

National
Business
Leaders
Forum on
Sustainable
Development

LEADING THE CHANGE: SUSTAINABLE BUSINESS IN ACTION

21 & 22 MAY 2007
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**‘Action on climate change can
help business competitiveness
and economic growth’**

Executive Report

(Executive Summary available at www.sustainableforum.com.au)

**A call for leadership in supporting a
‘Climate Change Framework for Australia’
to participants of the ‘8th National
Business Leaders Forum on Sustainable
Development’**

Developed by:



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1) An historic tipping point on climate change

CEOs surveyed by the World Economic Forum in Davos in 2000, stated that for them, *'The greatest challenge facing the world at the beginning of the 21st Century – and the issue where business could most effectively adopt a leadership role - is climate change.'*¹ This report will show executives that if you embrace this challenge, not only will you gain an advantage in a future 'carbon-constrained' world, but you will strengthen every aspect of your business. To demonstrate this we start first with some examples of Australian and international companies who have embraced this challenge and are reaping the rewards. Let's consider first Westpac, one of Australia's oldest companies. Westpac has already achieved a 45 percent reduction in greenhouse gas emissions on 1996 levels. In 2007, The Climate Group reported that,

*Since 1996 reductions in travel, paper and electricity use have cut the company's GHG emissions by 45% on 1996 levels. In 2005-06, Westpac realized a 12% reduction by purchasing green power and integrating energy, water and emission performance indicators into facility managers' contracts. Westpac is striving towards an ultimate goal of zero net emissions. Since 1993, Westpac has saved over US\$7 million in energy costs and recently invested in a new headquarters designed to achieve optimal energy efficiency and minimal GHG emissions. As well as reducing its own carbon footprint, Westpac helps its customers reduce theirs – for example, through its green mortgage scheme. Its environmental credentials are also attracting new business and employees – 50% of graduates chose Westpac over other Australian banks explicitly because of its CSR approach.*²

Westpac is not alone in seeking to achieve large reductions quickly and in time net climate neutrality. Westpac are one of many high profile companies and organisations in Australia now committing to serious carbon emission reduction targets. Other high profile companies committing to becoming net climate neutral rapidly include the News Ltd, Australian Football League (AFL), Price Waterhouse Coopers, the Insurance Australia Group, Swiss Re, Bunnings Warehouse, KPMG Australia, and Channel Seven's Sunrise Breakfast TV Program. There have even been significant developments in areas of the economy that are very fossil fuel dependant like air travel. Virgin Airlines founder Sir Richard Branson pledged in October 2006 to invest US\$3 billion in re-newables and outlined a plan to cut aviation emissions by 25 percent. Virgin Airlines in Australia has launched a carbon offset option through which customers can choose to offset their emissions.³ In his new book, 'Let's not screw it, let's just do it', Branson says *'my new goal in life is to work at reducing carbon emissions'*. Europcar Australia is also jumping on the offsetting band wagon, partnering with Greenfleet to offset the carbon emissions of every new vehicle that is added to its fleet. Even the Melbourne airport Skybus bus service is now offsetting its emissions to be now completely climate neutral.⁴

None of these companies were required to do this. Companies that embark on this exciting journey find that not only does a commitment to behave in more sustainable ways cut their costs, but it can also increase the productivity of the business and create new sources of cost savings. This has been shown in The Climate Group's report *Carbon Down: Profits Up*⁵ in 2006. This report showed that 43 companies had significantly reduced their greenhouse gas emissions and saved a total of AU\$15 billion.⁶ The Climate Group also published a report on the leading cities around the world that are making similar savings to both costs and greenhouse gas emissions.⁷ Using energy more efficiently offers an economic bonanza because saving fossil fuel is a lot cheaper than buying it. Since the early 1990s, The Climate Group's reports⁸ have shown that six major firms – Dupont, IBM, British Telecom, Alcan, NorskeCanada and Bayer – have collectively saved over US\$4 billion while reducing their carbon emissions by more than 60 percent. DuPont was able to achieve such significant overall reductions in GHG emissions largely by a focus on reducing and replacing the non CO2 GHG such as HFCs, PFCs, CH4 (starting as the middle line) and NO2 (starting as the top line) as shown in Figure 1.

¹ Cogan, D.G. (2003) *Corporate Governance and Climate Change: Making the Connection*, a CERES Sustainable Governance Project Report prepared by the Investor Responsibility Research Center.

² See The Climate Group's 2007 *Carbon Down Profits Up* n.d. http://theclimategroup.org/assets/resources/cdpu_newedition.pdf. Accessed 14 April 2007

³ Virgin Airlines (2007) *Offsets – Frequently Asked Questions*. Available at www.virginblue.com.au/carbonoffset/faq/. Accessed 14 April 2007.

⁴ Skybus (2007) *Skybus leads the way to become the first climate neutral bus fleet*, Skybus. Available at <http://www.skybus.com.au/news.php>. Accessed 14 April 2007.

⁵ See The Climate Group's 2004 and 2005 *Carbon Down Profits Up* reports at www.theclimategroup.org/index.php?pid=732. Accessed 14 April 2007.

⁶ Ibid.

⁷ The Climate Group (2007) *Low Carbon Leader: Cities*, The Climate Group. Available at http://theclimategroup.org/assets/resources/low_carbon_leader_cities.pdf. Accessed 14 April 2007.

⁸ See The Climate Group's 2004 and 2005 *Carbon Down Profits Up* reports at www.theclimategroup.org/index.php?pid=732. Accessed 14 April 2007.

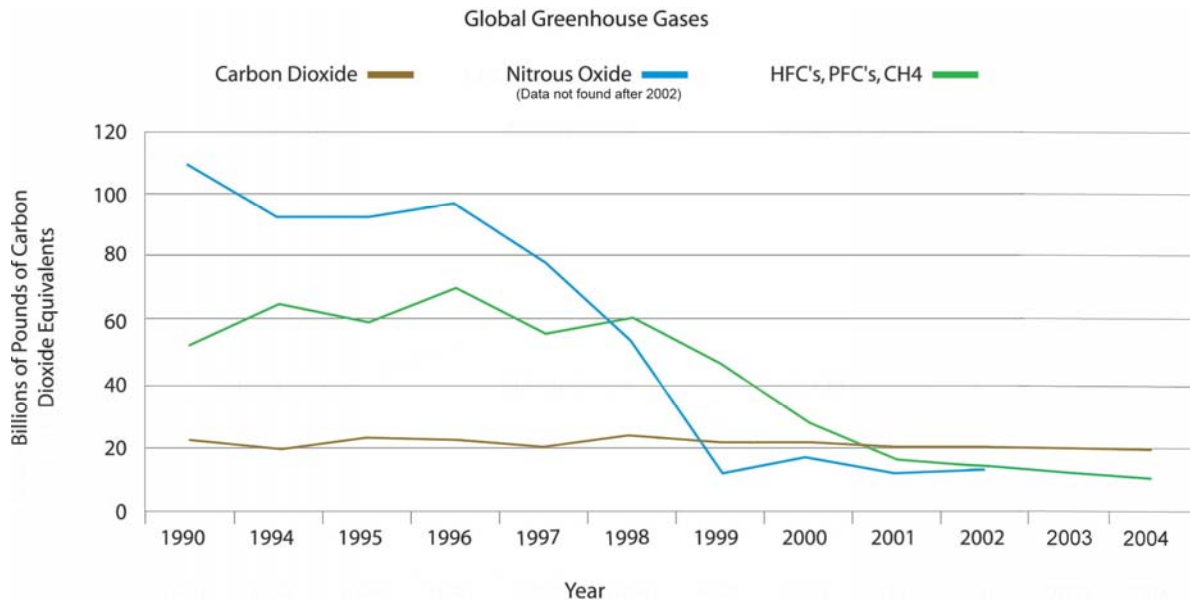


Figure 1. Global GHG emissions for DuPont (1990 – 2004)

Source: DuPont Inc.

