion and carbon sequestration.[81] All future assessments of the energy future for Australia accept that these resources will continue to constitute the majority of the country's energy resources for the foreseeable future.

These new technologies are expensive to install and operate. In light of the environmental imperative of reducing greenhouse gas emissions and other forms of pollutants associated with fossil fuels, it is considered important to ensure

[80] See also W Vincent, 'Hydrogen and Tort Law: Liability Concerns Are Not a Bar to a Hydrogen Economy' (2004) 25 *Energy LJ* 385; R Moy, 'Tort Law Considerations for the Hydrogen Economy' (2003) 24 *Energy LJ* 249.

[81] See American Coal Foundation, *New Technologies for Coal Combustion*, at <www.ket.org/Trips/coal/AGSMM/agsmmtech.html> (accessed 27 July 2005).

that these technologies are exploited to the maximum extent practicable. While regulation can be used to force higher environmental standards in appropriate circumstances, perhaps the most obvious role of the law here is to offer tax concessions to energy companies to adopt such technologies. These amendments could be by way of amendment to company tax legislation so as to allow accelerated depreciation allowances or generous investment allowances. As the tax legislation is already under the control of the Australian government, this reform would not pose the constitutional issues raised by legal reforms affecting the other resources.

APPENDIX A

Draft non-legally binding Statement of Principles for a Global Consensus on Sustainable Energy Production and Consumption

Preamble

(a) Access to clean and affordable energy is a precondition for all social and economic development. These Guidelines endeavour to lay out a universally acceptable framework for national policies and international cooperation in pursuit of the sustainable development objectives laid out in Agenda 21. Adherence to these guidelines is expected to facilitate the achievement of 'a sustainable energy future for all'.

(b) Energy resources should be sustainably managed to meet the social, economic and ecological needs of present and future generations. The currently prevailing patterns of energy production and consumption are predominantly based on finite fossil fuel reserves and are therefore not sustainable in a longer term perspective. Growing environmental concerns also call for a stringent review of energy policies.

(c) Unsustainable patterns of energy production and consumption threaten to harm the global environment. Industrialized countries should take the lead in achieving sustainable energy production and consumption patterns; developing countries should seek to achieve sustainable energy production and consumption patterns in their development process, having due regard to the principle of common but differentiated responsibilities. The special situation and needs of developing countries in this regard should be fully taken into account.

(d) States should strive to promote an international economic climate conducive to the continued and environmentally sound development of sustainable energy production and consumption in all countries.

Objectives

1. The guiding objective of these principles is to allow for economic development to occur in all States with the minimum possible adverse impact to human health and the environment and to preserve the existing reserves of fossil fuels for the benefit of future generations.

2. The objectives of this Statement of Principles are as follows:

(a) To act as a framework for a world energy strategy aimed at concerted international, national and regional programmes for harmonious and sustainable economic and social development;

(b) To encourage States to cooperate and, as appropriate, assist each other in developing and implementing policies, laws and regulations designed to promote sustainable energy production and consumption;

(c) To promote energy efficiency policies consistent with sustainable development;

(d) To create framework conditions which induce energy producers and consumers to use energy as economically, efficiently and environmentally soundly as possible, particularly through the organization of energy efficient markets and a fuller reflection of environmental costs and benefits;

(e) To advance the sustainable energy policies agreed to in Chapter 9 of Agenda 21 relating to the protection of the atmosphere;

(f) To encourage and facilitate programmes for fuel switching from high carbon to low carbon sources of energy and for the substitution of fossil fuels by environmentally benign sustainable energy technologies;

(g) To ensure financial and technological assistance for developing countries to adopt sustainable energy production and consumption policies; and

(h) To preserve dwindling global reserves of fossil fuels from further unnecessary waste due to past unsustainable patterns of energy production and consumption.

3. Energy conservation and energy efficiency are important features of energy security, and their promotion can enhance the prospects of economic development and world peace.

Common principles

4. States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own energy resources pursuant to their own environmental policies, but have the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

5. States have the sovereign and inalienable right to utilize, manage and develop their existing energy resources in accordance with their development needs and level of socio-economic development, but subject to policies consistent with sustainable development.

Efficiency in energy supply systems

6. States should promote the greater use of renewable sources of energy and energy efficiency as far as possible throughout all sectors of the economy. Renewable sources of energy include, among others, the following: (a) biomass fuel (including crop residues, wood mill wastes, forest residues, municipal solid wastes and ethanol); (b) solar energy (in all its applications); (c) wind energy; (d) geothermal energy; (e) tidal and wave energy; (f) salt gradient energy; (g) ocean thermal energy conversion; and (h) small-scale hydropower (of capacity of 10MW or less).

7. States should strive to achieve the full benefit of energy efficiency throughout the energy cycle. To this end they should, to the best of their competence, formulate and implement energy efficiency policies and cooperative or coordinated actions based on cost-effectiveness and economic efficiency, taking due account of environmental aspects.

8. In the maintenance and development of supply-side energy systems, conversion and transmission losses need to be minimized to the extent technically possible and economically feasible.