Their report also showed that STMicroelectronics (ST) have pledged to have zero net CO₂ emissions with a 40-fold increase in production over its 1990 levels. It set a 2010 goal of 50 percent reductions in greenhouse gas emissions. This includes a mix of 15 percent renewable energy, 55 percent from cogeneration and 30 percent from conventional sources. By the time ST is climate neutral, it will have saved US\$900 million. Perhaps more important, ST's commitment to this goal has driven the company's innovation, taking the company from being the number twelve chipmaker in the world to being the number six. In 2007 ST have stated that they believe that a focus on what they are calling 'Sustainable excellence' reflects the *'belief we have in our ability to evolve, to improve and to respond to the expectations of our stakeholders, which will make our company 'sustainable' and enable us to contribute to sustainable development at a global level.*

Numerous companies overseas are committing to becoming climate neutral, including, Barclays Bank⁹, Marks & Spencer and BSkyB. They are a part of forty top British companies who, in early April 2007, launched an unprecedented campaign to shrink Britain's carbon footprint, by cutting their own energy use and trying to turn 'green consumerism into a mass movement'. The initiative, launched by Tony Blair, aims to counter a widespread feeling of helplessness among people who want to act to combat climate change, but fear that any contribution they make will be too small to make any difference. It is being spearheaded by some of the country's best-known brands - including Tesco, Marks & Spencer, BSkyB, HSBC, the BBC, B&Q and 02 - working with the Prime Minister's office, the National Consumer Council and the Church of England. Top businessmen, such as Sir Terry Leahy, chief executive of Tesco, and James Murdoch, chief executive of BSkyB, are intimately involved. The companies at the heart of the plans have all promised to clean up their own operations as a precondition of the campaign. BSkyB, for example, has cut greenhouse-gas emissions from its sites by 47 percent, buys all its electricity from renewable sources and has announced its intention to go carbon neutral.¹⁰

⁹Bond, S. (2007) *Barclays bank goes carbon neutral in UK*, edie.net. Available at http://www.edie.net/news/news_story.asp?id=12751. Accessed 14 April 2007.

¹⁰Lean, G. (2007) 'Green giants join forces to fight carbon emissions', *The Independent (UK)*, 25 March 2007. Available at http://news.independent.co.uk/environment/climate_change/article2390843.ece. Accessed 14 April 2007.

2) Improving competitive advantage through sustainable business practices

As Philip Stephens wrote this year in the *UK Financial Times*,¹¹

Business is about to discover that the shift towards a low-carbon economy is irreversible. Going green is about staying competitive. The steady trickle of companies signing up to do their bit to reduce carbon emissions is turning into a sizeable river.

While some in politics still assume that climate change is a significant threat to business and the economy, increasingly many leading businesses see it as a major business opportunity to improve their competitive advantage. A business strategy to achieve large reductions in greenhouse gas emissions can help business improve their long term strategic competitive advantage by both reducing operational costs and through product differentiation. As European Union Environment Commissioner Stavros Dimas, recently stated,

*Businesses which have responded to the need to reduce greenhouse gas emissions before regulators have forced restrictions are at a comparative advantage, and businesses which actively pursue innovations and opportunities that have been raised as a result of climate change will profit.*¹²

Many leading companies are showing that early action on climate change can help improve bottom line competitiveness while providing benefits to the company's brand and reputation. Leading companies implementing sustainable business practices in the light of growing calls for corporate social responsibility like Toyota and Westpac are now basing a significant part of their marketing on their corporate sustainability performance.

Many corporations are committing to achieving deep cuts in greenhouse gas emissions as part of their corporate strategy. There is now evidence that those companies that ignore these business opportunities risk losing significant market share:

- In 2005, Standards and Poors downgraded GM and Ford in the US market to junk-bond status while Toyota's profits reached over US\$14 Billion more than GM or Ford due to a focus on energy efficient cars like the Hybrid Prius and the Toyota Corolla.¹³ GM¹⁴ and Ford¹⁵ ignored the hybrid car market in the 1990s and banked on people wanting to keep on buying SUVs. GM and Ford now have hybrid cars available.
- Wal-Mart announced in 2006 a US\$500 million climate change commitment including initiatives to increase truck fleet fuel efficiency by 25 percent in three years and double it in ten.¹⁶ They projected that such efficiency improvements will reap significant bottom line benefits for WalMart making it even tougher for their competitors to compete. In addition WalMart has developed a strategy to influence its 60,000 suppliers to produce lower carbon products.¹⁷
- In May 2005, General Electric, announced 'Ecomagination', a major new business driver expected to more than double revenues from cleaner technologies to US\$20 billion by 2010 (from US\$6.2 billion in 2004). In May 2006, the company has already reported revenues of US\$10.1 billion from its energy efficient¹⁸ and environmentally advanced products and services.

¹¹ Stephens, P. (2007) 'Bend or Bust for Big Business', *UK Financial Times*. Available at <http://www.businessday.co.za/articles/opinion.aspx?ID=BD4A363984>. Accessed 14 April 2007.

¹² Extract from February 2007 transcript of EurActiv interview with Commissioner Dimas. Available at <http://www.euractiv.com/en/climate-change/dimas-business-attitudes-climate-change/article-161586>. Accessed 28 February 2007.

¹³ Business Week (2005) 'GM, Ford Fall on Ratings Downgrade to Junk', *Business Week Online*. Available at http://www.businessweek.com/investor/content/may2005/pi2005055_1209_pi004.htm. Accessed 14 April 2007.

¹⁴ GM (2005) *General Motors Sustainability Report*, GM. Available at http://www.gm.com/company/gmability/sustainability/reports/05/600_environment/index.html. Accessed 14 April 2007.

¹⁵ Ford Motor Co. (2006) *Ford Motor Co. Sustainability Report 2005-06*, Ford. Available at www.ford.com/NR/rdonlyres/5sy15bb33xlhoaxv4z7yc3ty6sdi25makivgg/2005-06_sustainability_report.pdf. Accessed 14 April 2007.

¹⁶ Climate Change Corp.Com (2006) *Wal Mart – An Environmental Epiphany?* Climate Change Corp.Com. Available at <http://www.climatechange.org/content.asp?ContentID=4009&ContentTypeID=8>. Accessed 14 April 2007.

¹⁷ The Climate Group (2007) *Profits Up, Carbon Down* (3rd ed), The Climate Group. Available at http://theclimategroup.org/assets/resources/cdpu_newedition.pdf. Accessed 14 April 2007.

¹⁸ Ibid.

3) Business and Government leadership improves competitive advantage

There are now significant government programs in most OECD countries working with hundreds to thousands of companies who are meeting their greenhouse gas reductions targets ahead of schedule and making money. The Executive Summary of this report outlined how the UK has implemented a national emissions trading scheme and a carbon tax in such a way that it has helped business competitiveness overall rather than harming it. In this discussion about the UK experience the Executive Summary stated that almost all UK companies have exceeded their carbon reduction targets. In total this has saved UK business US\$650 million.

Similar results are being achieved in the USA. Nearly 100 case studies charted by the Center for Energy & Climate Solutions for the 'Cool Companies Project' demonstrate how one business after another is earning the equivalent of 40 to 50 percent returns on energy-saving investments.¹⁹ Savings bring not only lower costs, but also measurable, documented productivity gains through improved product quality and employee morale. The US Pew Climate Centre partner companies are also meeting targets ahead of schedule and making money²⁰ as are the US EPA's Climate Leaders.

In Australia companies in the Australian Greenhouse Office's Greenhouse Challenge and Department of Industry Tourism Resource's Energy Efficiency Best Practice, and now the Energy Efficiency Opportunities program have exceeded expectations. In Australia there are, in fact, a number of energy efficiency schemes, such as the Department of Industry, Tourism and Resource's Energy Efficiency Opportunities program²¹ that are aiming to achieve similar results. This program builds on from work, by the department with business between 1999-2004, that showed that 30-70 percent energy efficiency savings are possible in most industry sectors in Australia. There are now several significant government and private sector schemes around the world working with thousands of companies that are meeting their greenhouse gas reduction targets ahead of schedule, as well as reducing costs and increasing profits.

It is time for a more sophisticated approach in Australia towards competitive advantage for business and climate change issues. Professor Michael Porter from the Harvard Business School, and author of many books on business competitiveness, has written that,²²

Our central message is that the environment-competitiveness debate has been framed incorrectly. The notion of inevitable struggle between ecology and the economy grows out of a static view of environment regulation, in which technology, products, processes, and customer needs are all fixed. In this static world, where firms have already made their cost-minimizing choices, environmental regulation inevitably raises costs and will tend to reduce the market share of domestic companies on global markets. Managers must start to recognize environmental improvement as an economic and competitive opportunity, not as an annoying cost or an inevitable threat. Environmental progress demands that companies innovate to raise resource productivity - precisely the new challenge of global competition. It is time to build on the underlying economic logic that links the environment, resource productivity, innovation, and competitiveness.

¹⁹ Centre for Energy & Climate Solutions: n.d www.cool-companies.org: www.cap-e.com: www.energyandclimate.org. (Accessed April 2007)

²⁰ Pew Climate Centre: n.d www.pewclimate.org/companies_leading_the_way_belc/targets/ (Accessed April 2007).

²¹ See Department of Industry, Tourism and Resource's Energy Efficiency Opportunities program at <http://www.energyefficiencyopportunities.gov.au/>. Accessed 14 April 2007.

²² Porter, M. and van der Linde, C. (1995) 'Green and Competitive: Ending the Stalemate', *Harvard Business Review*, September–October, pp 121–134; Porter, M. and van der Linde, C. (1995) 'Toward a New Conception of the Environment–Competitiveness Relationship', *Journal of Economic Perspectives*, vol IX-4, Fall, pp 97–118.

4) Bottom line benefits of greater energy efficiency

Energy efficiency opportunities are the quickest, easiest and cheapest way to reduce greenhouse gas emissions. Achieving greater levels of efficiency will be vital to ensuring long term sustainable prosperity for the global economy, especially when coupled with design and process improvements. Energy efficiency gains can come in a variety of ways, including lower capital costs and operating costs, increased yields, and reductions in other resource use such as water. Any energy efficient industrial technology improvement will incorporate one or more of these improvements. Some energy efficiency improvements may primarily be aimed at one goal, but also generally include beneficial impacts on other aspects of a production process. For instance, certain designs or technologies that are identified as being ‘energy-efficient’ because they reduce the use of energy will bring a number of additional enhancements to the production process. These improvements include lower maintenance costs, increased production yield, safer working conditions, and many other ‘productivity benefits’ or ‘non-energy benefits’, because in addition to reducing energy, they all increase the productivity of the firm. Several authors have studied the relationship between productivity and energy efficiency and found a direct relationship using different methodologies and datasets.²³

A key part of the business case for action on climate change comes from the fact that there still is a surprising amount of opportunities in most industries for energy efficiency to help significantly reduce greenhouse gas emissions and business costs. The discussion paper published by the National Framework for Energy Efficiency shows that energy efficiency opportunities of 30-70 percent still exist for almost all industry sectors in Australia.²⁴ Supported by the CSIRO Energy Transformed Flagship and the National Framework for Energy Efficiency, TNEP is working in with Griffith University (Centre for Environmental Systems Research) and the Australian National University (Institute for Environment) to develop education and training material to deliver an effective toolkit for capacity-building engineers and other key technical professions, in the skill of finding cost-effective low-carbon energy approaches and energy efficiency options.

Over the last twenty years engineers using Whole-of-Production (or Whole System Design²⁵) techniques have found that they can achieve large efficiency improvements profitably. Such energy efficiency opportunities exist because in the past many engineered systems did not take into account the multiple benefits that can be achieved by considering the whole system. Whole System Design is a process through which the inter-connections between sub-systems and systems are actively considered, and solutions are sought to address multiple problems via one and the same solution. Whole System Design is highly relevant because most energy-using technologies are designed sub-optimally in three ways: (which are usually so pervasive they often go unnoticed)

1. Components are optimised in isolation (thus ‘pessimising’ the systems of which they are a part).
2. Optimisation typically considers single rather than multiple benefits.
3. The right steps should be taken at the right time and in the right sequence.

Books such as *Factor 4*,²⁶ *Natural Capitalism*²⁷ and TNEP’s *The Natural Advantage of Nations*²⁸ show the multiple benefits to business of pursuing energy efficiency opportunities through a whole system approach. Companies that reduce their energy usage and their GHG emissions through these advanced approaches are reducing the risk of higher energy, carbon allowance or credit prices in the future, and are protecting shareholder value. Innovest’s research suggests that even a five percent shift in energy prices could impact per share earnings by as much as 15 percent in energy intensive industries.²⁹

²³ Boyd, G.A. and Pang, J.X. (2000) ‘Estimating the linkage between energy efficiency and productivity’. *Energy Policy*, vol 28, no. 5, pp 289–296; Kelly, H.C., Blair, P.D. and Gibbons, J.H. (1989) ‘Energy use and productivity: current trends and policy implications’, *Ann. Rev. Energy*, vol 14, pp 321–352; US Department of Energy (1997) *The interrelationship between environmental goals, productivity improvement, and increased energy efficiency in integrated paper and steel plants*, US Department of Energy, Office of Policy and International Affairs and Office of Energy Efficiency and Renewable Energy, DOE/PO-0055, Washington, DC.

²⁴ Energy Efficiency and Greenhouse Working Group (2003) *Towards a National Framework for Energy Efficiency – Issues and Challenges Discussion Paper*, National Framework for Energy Efficiency. Available at http://www.nfee.gov.au/about_nfee.jsp?xcid=64. Accessed 14 April 2007.

²⁵ Hargroves, K., Stasinopoulos, P., Smith, M. and Paten, C. (2007) *Engineering Sustainable Solutions Program: Design Principles Portfolio, Whole Systems Design*, The Natural Edge Project (TNEP), Australia. (http://www.naturaledgeproject.net/Whole_Systems_Design_Suite.aspx)

²⁶ von Weizsäcker, E., Lovins, A.B. and Lovins, L.H. (1997) *Factor 4: Doubling Wealth, Halving Resource Use*, Earthscan Publishing, London.

²⁷ Hawken, P. et al (1999) *Natural Capitalism: The Next Industrial Revolution*, Earthscan Publishing, London, Chapter 6: Tunneling Through the Cost Barrier.

²⁸ Hargroves, K. and Smith, M (2006) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance for the 21st Century*, Earthscan Publishing, London, pp 53-55.

²⁹ Innovest Strategic Value Advisors (2004) *Carbon Disclosure Project: Climate Change and Shareholder Value*, Innovest.

The economic benefits to Australia are remarkable of even just a 50 percent penetration of the energy efficiency opportunities, with a four year or less pay back period. The economic modelling for this National Framework for Energy Efficiency has shown that such a scenario would increase real GDP by AU\$1.8 billion and create 9000 new jobs in addition to the environmental benefits.³⁰

Improvements in end use energy efficiency on a large enough scale can also reduce infrastructure costs from reducing peak and base load electricity demand, thus helping to keep electricity costs down. As the authors of *Natural Capitalism* wrote,³¹

From the power plant to an industrial pipe, inefficiencies along the way whittle the energy input of the fuel - set at 100 arbitrary units in this example - by more than 90%, leaving only 9.5 units of energy delivered to the end use. Small increases in end-use efficiency can reverse these compounding losses. For instance, saving one unit of output energy will cut the needed fuel input by 10 units, slashing cost and pollution at the power plant.

Hence by focusing on end use efficiency a cascade of savings can be created all the way back to the power plant. This is why a focus on achieving end use energy efficiency gains in engineered systems such as motors, HVAC systems, commercial buildings, appliances and office equipment can help Australia reduce greenhouse gases significantly. The Natural Edge Project has developed a range of engineering training packages to help engineers help business identify and implement large energy efficiency saving opportunities. (See Further Reading and Online Resources)

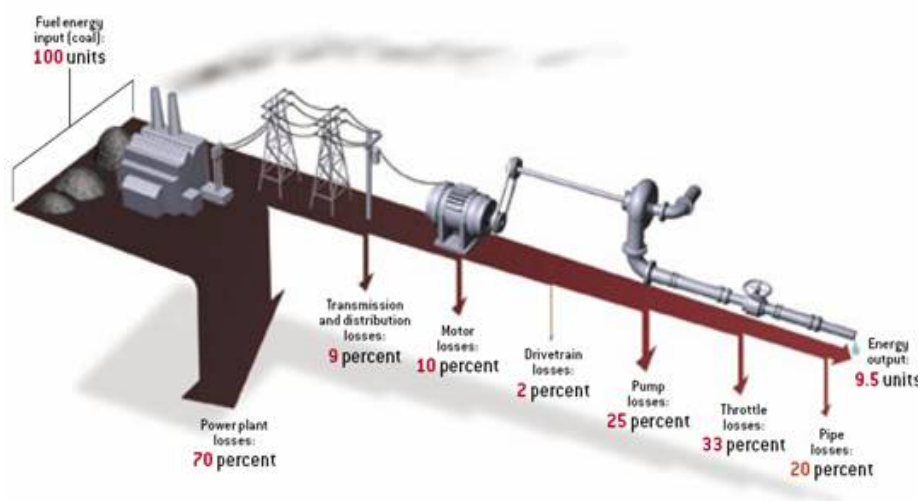


Figure 2. From the fuel power plant to an industrial pipe, inefficiencies along the way whittle the energy input of the fuel - set at 100 arbitrary units in this example - by more than 90 percent, leaving only 9.5 units of energy delivered to the end use.

Source: RMI³²

³⁰ Energy Efficiency and Greenhouse Working Group (2003) *Towards a National Framework for Energy Efficiency – Issues and Challenges Discussion Paper*, NFEF. Available at http://www.nfee.gov.au/about_nfee.jsp?xcid=64 (Accessed April 2007)

³¹ Hawken, P. *et al* (1999) *Natural Capitalism: The Next Industrial Revolution*, Earthscan Publishing, London, Chapter 6: Tunnelling Through the Cost Barrier

³² Lovins, A.B. (2005) 'More Profit with Less Carbon', *Scientific American*, Sept. 2005. See the extended bibliography at www.rmi.org/sitepages/pid173.php#C05-05. Accessed 12 January 2007.