9. The facilitation or increase of private-sector participation can be an important option for the development of energy supply infrastructures, in particular in developing countries. Where this occurs, legislative measures must be taken to ensure that the use of energy efficiency measures and renewable energy technologies are enhanced.

10. The future use and expansion of nuclear energy should only proceed if the problems of the disposal of nuclear wastes and the environmental risks associated with the accidental release of radiation are adequately addressed.

Efficiency in energy consumption

11. States should formulate, implement, publish and regularly update national programmes containing measures to reduce energy intensity. These programmes concern all sectors of the economy, including, *inter alia*, industry, transport, and commercial, institutional and residential buildings.

12. In most industrialized and new industrializing countries industry accounts for the largest share in final energy end-use. At the national level appropriate measures should be considered with a view to raising the energy efficiency of industrial production, in particular in those sectors and industrial establishments which are characterized by energy intensities significantly above world average.

13. Measures to promote periodic, regular energy and environmental auditing of resource use in industry are useful for enhancing productivity. However, adequate training of designated energy managers is a further important factor in advancing energy conservation programmes in industry.

14. In consultation with manufacturers and consumer organizations, States should seek to promote higher levels of energy efficiency in electrical home and office appliances. The introduction of minimum energy efficiency standards and energy labelling programmes for enhanced consumer information can be cost-effective tools for energy efficiency promotion. Measures aimed at reducing electricity leakage and standby losses will be significant for the long-term development trend in energy use.

15. Increasing the fuel efficiency of automobiles is another effective policy measure for reducing harmful atmospheric emissions. The introduction of fuel efficiency standards and fuel efficiency labelling, and the mandatory inclusion of fuel efficiency information in model-specific vehicle advertising are among the policy options through which vehicle fuel efficiency can be improved.

16. In many of the developed and the rapidly developing economies, commercial and institutional buildings account for a growing share in energy consumption, in particular electricity consumption. Building codes and standards requiring improved building insulation can be effective tools to reduce energy consumption. The introduction of pre-construction permits, building energy audits and training of professional personnel are among the most effective optional measures for energy efficiency promotion. In addition, the promotion of bio-climatic building designs and maximum use of daylighting have also proven effective measures in both developed and developing countries.

17. Mandatory building codes or energy rating schemes for residential buildings have shown to be an important energy-saving measure, in particular in countries with cold climates. In developing countries such schemes are less relevant and less applicable.

Energy pricing

18. The incorporation of environmental costs and benefits into market forces and mechanisms, in order to achieve sustainable energy production and consumption, should be encouraged.

19. States should seek to enhance sustainable energy production and consumption by adjusting energy prices upwards to reflect the real cost of energy supply and to enable energy efficiency projects to compete financially on a level playing field with other technologies. Existing subsidies in favour of conventional energy technologies distort the market and discourage energy efficiency initiatives. Such subsidies should be phased out.

Mitigation of environmental impacts

20. Pollutants from energy production and consumption, particularly airborne pollutants, including those responsible for acidic deposition, that are harmful to the health of forest ecosystems at the local, national, regional and global levels should be strictly controlled.

21. States should take appropriate measures to ensure that before they adopt policies, programmes and plans relating to energy production by the use of non-renewable energy resources that are likely to have a significant adverse effect on the environment, the environmental consequences of such actions are duly taken into account.

22. States should:

(a) Establish or strengthen national environmental impact assessment procedures to ensure that all activities involving the production of energy by the use of non-renewable energy resources which are likely to have a significant adverse effect on the environment are evaluated before approval.

(b) Designate appropriate national authorities to ensure that environmental impact assessments are effective and conducted under procedures accessible to concerned States, international organizations, persons and non-governmental organizations.

(c) Conduct periodic reviews both to determine whether activities approved by them are carried out in compliance with the conditions set out in the approval and to evaluate the effectiveness of the proposed mitigation measures.

Consumer information and environmental education

23. Greater public awareness and understanding of the environmental impacts of energy production and consumption is an essential precondition to achieving more environmentally conscious patterns of consumption.

24. Consumers should be entitled to full information on visible and invisible product qualities, including comparative energy efficiency. Independent product testing, publications of comparative market surveys and other measures such

as energy or environmental labelling are important elements in consumer information programmes.

25. The task of supporting and expanding consumer education and awareness programmes in the field of sustainable energy consumption, especially targeting children as future consumers, is of vital importance. States should recognize that education is the key to influencing electricity producers and consumers to adopt sustainable energy policies.

Policies and strategies for implementation

26. Sustainable energy production and consumption can most effectively be promoted by a combination of policy initiatives and financing. State initiatives may take the form of regulation, financial stimulation or educational measures.

27. States should strive to implement national energy management and energy conservation laws. Such laws should provide basic mandates for institutional development or for national advisory services, improved energy efficiency in power generation and transmission, minimum energy efficiency standards for motor vehicles, industrial equipment, domestic appliances and buildings, and improved market transparency resulting from energy labels or other measures designed to enhance public or investor awareness for the benefit of energy efficiency investments.