5) Positioning for fast growing markets in renewable energy

Businesses competitive advantage also depends on positioning for new and emerging markets. Decentralised sources of electricity - cogeneration (the combined production of electricity and heat, typically from natural gas) and renewables (such as solar and wind power) – have surpassed nuclear power in global generating capacity. As can be seen in Figure 3, the annual output of these low- and no-carbon sources exceeded that of nuclear power in 2003.

Solar, biofuels, geothermal, tidal and hydropower now represent a global market of AU\$74 billion, which is forecast to grow fourfold by 2015. The European Union has committed to improved energy efficiency and use of renewables, which it sees as key to their competitive advantage in the 21st century. The Energy Intelligent Europe Initiative, signed by Parliamentarians from all 15 member countries, calls for the integration of energy efficiency and renewable energy as the basis for European competitiveness and high quality of life. The EU is seeking to source 22 percent of its electricity and 10 percent of its energy from such clean sources as wind within 10 years.³³ But it is not just in Europe that this is happening, China, Japan, Canada and the North East and Western States of the USA are investing heavily in renewable energy.

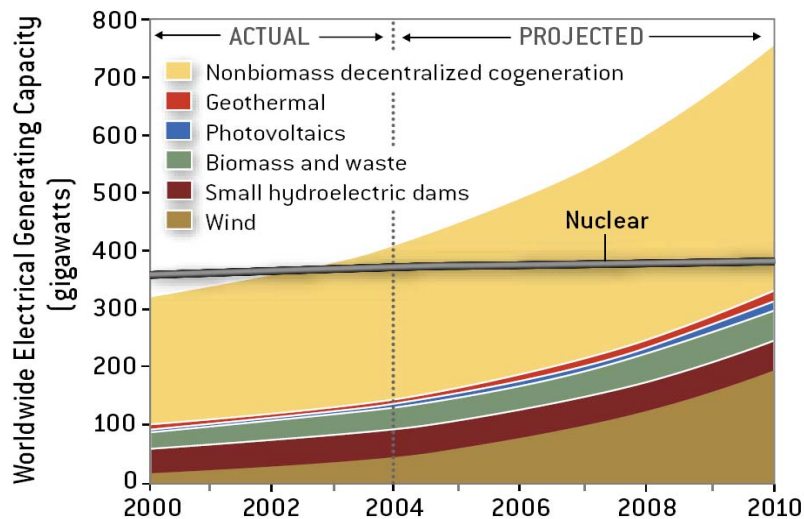


Figure 3. Decentralised sources of electricity—cogeneration (the combined production of electricity and heat, typically from natural gas) and renewables (such as solar and wind power)—surpassed nuclear power in global generating capacity in 2003.

Source: Rocky Mountain Institute

Energy efficiency properly applied can lead to large reductions in electricity demand. It is relatively easy for business, government, organisations and households through GreenPower accredited schemes³⁴ to afford purchasing at least a percentage of their electricity from sustainable renewable energy sources. This is driving these rapidly expanding global markets. In addition, State Governments in Australia have committed to significant renewable energy targets. The South Australian strategic plan has a target of 20 percent of South Australia's energy consumption to be sourced from green power by the year 2014. The NSW renewable energy target levels are 10 percent of NSW end use consumption by 2010 and 15 percent by 2020.³⁵ The Victorian Government has committed to 10 percent of all electricity coming from renewables by 2016.³⁶ The Western Australian Government has committed to purchasing 20 percent renewable energy by 2010.³⁷

³³ 'Intelligent Energy – Europe' (EIE) is the Community's support program for non-technological actions in the field of energy, more specifically the field of energy efficiency and renewable energy sources. The duration of the program is from 2003-2006. The program was adopted by the European Parliament and the Council on 26 June 2003. It was published in the Official Journal of the European Union on 15 July 2003 (OJ, L 176, p 29-36) and entered into force on 4 August 2003.

³⁴ See Green Power Accredited Schemes in Australia at <http://www.greenpower.gov.au/pages/>. Accessed 14 April 2007.

³⁵ See NSW Renewable Energy Targets at <http://www.deus.nsw.gov.au/Publications/NRET%20Explanatory%20Paper%20FINAL.pdf>. Accessed 14 April 2007.

³⁶ See Victoria's Renewable Energy Targets at <http://www.envict.org.au/inform.php?menu=4&submenu=20&item=1211>. Accessed 14 April 2007.

³⁷ See WA Governments Renewable Energy Targets at <http://www.mediastatements.wa.gov.au/media/media.nsf/9dbd10dc05971ee348256a76000cc002/3ebfa997263f4435c825727900050a50?OpenDocument>. Accessed 14 April 2007.

In addition to these renewable energy targets in Victoria, New South Wales, South Australia and Western Australia; other state government initiatives to encourage reduced greenhouse gas emissions include:

- A mandatory gas energy target in Queensland.
- Feed-in tariffs in South Australia and Victoria.
- Legislated greenhouse gas emission targets in Victoria and South Australia.
- Minimum building efficiency schemes in each state.
- Energy savings and demand management incentive programs in Victoria, South Australia and New South Wales.

Wind power is the cheapest and in windy areas is now getting close to being cost competitive with coal. Yet to date wind atlases, informing business on where the best wind resources exist, are only available for Victoria and NSW. For these two states these wind atlases show that many of the windiest sites are in rural regions offering new ways for rural communities to earn valuable income and create jobs during the drought.

6) Staying ahead of the game through a focus on becoming climate neutral

The game is shifting so fast that companies who wish to get the first mover advantage of committing to becoming climate neutral need to do it sooner than later. Some of the higher profile companies and organisations who have done so recently include Price Waterhouse Coopers, The AFL Commission, Collingwood Football Club and the Channel Seven's breakfast show 'Sunrise'. But these are simply the high profile leaders amongst now a growing number of companies that are making this commitment. All these companies have energy efficiency programs and are purchasing renewable energy through accredited Green Power schemes. But air and car travel emissions need to be offset as well. Hence all these companies are also investing in carbon offsets. There are three types of carbon offsets schemes being offered which provide carbon credits:

1. Energy efficiency initiatives which reduce X tons of carbon, gaining carbon credits. The offsetting company Easy Being Green³⁸ uses this approach.
2. Renewable energy to gain carbon credits. This is the approach of the carbon offsetting company Climate Friendly.³⁹
3. Tree planting and revegetation to gain carbon credits and improve biodiversity. Greening Australia⁴⁰ is launching in 2007 a premium biodiversity carbon credit product called Breathe Easy.

In addition there is nothing to stop companies from investing in their own wind/solar farms and selling excess to the grid or purchasing land for re-vegetation and tree planting, or giving donations to organisations like the Australian Bush Heritage Fund.

There is value in all approaches. Some are sceptical about the value of carbon offsets from tree planting and revegetation. There is justifiable concern that with the increased risks of bushfires in Australia such schemes may not store long term as much carbon as promised. There is a need for this rapidly growing sector to be better regulated and for there to be formal accreditation programs to ensure that those purchasing carbon offset products are not let down. Such regulation is needed as there is evidence that efforts to offset are of value. For instance the latest studies show that plantations and timber products are better at storing carbon than previously thought.

Numerous life cycle analysis (LCA) studies show that plantation timber products – structural timber, timber flooring, window frames, furniture, cabinets - have a far lower 'carbon footprint' than many other materials. Timber products can all be recycled. But once they have to be sent to landfill studies by the Australian CRC for Greenhouse Accounting⁴¹ show that timber and paper products take significantly longer to decompose and release their carbon than previously thought. Their research showed that timber that had been in landfill

³⁸ See Easy Being Green at <http://shop.easybeinggreen.com.au/categories.asp?cID=109&fromhome=true>. Accessed 14 April 2007.

³⁹ See Climate Friendly at <http://www.climatefriendly.com/>. Accessed 14 April 2007.

⁴⁰ Greening Australia. n.d <http://www.greeningaustralia.org.au/GA/NAT/>. Accessed 14 April 2007

⁴¹ Smith, M. and Hargroves, K. (2006) 'Wood - Another Low Carbon Footprint Solution', CSIRO ECOS, Issue 129, pp 12-13.

for 46 years had only lost between 1.4 to 3.5 percent of its carbon. Also they found that paper likewise had lost little of its carbon over 20-50 year periods in landfill. Previously scientists have assumed that decomposition rates would be 10-100 times greater than this. Similarly in the past scientists have assumed that the rate of decomposition of the roots of trees cut down and their litter was rapid thus quickly releasing the stored carbon. Again the CRC for Greenhouse Accounting's research has shown that the rate of decomposition is orders of magnitude less than previously thought. Carbon offsets therefore can buy humanity time through a transition to a low carbon economy and hence are of value. But they should never be seen as a substitute for reassessing the current systems to uncover opportunities for design, operation and process improvements to reduce emissions.

7) The time for inaction on climate change has passed

Companies that ignore climate change will now be left behind and risk losing reputation and community good will. The struggle to understand the science of complex carbon cycles has often provided mixed messages to business leaders and politicians, however for better or for worse the messages have reached consensus and it is time to act. The time has come for three main reasons:

1. Science has revealed more extensive consequences and shorter timelines for solving global warming problems than had previously been thought. The latest IPCC 4th Assessment's 3rd report published on May 4th 2007⁴² makes this very clear. Reporting on the IPCC's report Minchin wrote that, "*The world has less than eight years to arrest global warming or risk what many scientists warn could be catastrophic changes to the planet... The latest volume of the Intergovernmental Panel on Climate Change report, on how to slow global warming, found that making deep emission cuts will require significant changes to the way we live, from the types of power and transport we use, to how much we consume. In the panel's strongest warning so far that time is running out, it said that the next two to three decades will largely determine how much the planet warms up and how severely climate change affects our lives.*"⁴³
2. Most leading corporations around the world are taking action now on climate change and positioning themselves for the booming markets in greenhouse friendly products. Companies that do not act now will be left behind. Take for instance, News Ltd and Fox, one of the biggest media companies in the world. Rupert Murdoch's media empire will seek to become climate neutral and use his vast media empire to promote action on climate change. Murdoch stated recently, "*And as many companies have already learned, acting on this issue is simply good business. Reducing our use of energy reduces costs... Inviting our employees to be active on this issue helps us recruit and retain the world's best. For us, as a media company-- this is a chance to deepen our relationships with our viewers, readers, and web users. The debate is shifting from whether climate change is really happening to how to solve it. And when so many of the solutions make sense for us as a business, it is clear that we should take action not only as a matter of public responsibility, but because we stand to benefit.*"⁴⁴ Murdoch's media empire reaches over 3 billion people globally including over 100 million in India alone. Murdoch has announced that his media network globally is working on new ways to inspire people to act.
3. Hence, more than ever, competent greenhouse gas management is becoming a proxy for competent corporate governance. By taking a leadership position in dealing responsibly with climate change businesses will be positioning themselves for new emerging markets and also ahead of likely changes to regulations and government incentives. Post the UK *Stern Review*⁴⁵ it is clear that significant action on climate change from governments nationally and globally is warranted to correct what Stern described as the biggest market failure ever – climate change.

⁴² IPCC (2007) *Fourth Assessment Report. WG2: 'Climate Change 2007: Impacts, Adaptation & Vulnerability'*, IPCC. Available at <http://www.ipcc.ch/SPM6avr07.pdf>. Accessed 14 April 2007

⁴³ Minchin, L (2007) *A Climate of Change*, The Age. n.d <http://www.theage.com.au/news/national/a-climate-of-change/2007/05/04/1177788398904.html?page=fullpage#contentSwap1> May 5th, 2007.

⁴⁴ Rupert Murdoch speech on Climate Neutrality n.d <http://www.theaustralian.news.com.au/story/0,20867,21705121-601,00.html> May 10th, 2007 (Accessed May 2007)

⁴⁵ Stern, N. (2006) *The Stern Review: The Economics of Climate Change*, Cambridge University Press, Cambridge. Available at www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm. Accessed 14 April 2007

8) Managing risk and liability

A pro-active position on climate change also assists to address other risks for business. In a world that overwhelmingly recognises climate change as a serious threat, behaviour that ignores it is coming to be seen as irresponsible. In 2003 the *Columbia Journal of Environmental Law* published an article⁴⁶ demonstrating the legal feasibility of lawsuits holding companies accountable for climate change. The effects of such have already started.⁴⁷

In 2003, the *Wall Street Journal* reported that '*With all the talk of potential shareholder lawsuits against industrial emitters of greenhouse gases, the second largest re-insurance firm, Swiss Re, has announced that it is considering denying coverage, starting with director's and officer's liability policies, to companies it decides aren't doing enough to reduce their output of greenhouse gases.*'⁴⁸ In the United States, the new Sarbanes-Oxley Act⁴⁹ makes it a criminal offence for a company board of directors to fail to disclose environmental liabilities (including greenhouse gas emissions) that could alter a reasonable investor's view of the organisation. In France, The Netherlands, Germany⁵⁰ and Norway, companies are required by law to publicly report their greenhouse gas emissions.

In an era of instant global communication, corporations and organisations can have their activities broadcast to an audience of millions, and risk swiftly losing their reputation. A 2004 survey of some of the world's leading CEOs, undertaken by the World Economic Forum at Davos, found that the responding leaders felt that corporate reputation is now a more important measure of success than stock market performance, profitability, and return on investment. Only the quality of products and services edged out reputation as the leading measure of corporate success. Fifty-nine percent of the respondents estimated that corporate brand or reputation represents more than 40 percent of a company's market capitalisation.⁵¹

9) Government leadership and effective incentives to achieve sustainable cuts

Increasingly business in Australia is calling for early action on climate change as lack of certainty about future climate policy in Australia heightens the risks associated with investment. All sectors of the economy will be affected by climate change, and by emissions trading schemes and/or a carbon tax. For instance, The Energy Supply Association of Australia (ESAA) estimates that \$30 billion of investment is required in the electricity sector over the next decade. Lead times for base load generation are four to six years and these assets have long lives. In the absence of carbon risk, these investments would be driven by well known factors. But climate change is now a key factor in the decision-making process for base load generation. In the absence of a clear long-term framework on climate change, investor appetite for new large plant is likely to remain low due to potential risk. The ESAA has clearly stated that '*One of the biggest sovereign risk issues facing the energy sector is [the uncertainty surrounding] future Government policy and measures on emissions*'.

This issue highlights the need in Australia for a sophisticated short and long term develop approach to achieve deep cuts to greenhouse gas emissions while maintaining strong economic growth. This requires us to examine more deeply what is happening with electricity demand in Australia. This requires as to ask some key questions, such as what is driving such large increases in electricity demand? No one seems to ever ask this basic question, let alone ask what creative win-win options exist to reduce electricity demand and reward customers and utilities alike. We consider these questions next.

⁴⁶ Grossman, D. (2003) 'Warming Up to a Not-So-Radical Idea: Tort-Based Climate Change Litigation', *Columbia Journal of Environmental Law*, vol 28.

⁴⁷ FoE, in conjunction with Greenpeace and several western cities, filed one of the first climate change lawsuits last year. The suit charges two U.S. government agencies with failing to comply with the National Environmental Policy Act (NEPA) requirements to assess the environmental impact of projects they financed over the past decade. The states of Connecticut, Massachusetts, and Maine have also filed a climate change lawsuit against another U.S. government bureau, the Environmental Protection Agency, for failing to regulate carbon dioxide emissions under the Clean Air Act.

⁴⁸ Ball, J. (2003) Insurers Weigh Moves to Cut Liability for Global Warming Directors, Officers Could Face the Denial Of Coverage After Rules Are Implemented *Wall Street Journal*, May 7, 2003. n.d <http://www.heatisonline.org/contentserver/objecthandlers/index.cfm?id=4277&method=full> (Accessed May 2007)

⁴⁹ Lyons, F.X. (2003) *Sarbanes-Oxley and the Changing Face of Environmental Liability Disclosure Obligations*, Gardner Carton & Douglas LLP. Available at www.gcd.com/db30/cqi-bin/pubs/Sarbanes2.pdf. Accessed 14 April 2007.

⁵⁰ In Germany, only 'heavy' industry is required to report greenhouse gas emissions.

⁵¹ Sosnowchik, K. (2004) 'Between Blue and Yellow: What's In a Name?', *Green@work*. Available at <http://www.greenatworkmag.com/magazine/between/04mayjun.html>. Accessed 14 April 2007.

10) What is driving the rising electricity demand in Australia?

The International Energy Agency forecasts that, *‘if policies remain unchanged, world energy demand is projected to increase by over 50% between now and 2030’*.⁵² CSIRO has projected that energy demand will double in Australia by 2020. This is why the ESAA estimates that AU\$30 Billion of investment is required in the electricity sector over the next decade. Clearly striving to meet such a large forecast demand will make it very hard to also achieve the required reductions in greenhouse gas emissions. Therefore, it is important to ask the question - what is driving increased demand for electricity in Australia?