28. Recognizing that the responsibility for sustainable energy production and consumption is in many States allocated among federal/national, state/provincial and local levels of government, each State, in accordance with its constitution and/or national legislation, should pursue these principles at the appropriate level of government.

29. States should promote and provide opportunities for the participation of all interested parties, including local communities and indigenous people, women, industries, labour and non-governmental organizations, in the development, implementation and planning of national sustainable energy policies.

30. States should establish, consolidate or expand national energy efficiency promotion or energy conservation funds, based on domestic revenues from direct or indirect forms of energy consumption taxation used for the purpose of providing financial incentives for energy efficiency investments.

31. Scientific and technological research in relation to sustainable energy production and consumption should be strengthened.

32. Institutional capabilities in education, training, science, technology, economics, law, architecture and social aspects of energy production and

consumption are essential to the development of sustainable energy production and consumption policies and should be strengthened.

33. States should control the importation of old, polluting energy technologies into developing countries.

International cooperation

34. The implementation of national policies and programmes aimed at sustainable energy production and consumption, particularly in developing countries, should be supported by international financial and technical cooperation, including through the private sector, where appropriate.

35. International institutional arrangements, building on those organizations and mechanisms already in existence, as appropriate, should facilitate international cooperation in the field of sustainable energy production and consumption.

36. International exchange of information on research into sustainable energy production and consumption should be enhanced and broadened, as appropriate, making full use of education and training institutions, including those in the private sector.

37. States should promote international awareness and information exchange on their relevant energy efficiency and renewable energy programmes and standards and on the implementation of those programmes and standards.

38. New and additional financial resources should be provided to developing countries to enable them to introduce sustainable energy production and consumption policies. The efforts of developing countries to implement policies consistent with sustainable energy production and consumption should be supported by the international community, taking into account the importance of redressing external indebtedness. In this respect, special attention should also be given to the countries undergoing the process of transition to market economies.

39. States should endeavour to support the development of sustainable energy production and consumption in developing countries by the use of the flexibility mechanisms (the clean development mechanism, joint implementation and emissions trading) prescribed in the Kyoto Protocol to the United Nations Framework Convention on Climate Change.

40. In order to enable, in particular, developing countries to adopt sustainable energy production and consumption policies, the access to and transfer of environmentally sound technologies and corresponding know-how on favourable terms, including on concessional and preferential terms, as mutually agreed, in accordance with the relevant provisions of Agenda 21, should be promoted, facilitated and financed, as appropriate.

APPENDIX B

Draft Protocol on Energy Efficiency and Renewable Energy to the United Nations Framework Convention on Climate Change

Preamble

The Parties to this Protocol:

Being Parties to the United Nations Framework Convention on Climate Change, hereinafter referred to as 'the Convention',

Guided by the pertinent provisions of the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972, the World Charter for Nature, the Rio Declaration on Environment and Development, Agenda 21: Programme of Action for Sustainable Development, the Johannesburg Declaration on Sustainable Development and Plan of Implementation, and other relevant instruments and fundamental principles of international environmental law,

Mindful that current patterns of energy use and production, based primarily on non-renewable energy resources, are responsible for more than two-thirds of all atmospheric carbon emissions, and are a major source of acid rain and ozone-depleting substances,

Reflecting the urgent concern of the international community, including States and international organizations, about the adverse environmental impacts of the continued use of non-renewable energy resources,

Conscious that the right to development must be fulfilled so as to meet the developmental and environmental needs of the present and future generations in a sustainable and equitable manner,

Conscious also of the importance and necessity of international cooperation and partnership in promoting the use of energy efficiency and renewable energy technologies,

Bearing in mind the contribution that promoting the use of energy efficiency and renewable energy technologies can make to achieving the objectives of the United Nations Framework Convention on Climate Change and the Kyoto Protocol,

Recognizing also the importance of the provision to developing countries of effective means, including new and additional funding, and access to technology, without which it will be difficult for them to implement fully their commitments under this Protocol,

Aware of the improvements in energy supply security, and of the significant economic and environmental gains, which result from the implementation of cost-effective energy efficiency measures and measures promoting renewable energy technology, and aware of their importance for restructuring economies and improving living standards,

Desiring to undertake cooperative and coordinated action in the field of energy efficiency and renewable energy and to adopt a Protocol providing a framework for using energy as efficiently and cleanly as possible:

AGREE as follows:

Article 1

Use of terms

For the purposes of this Protocol, the definitions contained in Article 1 of the Convention shall apply. In addition:

'Cogeneration' means the simultaneous production of electrical or mechanical energy and thermal energy.

'Conference of the Parties' means the Conference of the Parties to the Convention.

'Convention' means the United Nations Framework Convention on Climate Change, adopted in New York on 9 May 1992.

'Cost-effectiveness' means to achieve a defined objective at the lowest cost or to achieve the greatest benefit at a given cost.

'Energy cycle' means the entire energy chain, including activities related to prospecting for, exploration, production, conversion, storage, transport, distribution and consumption of the various forms of energy, and the treatment and disposal of wastes, as well as the decommissioning, cessation or closure of these activities, minimizing harmful environmental impacts.