This question was asked in The Natural Edge Project publication *The Natural Advantage of Nations*, where after extensive mentoring and expert advice from leaders such as Professor Alan Pear and Professor Mark Diesendorf, it stated,⁵³

Intuitively, one would assume factors such as increasing population, increased use of electrical appliances and equipment and a growing economy would dictate energy use in society and be driving increased energy production. But the main driver to build new power stations in Australia currently typically comes from the increasing seasonal peak energy demands for cooling and heating poorly insulated and designed commercial and residential buildings. Effectively the entire system is designed to ensure it meets these demand for air conditioning on those stinking hot 40 degree summer days in Australia. Then the electricity supply sector in Australia carries a redundancy during the predominant non-peak periods... Once these new power stations were built to meet peak energy demand, they made more money for the more energy they sold. Hence there was little incentive for governments to encourage passive cooling design, demand management and energy efficiency.

Today, as a result of this, meeting forecast rising peak electricity load demand is very expensive for governments and tax payers. This is because a significant amount of electricity supply infrastructure needs to be built to meet the daily and seasonal peak loads which only account for a small percentage of annual demand. So a key leverage point here to reduce forecast electricity demand is to focus on ways to reduce daily and seasonal peak load electricity demand. Clearly governments could provide further incentives to encourage households and commercial buildings to be better designed to reduce their demand for air-conditioning. Better incentives to help reduce greenhouse gas emissions from commercial and residential buildings can help significantly. But these could help further if they were complimented by a national roll out of smart meters in combination with tariff reform.

11) Smart ways to reduce ‘Peak’ load electricity demand

Most of the time domestic and commercial building energy use is invisible to the customer. Most people do not realise that the demand and price of electricity changes during the day, reaching a peak between 3-6pm on most days in OECD countries. Most do not realise that through changing day-to-day behaviour and investing in efficiency measures what a difference they can make. Instead, currently, basic meters are used, which accumulate the total electricity used over a period of time such as three months, whereupon customers receive a quarterly bill from their electricity provider. Therefore smart meters, which provide customers with information about how much energy they are using, and the price of energy - usually every half hour - are an important first step.

Overall, the literature demonstrates that clear feedback is a necessary element in learning how to control electricity use more effectively over a long period of time and that instantaneous direct feedback in combination with frequent, accurate billing (a form of indirect feedback) is needed as a basis for sustained electricity demand reduction by households and business. Smart Metering is being rolled out in a number of countries and states globally to help reduce peak electricity demand.⁵⁴ Extensive roll outs are underway in

⁵² International Energy Agency (2005) *World Energy Outlook 2005: IEA Projects Growth in Middle East and North Africa Oil and Natural Gas Sectors through 2030 but a Lack of Investment would Push up Prices and Depress GDP Growth*, International Energy Agency. Available at http://www.iea.org/Textbase/press/pressdetail.asp?PRESS_REL_ID=163. Accessed 14 April 2007.

⁵³ Hargroves, K. and Smith, M (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance for the 21st Century*, Earthscan Publishing, London, pp 53-55.

⁵⁴ Siderius, H.P. and Dijkstra, A. (2006) *Smart Metering for Households: Cost and Benefits for the Netherlands*, SenterNovem. Available at http://mail.mtprog.com/CD_Layout/Day_2_22_06_06/0900_1045/ID57_Siderius_final.pdf. Accessed 14 April 2007; Sarah Darby (2006) *The Effectiveness of Feedback on Energy Consumption: A Review for DEFRA of the Literature on Metering, Billing and Direct Displays*, Environmental Change Institute Oxford. Available at www.defra.gov.uk/environment/energy/research/pdf/energyconsump-feedback.pdf. Accessed 14 April 2007.

countries like Italy and Sweden, and in states like Victoria in Australia, and California and Pennsylvania in the USA. Victoria is planning on replacing all old meters with smart meters over the next 4-5 years. In New South Wales over 160,000 manually read interval meters have been installed to-date and a further 250,000 meters are to be installed over the next four years as part of an extensive trial.⁵⁵ Trials of smart metering are also an intrinsic part of the Federal Government's Solar Cities program.⁵⁶ For instance, Townsville City Council will roll out 2,500 smart meters and 1,700 in-house energy display meters.⁵⁷ The Council of Australian Government's Meeting held on the 10th of February 2006⁵⁸ publicly announced their decision to:

Improve the price signals for energy investors and customers by: (a) committing to the progressive roll out of electricity smart meters to allow the introduction of time of day pricing and to allow users to respond to these prices and reduce demand for peak power; (b) requesting the MCE to agree on common technical standards for smart meters and implement the roll out as may be practicable from 2007 in accordance with an implementation plan that has regard to costs and benefits and takes account of different market circumstances in each State and Territory.

At the subsequent Ministerial Council on Energy (MCE) meeting Communiqué Sydney, 27 October 2006⁵⁹ the State and Federal Government Energy Ministers re-iterated this commitment to rolling out smart meters subject to further cost benefit analysis and consultation with stakeholders. The Energy Ministers stated,

Ministers agreed on a policy framework for pursuing a progressive roll out of smart meters, including an initial statement of functionality and a broad timeline for development of the initiative. Final and detailed policy decisions will reflect a cost-benefit analysis managed by MCE and stakeholder consultation. Further analysis of jurisdictional markets to identify implementation costs and benefits, and consultation with all stakeholders, will now commence.

To date, most cost benefit analysis suggests that investment in smart meters is justified. For instance, in California, where they have embraced smart metering technology, the results have exceeded even the optimists' hopes with energy demand during peak periods lowered by 12-35 percent. The vast majority of householders now receive lower bills on the new rates, and 90 percent of participants support the use of smart meters and dynamic rates throughout the state. There is a great deal of international experience from which COAG and the Ministerial Council on Energy can learn. In Italy, for instance, they are in the process of rolling out smart meters to 30 million customers. Sweden is now embarking on a national roll out scheme of smart meters. In the USA, Pennsylvania Power and Light (PPL) have installed 1.35 million smart meters. In Florida, electricity suppliers Georgia Power and Gulf Power have implemented smart meters and real time pricing with remarkable results. For Georgia Power, large customers reduced electricity demand by 20-30 percent during peak load. For Gulf Power, a 41 percent reduction in load during peak times was achieved. These initiatives and trials in Australia and globally will provide further information on how best to implement smart metering roll outs in Australia.

⁵⁵ NEMMCO (2006) *Metering and Retail Market Development 2006 Annual Report*, NEMMCO. Available at <http://www.nemmco.com.au/meteringandretail/610-0112.htm>. Accessed 14 April 2007.

⁵⁶ For Background on the Solar Cities program see Australian Greenhouse Office (n.d.) *Solar Cities Program*, AGO. Available at www.greenhouse.gov.au/solarcities. Accessed 14 April 2007.

⁵⁷ Townsville: Queensland's First Solar City. www.deh.gov.au/minister/env/2006/mr26sept06.html

⁵⁸ See COAG February 2006 - Decision 2.2 at www.coag.gov.au/meetings/100206/attachment_b_ncp_review.pdf. Accessed 14 April 2007.

⁵⁹ Ministerial Council on Energy (2006) Ministerial Council on Energy: Communiqué. Available at www.mce.gov.au/assets/documents/mceinternet/FINAL%20MCE%20Communique%20Oct%2006%20revised20061027125733.pdf. Accessed 14 April 2007.

12) Smart ways to reduce 'Base' load electricity demand

Baseload electricity describes the electricity used by the economy 24 hours a day, seven days a week. Given the size of the Australian service industry, commercial building and residential market, it is clear that there should be a significant reduction in electricity used at night and over the weekend. However this is not the case. Research by Genesis Auto shows that in NSW and Victoria there is very little variation between electricity base-load between weekdays (when one would expect the highest base-load) and between 10pm-5am or weekends (when one would expect the lowest base-load electricity demand).