'Energy efficiency' means maintaining the same unit of output (of a good or service) without reducing the quality or performance of the

output, while reducing the amount of energy required to produce that output.

'Energy intensity' means the level of energy needed per unit of output.

'Environmental impact' means any effect caused by a given activity on the environment, including human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments or other physical structures or the interactions among these factors; it also includes effects on cultural heritage or socio-economic conditions resulting from alterations to these factors.

'Non-renewable energy resources' means all sources of energy not included within the definition of 'renewable energy' contained within this Article.

'Parties present and voting' means Parties present and casting an affirmative or negative vote.

'Party' means, unless the context otherwise indicates, State or regional economic integration organization which has consented to be bound by this Protocol and for which the Protocol is in force.

'Party included in Annex I' means a Party included in Annex I to the Convention, as may be amended, or a Party which has made a notification under Article 4, paragraph 2(g), of the Convention.

'Renewable energy' means, for the purposes of this Protocol, solar energy (in all its applications), wind energy, geothermal energy, biomass energy, tidal energy, wave energy, salt gradient energy, ocean thermal energy conversion, and small hydropower (of capacity of 10MW or less).

'Regional economic integration organization' means an organization constituted by sovereign states of a given region which has competence in respect of matters governed by this Protocol and has been duly authorized, in accordance with its internal procedures, to sign, ratify, accept, approve or accede to the instruments concerned.

Article 2

Objectives

The objectives of this Protocol are:

1. The promotion of energy efficiency and renewable energy policies consistent with sustainable development.
2. The development and use of energy efficiency and renewable energy throughout the world as a means of reducing the current substantial reliance on non-renewable energy resources, and by so doing to reduce the level of greenhouse gas concentrations and other pollutants in the atmosphere.
3. The creation of framework conditions which induce producers and consumers to produce and use energy as economically, efficiently and environmentally soundly as possible.
4. The fostering of cooperation in the field of energy efficiency.

Article 3

Fundamental principles

In their actions to achieve the objectives of this Protocol and to implement its provisions, the Parties shall be guided, *inter alia*, by the following fundamental principles:

1. The global environment is a common concern of humanity.
2. The freedom of action of each generation in regard to the environment is qualified by the needs of future generations.
3. Protection of the environment is best achieved by preventing environmental harm rather than by attempting to remedy or compensate for such harm.
4. Lack of scientific certainty is no reason to postpone action to avoid potentially significant or irreversible harm to the environment. All precautionary policies and measures to foster the development of energy efficiency and renewable energy should be cost-effective so as to ensure global benefits at the lowest possible cost. To achieve this, such policies and measures should take into account different socio-economic contexts, be comprehensive, and comprise all economic sectors.
5. The exercise of the right to development entails the obligation to meet the developmental and environmental needs of humanity in a sustainable and equitable manner.
6. The elimination of unsustainable patterns of energy production and consumption is necessary to enhance the quality of life for all humanity and reduce disparities in standards of living.
7. Parties should act to foster the development of energy efficiency and renewable energy on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in fostering the development of energy efficiency and renewable energy.
8. The specific needs and special circumstances of developing country Parties should be given full consideration.
9. Measures taken to foster the development of energy efficiency and renewable energy, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

Article 4

Specific principles

In their actions to achieve the objectives of this Protocol and to implement its provisions, the Parties shall be guided, *inter alia*, by the following specific principles:

1. Parties shall have particular regard to further improving energy efficiency and to further developing and using renewable energy.
2. Parties shall cooperate and, as appropriate, assist each other in developing and implementing policies, laws and regulations relating to energy efficiency and renewable energy.
3. Parties shall establish policies and appropriate legal and regulatory frameworks relating to energy efficiency and renewable energy which promote, *inter alia*:
   (a) the efficient functioning of market mechanisms, including market-oriented price formation, and a fuller reflection of environmental costs and benefits;
   (b) the reduction of barriers to energy efficiency and renewable energy, thus stimulating investments;
   (c) the right of solar access to solar collector panels;
   (d) the right of access of wind to wind generators;
   (e) the use of renewable energy and cogeneration;
   (f) mechanisms for financing energy efficiency and renewable energy initiatives;
   (g) education and awareness;
   (h) the dissemination and transfer of technologies;
   (i) transparency of legal and regulatory frameworks.
4. Parties shall strive to achieve the full benefit of energy efficiency throughout the energy cycle. To this end they shall, to the best of their competence, formulate and implement energy efficiency policies and cooperative or coordinated actions based on cost-effectiveness and economic efficiency, taking due account of environmental aspects.
5. Energy efficiency policies shall include both short-term measures for the adjustment of previous practices and long-term measures to improve energy efficiency throughout the energy cycle.
6. Parties shall promote and cooperate in the research, development and application of energy efficiency and renewable energy technologies, which will minimize harmful environmental impacts of all aspects of the energy cycle in an economically efficient manner.
7. Parties shall encourage favourable conditions for the transfer and dissemination of energy efficiency and renewable energy technologies consistent with the adequate and effective protection of intellectual property rights.
8. Parties shall promote international awareness and information exchange on their relevant energy efficiency and renewable energy programmes and standards and on the implementation of those programmes and standards.
9. Parties recognise the vital role of the private sector. They shall encourage action by energy utilities, responsible authorities and specialised agencies, and close cooperation between industry and administrations.

10. Parties shall take full advantage of the work and expertise of competent international or other bodies and shall take care to avoid duplication.

Article 5

Division of responsibility and coordination

Each Party shall strive to ensure that energy efficiency and renewable energy policies are coordinated among all of its responsible authorities.

Article 6

Commitments of developed country parties

1. The developed country Parties shall consist of those Parties included in Annex 1 of the Convention that are Parties to this Protocol.

2. The developed country parties shall, individually or jointly, ensure that their energy intensity be reduced according to the reduction commitments inscribed in Annex A to this Protocol and in accordance with the provisions of this Article, with a view to reducing their energy intensity by at least . . . . per cent below 2005 levels in the commitment period ending on 31 December 2013.

3. Each developed country Party shall, by 31 December 2009, have made demonstrable progress in achieving its commitments under this Protocol.

4. Prior to the first session of the Conference of the Parties serving as the meeting of the Parties to this Protocol, each developed country Party shall provide for consideration by the Subsidiary Body for Scientific and Technical Advice data to establish its energy intensity in 2005 and to enable an estimate to be made of its changes in energy intensity in subsequent years.

5. In the first quantified energy intensity reduction commitment period, ending on 31 December 2013, the assigned amount for each developed country Party shall be equal to the percentage inscribed for it in Annex A to this Protocol of its energy intensity in 2005.

6. Commitments for subsequent periods for developed country Parties shall be established in amendments to Annex A to this Protocol, which shall be adopted in accordance with the provisions of Article 19. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall initiate the consideration of such commitments at least 4 years before the end of the first commitment period referred to in paragraph 2 above.

7. If the energy intensity of a developed country Party during a commitment period is less than its assigned amount under this Article, this difference shall, on request of that Party, be added to the assigned amount for that Party for subsequent commitment periods.

Article 7

Joint implementation

1. Any developed country Parties that have agreed to jointly fulfil their commitments under Article 6 shall be deemed to have met those commitments provided that their combined aggregate energy intensity does not exceed their assigned amounts calculated pursuant to their quantified reduction commitments inscribed in Annex A to this Protocol and in accordance with the provisions of Article 6. The respective energy intensity allocated to each of the Parties to the agreement shall be set out in the agreement.

2. The Parties to any such agreement shall notify the secretariat of the terms of the agreement on the date of deposit of their instruments of ratification, acceptance, approval or accession. The secretariat shall in turn inform the Parties and signatories to the Protocol of the terms of the agreement.

3. The agreement shall remain in operation for the duration of the commitment period specified in Article 6, paragraph 2.

4. If Parties acting jointly do so in the framework of, and together with, a regional economic integration organization, any alteration in the composition of the organization after adoption of this Protocol shall not affect existing commitments under this Protocol. Any alteration in the composition of the organization shall only apply for the purposes of those commitments under Article 6 that are adopted subsequent to that revision.

5. In the event of failure by the Parties to such an agreement to achieve their total combined level of energy intensity reductions, each Party to such an agreement shall be responsible for its own energy intensity set out in the agreement.

6. If Parties acting jointly do so in the framework of, and together with, a regional economic integration organization which is itself a Party to this Protocol, each member State of that regional economic integration organization individually, and together with the regional economic integration organization acting in accordance with Article 6, shall, in the event of failure to achieve the total combined energy intensity reductions, be responsible for its own energy intensity as notified in accordance with this Article.

Article 8

Estimation of energy intensity

Each developed country Party shall have in place, no later than one year prior to the start of the first commitment period, a national system for the estimation of energy intensity in all sectors of the economy. Guidelines for such national systems shall be decided upon by the Conference of the Parties serving as the meeting of the Parties to this Protocol at its first session.

Article 9

Requirement for national communication

1. Each developed country Party shall incorporate in its national communication, submitted under Article 12 of the Convention, the supplementary information necessary to demonstrate compliance with its commitments under this Protocol, to be determined in accordance with paragraph 2 below.

2. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall adopt at its first session, and review periodically thereafter, guidelines for the preparation of the information required under this Article, taking into account guidelines for the preparation of national communications by developed country Parties adopted by the Conference of the Parties. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall also, prior to the first commitment period, decide upon modalities for the accounting of assigned amounts.

Article 10

Commitments of all Parties

All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall:

1. Formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to reduce energy intensity. These programmes concern all sectors of the economy, including, *inter alia*, transport, industry, buildings and appliances.
2. Cooperate in the promotion of effective modalities for the development, application and diffusion of, and take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies, know-how, practices and processes pertinent to energy efficiency and renewable energy, in particular to developing countries, including the formulation of policies and programmes for the effective transfer of environmentally sound technologies that are publicly owned or in the public domain and the creation of an enabling environment for the public sector, to promote and enhance access to, and transfer of, environmentally sound technologies.
3. To the best of their capability, cooperate in scientific and technical research designed to promote energy efficiency and renewable energy, and promote the development and strengthening of endogenous capacities and capabilities to participate in international and intergovernmental efforts, programmes and networks on research into improving energy efficiency and renewable energy technologies.