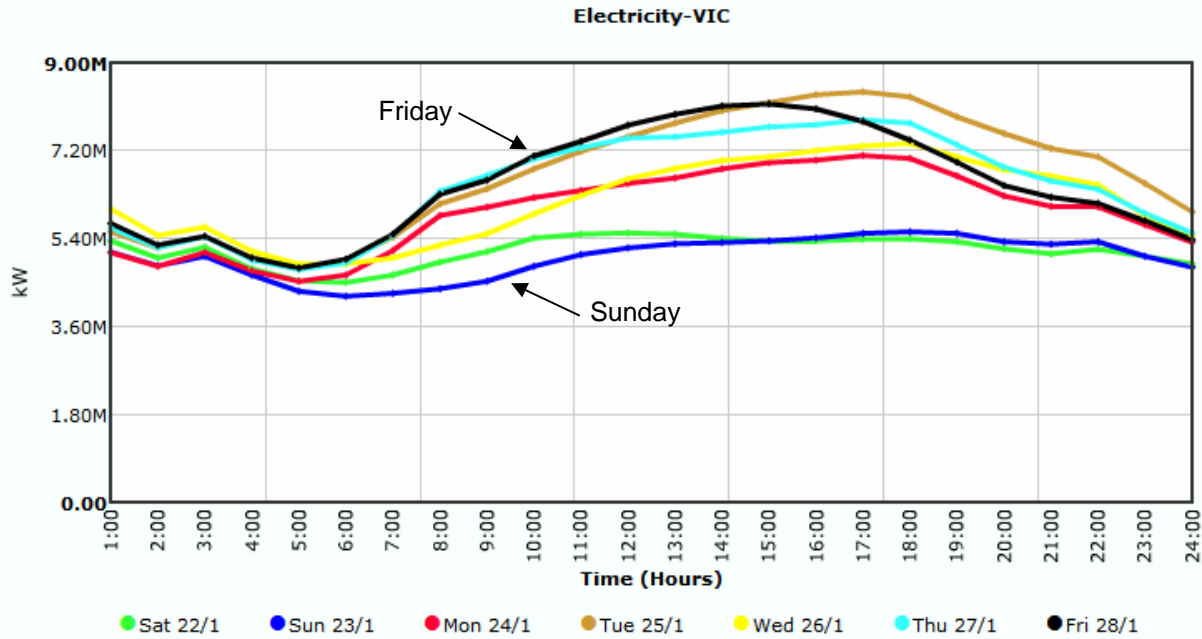


Figure 4: Victoria's Summer Electricity Demand (GW) Saturday 22 January 2005 to Friday 28 January 2005. Includes Australia Day public holiday showing much higher load than the Saturday and Sunday. (Source: Genesis Auto, Source Data: NEMMCO <http://www.nemmco.com.au/>)

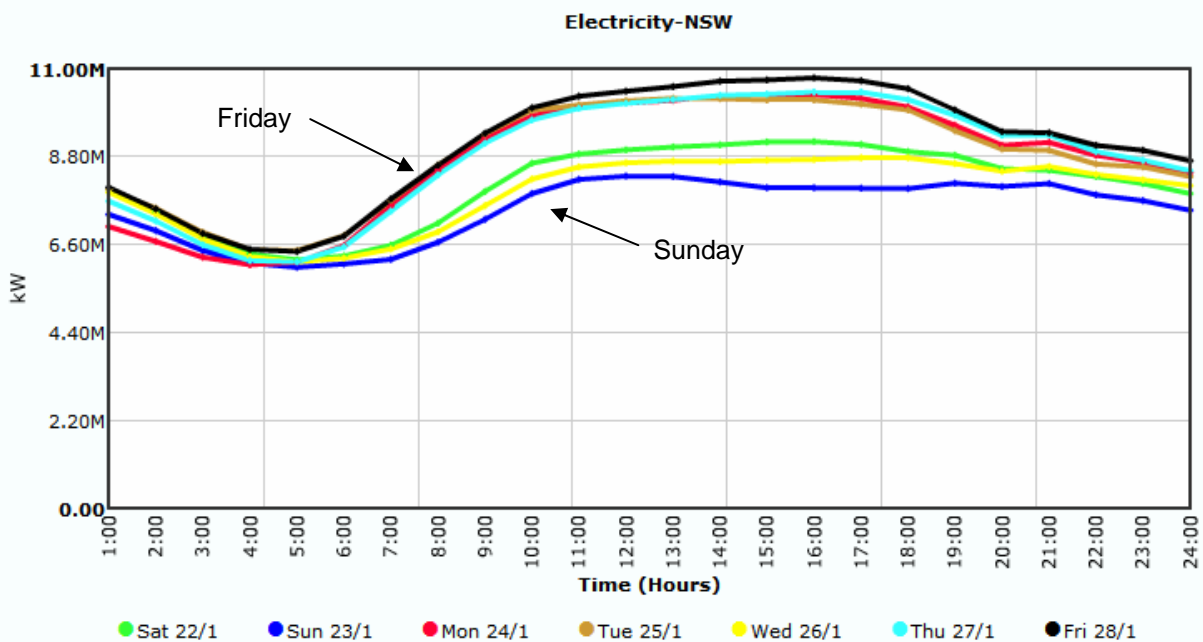


Figure 5: NSW's Summer Electricity Demand (GW) Saturday 22 January 2005 to Friday 28 January 2005. Includes Australia Day public holiday showing much higher load than the Saturday and Sunday. (Source: Genesis Auto, Source Data: NEMMCO <http://www.nemmco.com.au/>)

This suggests that there is significant potential to reduce base-load electricity demand in Australia between 10pm and 5am and on weekends through using timers to switch off what does not need to be left on. In Italy they have instituted regulations that require commercial buildings to turn their lights off after 12am to save electricity and reduce greenhouse gas emissions. Research by energy efficiency experts Alan Pears and Geoff Andrews suggests that most organisations leave at least 5-10% of equipment, lighting or appliances on that does not need to be.⁶⁰

Australia is blessed with very cheap energy compared to most OECD countries, due to our coal reserves. This has led to many businesses, commercial buildings and households simply leaving on machinery, lighting, appliances, air-conditioning and heating throughout the night and over weekends rather than ensuring that such equipment turns off when it is not needed. Government energy efficiency programs have found that commercial buildings can save as much as 70 percent over the weekend simply by ensuring that more efficient lighting and air-conditioning is used and turned off when not needed. Australia wastes over 10 percent of all electricity used simply through leaving domestic appliances on standby which could otherwise be turned off. This results in Australia's base load electricity being a higher percentage of total electricity usage than other OECD nations. Australia's base load electricity usage is 70 percent while the UK's is 40 percent. Significant reductions in base load and peak load electricity demand can be achieved through investing in even half of the 70 percent energy efficiency potential in the Australian economy. Such investment could be assisted if government and industry worked together to address barriers to the uptake of more energy efficient practices.

13) Reducing the need for new power plants and infrastructure

Governments could improve the existing regulatory frameworks to reward electricity utilities for helping their customers to use electricity more efficiently. Currently there is little incentive for electricity utilities to move in this direction:

Electric utility experts have recognised for a long time that under regulatory structures (eg: traditional rate-of-return regulation, rate caps etc) utilities do not have an economic incentive to provide programs to help their customers be more energy-efficient. In fact, they typically have a dis-incentive because reduced energy sales reduce utility revenues and earnings. The financial incentives are very much tilted in favour of increased electricity sales and expanding supply side systems.⁶¹

Hence in the past, electric utilities have often opposed and lobbied against sustainable development type initiatives such as a utility run customer energy efficiency program and carbon emissions trading schemes. A new report, 'Aligning Utility Interests with Energy Efficiency Objectives: A Review of Recent Efforts at Decoupling and Performance Incentives'⁶² has investigated how to re-align incentives and regulations to ensure that electric utilities and customers can create a win-win situation from sustainable development.

Their report has found that there are at least 25 states in the USA with serious utility rate-payer-funded energy efficiency programs in operation, all with very positive results. All of these states have addressed the traditional disincentives by introducing some type of cost recovery mechanism for these energy efficiency programs for the electric utility (e.g. a public benefits charge plus the ability to recover additional energy efficiency costs in rates). Other examples include:

- Decoupling of utility revenues and profits through legislation to reward utilities for selling less energy. Generally in these new regulatory frameworks customers received 85 percent of those savings as lower bills, while the utility's shareholders received the rest as extra profits, not to mention the direct savings in infrastructure from the reduced peak load generation requirement - the perfect win-win option for the energy supply sector. This was first introduced in California in 1992 . 'Retaining 15% of the savings inspired Pacific Gas and Electric (PG&E) in 1992, the U.S.'s largest private utility, to put a halt to building or planning any new conventional power plants. PG&E found that they could address any

⁶⁰ Pears, A (2004) Misconceptions About Energy Efficiency – Its Real Potential: Some Perspectives and Experiences. Background paper for International Energy Agency Energy Efficiency Workshop, Paris April 2004 N.d http://www.naturaledgeproject.net/NAON_ch17.aspx (Accessed May 2007)

⁶¹ Kushler, M. (2006) *Aligning Utility Interests with Energy Efficiency Objectives: A Recent Review of Efforts at Decoupling and Performance Incentives*, P5. Available at <http://aceee.org/pubs/u061.pdf?CFID=1902973&CFTOKEN=31285910>. Accessed 14 April 2007.