4. Cooperate in and promote at the international level, and, where appropriate, using existing bodies, the development and implementation of education and training programmes, including the strengthening of national capacity building, in particular human and institutional capacities and the exchange or secondment of personnel to train experts in the field of energy efficiency and renewable energy, in particular for developing countries, and facilitate at the national level public awareness and public access to information on energy efficiency and renewable energy.
5. Include in their national communications information on programmes and activities undertaken pursuant to this Article.

Article 11

Information reporting

1. The information submitted under Article 6, paragraph 4, by each developed country Party, and the information submitted under Article 10, paragraph 1, by all Parties shall be reviewed by expert review teams pursuant to the relevant decisions of the Conference of the Parties and in accordance with guidelines adopted for this purpose by the Conference of the Parties serving as the meeting of the Parties to this Protocol under paragraph 4 below.

2. Expert review teams shall be coordinated by the secretariat and shall be composed of experts selected from those nominated by Parties to the Convention and, as appropriate, by intergovernmental organizations, in accordance with guidelines provided for this purpose by the Conference of the Parties.

3. The review process shall provide a thorough and comprehensive technical assessment of all aspects of the implementation by a Party to this Protocol. The expert review teams shall prepare a report to the Conference of the Parties serving as the meeting of the Parties to this Protocol, assessing the implementation of the commitments of the Party and identifying any potential problems in, and factors influencing, the fulfilment of commitments. Such reports shall be circulated by the secretariat to all Parties to this Protocol. The secretariat shall list those questions of implementation indicated in such reports for further consideration by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

4. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall adopt at its first session, and review periodically thereafter, guidelines for the review of implementation by expert review teams taking into account the relevant decisions of the Conference of the Parties.

5. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, with the assistance of the Subsidiary Body for Implementation and, as appropriate, the Subsidiary Body for Scientific and Technological Advice, consider:

(a) The information submitted by the Parties under Article 8 and the reports of the expert reviews thereon conducted under Article 11, paragraph 1; and
(b) Those questions of implementation listed by the secretariat under paragraph 3 above, as well as any questions raised by Parties.

6. Pursuant to its consideration of the information referred to in paragraph 5 above, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall take decisions on any matter required for the implementation of this Protocol.

Article 12

Environmental impact assessment

1. Parties shall establish or strengthen national environmental impact assessment procedures to ensure that all activities involving the production of energy by the use of non-renewable energy resources which are likely to have a significant adverse effect on the environment are evaluated before approval.

2. The assessment shall include evaluation of:
(a) the cumulative, long-term, indirect, long-distance, and transboundary effects;
(b) the possible alternative actions, including not conducting the proposed activity and using as an alternative energy efficiency or renewable energy; and
(c) measures to avert or minimize the potential adverse effects.

3. Parties shall designate appropriate national authorities to ensure that environmental impact assessments are effective and conducted under procedures accessible to concerned States, international organizations, persons and non-governmental organizations. Parties shall also ensure that the authority deciding on approval takes into consideration all observations made during the environmental impact assessment process and makes its final decision public.

4. Parties shall conduct periodic reviews both to determine whether activities approved by them are carried out in compliance with the conditions set out in the approval and to evaluate the effectiveness of the proposed mitigation measures. The results of such reviews shall be made public.

5. Parties shall take appropriate measures to ensure that before they adopt policies, programmes, and plans relating to energy production by the use of non-renewable energy resources that are likely to have a significant adverse effect on the environment, the environmental consequences of such actions are duly taken into account.

Article 13

Financial resources

In the context of the implementation of Article 10, the developed country Parties shall:

1. Provide new and additional financial resources, including the transfer of technology, to meet the agreed full costs incurred by developing country Parties in advancing the implementation of commitments that are covered in Article 10.
2. The implementation of the commitment in paragraph (1) of this Article shall take into account the need for adequacy and predictability in the flow of funds and the importance of appropriate burden sharing among developed country Parties.
3. The developed country Parties may also provide, and other Parties avail themselves of, financial resources for the implementation of Article 10, through bilateral, regional and other multilateral channels.

Article 14

Conference of the Parties

1. The Conference of the Parties, the supreme body of the Convention, shall serve as the meeting of the Parties to this Protocol.

2. Parties to the Convention that are not Parties to this Protocol may participate as observers in the proceedings of any session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. When the Conference of the Parties serves as the meeting of the Parties to this Protocol, decisions under this Protocol shall be taken only by those that are Parties to it.

3. When the Conference of the Parties serves as the meeting of the Parties to this Protocol, any member of the Bureau of the Conference of the Parties representing a Party to the Convention but, at that time, not a Party to this Protocol, shall be substituted by an additional member to be elected by and from among the Parties to this Protocol.

4. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall keep under regular review the implementation of this Protocol and shall make, within its mandate, the decisions necessary to promote its effective implementation. It shall perform the functions assigned to it by this Protocol and shall:

(a) Assess, on the basis of all information made available to it in accordance with the provisions of this Protocol, the implementation of this Protocol by the Parties, the overall effects of the measures taken pursuant to this Protocol, in particular environmental, economic and social effects as well

as their cumulative impacts and the extent to which progress towards the objective of the Convention is being achieved;

(b) Periodically examine the obligations of the Parties under this Protocol, giving due consideration to any reviews required by Article 4, paragraph 2(d), and Article 7, paragraph 2, of the Convention, in the light of the objective of the Convention, the experience gained in its implementation and the evolution of scientific and technological knowledge, and in this respect consider and adopt regular reports on the implementation of this Protocol;

(c) Promote and facilitate the exchange of information on measures adopted by the Parties to promote energy efficiency and renewable energy technologies, taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under this Protocol;

(d) Facilitate, at the request of two or more Parties, the coordination of measures adopted by them to address their commitments under this Protocol, taking into account the differing circumstances, responsibilities and capabilities of the Parties;

(e) Promote and guide, in accordance with the objective of the Convention and the provisions of this Protocol, and taking fully into account the relevant decisions by the Conference of the Parties, the development and periodic refinement of comparable methodologies for the effective implementation of this Protocol, to be agreed on by the Conference of the Parties serving as the meeting of the Parties to this Protocol;

(f) Make recommendations on any matters necessary for the implementation of this Protocol;

(g) Seek to mobilize additional financial resources in accordance with Article 13, paragraph 1;

(h) Establish such subsidiary bodies as are deemed necessary for the implementation of this Protocol;

(i) Seek and utilize, where appropriate, the services and cooperation of, and information provided by, competent international organizations and intergovernmental and non-governmental bodies; and

(j) Exercise such other functions as may be required for the implementation of this Protocol.

5. The rules of procedure of the Conference of the Parties and financial procedures of the Convention shall be applied *mutatis mutandis* under this Protocol, except as may be otherwise decided by consensus by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

6. The first session of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be convened by the secretariat in conjunction with the first session of the Conference of the Parties that is scheduled after the date of the

entry into force of this Protocol. Subsequent ordinary sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be held every year and in conjunction with ordinary sessions of the Conference of the Parties unless otherwise decided by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

7. Extraordinary sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be held at such other times as may be deemed necessary by the Conference of the Parties serving as the meeting of the Parties to this Protocol, or at the written request of any Party, provided that, within 6 months of the request being communicated to the Parties by the secretariat, it is supported by at least one-third of the Parties.

8. The United Nations, its specialized agencies and the International Atomic Energy Agency, as well as any State member thereof or observers thereto not party to the Convention, may be represented at sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol as observers. Any body or agency, whether national or international, governmental or non-governmental, which is qualified in matters covered by this Protocol and which has informed the secretariat of its wish to be represented at a session of the Conference of the Parties serving as the meeting of the Parties to this Protocol as an observer, may be so admitted unless at least one-third of the Parties present object. The admission and participation of observers shall be subject to the rules of procedure, as referred to in paragraph 5 above.

Article 15

Secretariat

1. The secretariat established by Article 8 of the Convention shall serve as the secretariat of this Protocol.

2. Article 8, paragraph 2, of the Convention on the functions of the secretariat, and Article 8, paragraph 3, of the Convention on arrangements made for the functioning of the secretariat, shall apply *mutatis mutandis* to this Protocol. The secretariat shall, in addition, exercise the functions assigned to it under this Protocol.

Article 16

Settlement of disputes

1. Parties shall settle disputes concerning the interpretation or application of this Protocol by peaceful means, such as by negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements, or by any other peaceful means of their own choice.

2. If Parties to a dispute do not reach agreement on a solution or on a dispute settlement arrangement within 1 year following the notification by one Party to another that a dispute exists, the dispute shall, at the request of one of the Parties, be submitted to either an arbitral tribunal, including the Permanent Court of Arbitration, or to judicial settlement, including by the International Court of Justice.

Article 17

State responsibility

Each Party is responsible under international law for the breach of its obligations under this Protocol.

Article 18

Relations with non-Parties

Parties shall be bound by the provisions of this Protocol in their relations with non-Parties.

Article 19

Amendments

1. Any Party may propose amendments to this Protocol.

2. The text of any proposed amendments to this Protocol shall be communicated to all Parties by the Depositary within 6 months.

3. At the request of one-third of the Parties, the Depositary shall call a special conference to consider the proposed amendment. The Parties shall make every effort to reach agreement on any proposed amendment by consensus. If all efforts at reaching a consensus have been exhausted, and no agreement reached, the amendment shall as a last resort be adopted by a two-thirds majority vote of the Parties to this Protocol who are present and voting at the special conference.

4. Amendments to this Protocol, texts of which have been adopted by a special conference, shall be submitted by the Depositary to all Parties for ratification, acceptance or approval.

5. Instruments of ratification, acceptance or approval of amendments to this Protocol shall enter into force between Parties having ratified, accepted or approved them on the 30th day after deposit with the Depositary of instruments of ratification, acceptance or approval by at least two-thirds of the Parties. Thereafter the amendments shall enter into force for any other Parties on the 30th day after

that Party deposits its instrument of ratification, acceptance or approval of the amendments.

6. For the purposes of this Article, 'present and voting' means Parties present and casting an affirmative or negative vote.

Article 20

Annexes

1. Annexes to this Protocol shall form an integral part thereof and, unless otherwise expressly provided, a reference to this Protocol constitutes at the same time a reference to any annexes thereto. Any annexes adopted after the entry into force of this Protocol shall be restricted to lists, forms and any other material of a descriptive nature that is of a scientific, technical, procedural or administrative character.

2. Any Party may make proposals for an annex to this Protocol and may propose amendments to annexes to this protocol.

3. Annexes to this Protocol and amendments to annexes to this Protocol shall be adopted at an ordinary session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. The text of any proposed annex or amendment to an annex shall be communicated to the Parties by the secretariat at least 6 months before the meeting at which it is proposed for adoption. The secretariat shall also communicate the text of any proposed annex or amendment to an annex to the Parties and signatories to the Convention and, for information, to the Depositary.

4. The Parties shall make every effort to reach agreement on any proposed annex or amendment to an annex by consensus. If all efforts at consensus have been exhausted, and no agreement reached, the annex or amendment to an annex shall as a last resort be adopted by a three-fourths majority vote of the Parties present and voting at the meeting. The adopted annex or amendment to an annex shall be communicated by the secretariat to the Depositary, who shall circulate it to all Parties for their acceptance.

5. An annex, other than Annex A, that has been adopted or amended in accordance with paragraphs 3 and 4 above shall enter into force for all Parties to this Protocol 6 months after the date of the communication by the Depositary to such Parties of the adoption or amendment of the annex, except for those Parties that have notified the Depositary in writing within that period of their non-acceptance of the annex or amendment to the annex. The annex or amendment to an annex shall enter into force for Parties which withdraw their notification of non-acceptance on the 90th day after the date on which withdrawal of such notification has been received by the Depositary.

6. If the adoption of an annex or an amendment to an annex involves an amendment to this Protocol, that annex or amendment to an annex shall not enter into force until such time as the amendment to this protocol enters into force.

7. Amendments to Annex A to this protocol shall be adopted and enter into force in accordance with the procedures set out in Article 20.4, provided that any amendments to Annex A shall be adopted only with the written consent of the Party concerned.

Article 21

Voting

1. Except as provided for in paragraph 2, each Party shall have one vote.

2. Regional economic integration organizations, in matters within their competence, shall exercise their right to vote with a number of votes equal to the number of their member States that are Parties. Such an organization shall not exercise its right to vote if any of its member States exercises its right, and vice versa.

Article 22

Depositary

The Government of . . . . . shall be the Depositary of this Protocol.

Article 23

Signature

This Protocol shall be open for signature at . . . . . from . . . . . to . . . . . by the States and regional economic integration organizations whose representatives have signed and ratified the Convention.

Article 24

Ratification, acceptance or approval

This Protocol shall be subject to ratification, acceptance or approval by signatories. Instruments of ratification, acceptance or approval shall be deposited with the Depositary.

Article 25

Accession

This Protocol shall be open for accession, from the date on which the Protocol is closed for signature, by States and regional economic integration organizations which are Parties to the Convention, on terms to be approved by the

Conference of the Parties. The instruments of accession shall be deposited with the Depositary.

Article 26

Entry into force

1. This Protocol shall enter into force on the 30th day after the date of deposit of the 30th instrument of ratification, acceptance or approval thereof, or of accession thereto, by a State or regional economic integration organization which is a Party to the Convention.

2. For each State or regional economic integration organization for which the Convention has entered into force and which ratifies, accepts or approves this Protocol or accedes thereto after the Protocol has entered into force in accordance with paragraph (1), the Protocol shall enter into force on the 30th day after the date of deposit by such State or regional economic integration organization of its instrument of ratification, acceptance, approval or accession.

3. For the purposes of paragraph (1), any instrument deposited by a regional economic integration organization shall not be counted as additional to those deposited by member States of such organization.

Article 27

Reservations

No reservations shall be made to this Protocol.

Article 28

Withdrawals

1. At any time after 2 years from the date on which this Protocol has entered into force for a Party, that Party may withdraw from this Protocol by giving written notification to the Depositary.

2. Any such withdrawal shall take place upon expiry of 1 year after the date of its receipt by the Depositary, or on such later date as may be specified in the notification of the withdrawal.

Article 29

Authentic texts

In witness whereof the undersigned, being duly authorized to that effect, have signed this Protocol in Arabic, Chinese, English, French, Russian and Spanish, of which every text is equally authentic, in one original, which will be deposited with the Government of. . . . . .

Done at . . . . . on the . . . . . day of . . . . . in the year . . . . . .

ANNEX A

Party	**Quantified energy intensity reduction commitment** (percentage of base year)

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