⁶² Ibid

*subsequent increase demand for electricity through renewables. Using this method in California in 1992, PG&E63 invested over US\$170 million to help customers save electricity more cheaply than the utility could make it. That investment created US\$300–400 million worth of savings. Customers received 85% of those savings as lower bills, while the utility's shareholders received the rest—over US\$40 million.'*⁶⁴ Seven states now in the USA have such decoupling mechanisms now in place.⁶⁵

- Providing shareholder 'performance incentives' for achieving energy efficiency program objectives. These can take several forms such as *'providing utilities with a specific reward for meeting certain targets, allowing utilities to earn a rate of return on energy efficiency investments equal to supply side and other capital investments or providing utilities with an increased rate of return either on the energy efficiency investment specifically or overall.'*⁶⁶

14) Can renewable energy meet Australia's forecast increases to peak and base load?

It is widely acknowledged that renewable energy is very effective at helping business and the economy meet peak load demand, as renewable energy sources like co-generation, wind and solar produce the most amount of energy during peak load times of the day. What there is still much debate on is whether renewable energy can meet forecast base load electricity demand. Modelling by the Clean Energy Group published in their 'Clean Energy Reports for Australia' suggests that a combination of demand management, investment in energy efficiency and renewable energy, and using gas as a transition fuel, can address a significant percentage of base load demand. This group has modelled deep cut scenario's for the whole of Australia as well as for four states - Victoria, NSW, WA and Queensland. Renewable energy now accounts for a quarter of the installed capacity of California, a third of Sweden's energy, half of Norway's and three-quarters of Iceland's. Wind power now supplies more than 10 percent of Danish electricity and wind turbines are Denmark's fourth largest export worth US\$1 billion annually, employing 12,000 people.

Many forms of renewable energy are not dependant on day-to-day weather variations and hence can provide electricity just as reliably as coal or nuclear, such as co-generation, geothermal, tidal, and biomass. Furthermore, renewable energy flows from wind and solar are much less intermittent than many assume. For a start, wind and solar farms have been and will be located deliberately in areas where there are the highest mean wind speeds and solar radiation respectively per annum. Until recently, in Australia there were no wind atlas's with such information. Now wind atlas's exist for NSW and Victoria showing where the windiest spots, on average per annum, are located. Interestingly, over half of the windiest spots are in rural and regional Australia where wind farms will bring valuable income to farmers and create rural jobs. The other windiest spots are along Australia's coasts, where most of the population live. There is almost always a coastal breeze that usually springs up by mid-morning, due to the temperature differential between the sea and the land. With the cost, of locating wind turbines out at sea, coming down significantly through expansion into this market in Europe, there are many options and locations for Australia's largely coast-bound population to meet its energy needs through wind power. Other emerging technologies in tidal hydro and mini turbines are allowing for populated areas to use systems that are out to sea and even completely submerged, drawing on the constant movement of the tide.⁶⁷

Due to the telecommunications revolution the fluctuations in renewable energy flows are also better understood and more predictable through real-time satellite weather forecasting. This real-time information therefore, in principle, allows energy suppliers to monitor and predict any shortfalls in energy supply from wind and address it. In the US, studies have shown that, for an illustrative Pacific Coast array of wind machines, a lull in the wind meant that, at worst, power generation was reduced to about a third of the summer mean for no more than fifteen hours with nearly 95 percent probability. These studies showed that the wind power would drop below one-sixth of the summer mean for as long as ten hours⁶⁸ only 1 percent

⁶³ This sensible program was mothballed when the 'deregulation' mania swept California, and set the state down the path to exporting billions of dollars to Enron and other Texas energy companies. But in the wake of the 2001 California Energy Crisis, it is coming back into fashion. Today, PG&E now runs an extensive Customer Energy Management Program that provides customers with access to energy efficiency experts in order to address demand-side energy efficiency and conservation.

⁶⁴ RMI (n.d.) *Saving the Utilities*, RMI. Available at <http://www.rmi.org/sitepages/pid322.php>. Accessed 14 April 2007.

⁶⁵ Kushler, M. (2006) *Aligning Utility Interests with Energy Efficiency Objectives: A Recent Review of Efforts at Decoupling and Performance Incentives*, P5 Available at <http://aceee.org/pubs/u061.pdf?CFID=1902973&CFTOKEN=31285910>. Accessed 14 April 2007.

⁶⁶ Ibid

⁶⁷ <http://www.biopowersystems.com/>

⁶⁸ Lovins, A. et al (2002) *Small is Profitable*, Rocky Mountain Institute Publishing, p 180.

of the time. In Denmark, the year-to-year variations are very small. The standard deviation for Danish wind power is about 9-10 percent.⁶⁹ In contrast, major outages in nuclear reactors in the late 1970s were lasting for an average of about 300 hours at zero output.⁷⁰

In Australia the entire eastern seaboard electricity grid is linked, and therefore can act like a massive battery to manage excess energy production from one part of Australia, and address a lack of energy production due to lack of wind in another part of Australia. If there is investment in even a modest amount of storage, then this dramatically increases the reliability of renewable energy sources like solar and wind. Analyses as far back as in the 1970s showed that ten hours storage alone would make a typical single wind machine in Denmark as reliable as a typical light-water nuclear reactor of that period.⁷¹ Recently, a US Great Plains utility scale wind farm installed a 20 hour compressed air storage facility (at a discharge rate of 150MW per 2250 peak-MW wind turbine) was simulated to raise the wind systems effective capacity factor from 34 percent to 93 percent at a delivered cost-premium of only about 15 percent.⁷²

15) Is nuclear power generation the answer to the greenhouse challenge?

The nuclear debate has always been one of the most emotional and passionate sustainability debates. Either side feels strongly about their case. Hence The Natural Edge Project (TNEP) has devoted a section of their web site⁷³ to seek to better inform the nuclear debate. The TNEP Nuclear Debate web pages outlines both points of view and provide links to key reports. What disappoints us about the nuclear debate to date is the degree to which the debate has been ill informed. Consider cost comparisons between nuclear power, coal and renewable energy? The Federal Government's Nuclear Energy Review's report, known as Switkowski report after the reviews chairperson Ziggy Switkowski the presents misleading costings in its executive summary. As Professor Mark Diesendorf points out,

"The Switkowski report acknowledges that nuclear power would be 20-50% more costly than (dirty) coal power and that it would require "low to moderate pricing of carbon dioxide emissions" in order to compete. However, the report obtained this result by making questionable assumptions that are highly favorable to nuclear power. In reality, nuclear power is likely to cost more than double the cost of coal power and hence even more than wind power. The report's very low estimates of the costs of nuclear electricity are achieved by means of a magician's trick. The report's Figure 4.6 shows that the cost estimates depend critically upon the interest rates and that, at the high interest rates prevailing in a competitive market (10% real or more), nuclear electricity is likely to cost about 10 cents per kilowatt-hour (c/kWh). However, in the comparison with the costs of competing technologies in Figure 4.7, the report selects lower interest rates for nuclear power, in effect halving the costs of nuclear electricity. These carefully selected results are then reproduced in the executive summary, without any explanation that low interest rates were assumed."

But even if you accept this questionable figure the Review panel's consultant report shows that bagasse, biomass and wind power are all cheaper sources of energy than nuclear.⁷⁴ As the consultants figures show, nuclear is more expensive than a range of technologies that can be rolled out in large quantities over the next twenty years to meet our growing power needs. Further, no assessment of geothermal was included, effectively omitting a significant cost-effective resource that can provide base load electricity. Geo-thermal is hardly a fringe technology. Iceland already sources over half of its electricity from geo-thermal power. Tim Flannery has been promoting geothermal electricity as a significant option for Australia for some time now. Similarly consider the debate about whether renewable energy can provide base load electricity for Australia? Biomass, geothermal, gas and hydro are all forms of energy supply which can be turned up or down as needed and can supply base load power options. Yet many leading politicians and media commentators continue to argue that this is not the case. It is important whichever side of the nuclear

⁶⁹ Krohn, S. (2000) *Seasonal Variation in Wind Energy*, Danish Wind Industry Association. Available at www.windpower.org.dk/tour/grid/season.htm. Accessed 14 April 2007.

⁷⁰ Lovins, A. et al (2002) *Small is Profitable*, Rocky Mountain Institute Publishing, p 180.

⁷¹ Sorensen, B. (1976) 'Dependability of Wind Energy Generators with Short Term Energy Storage', *Science*, no. 194, pp 935-937; Sorensen, B. (1979) *Renewable Energy*, Academic Press, New York.

⁷² Cavallo, A.J. (1996) 'Transforming Intermittent Wind Energy to a Baseload Power Supply Economically', *Power-Gen '96*, 4-6 December, Orlando.

⁷³ See The Natural Edge Project Nuclear Energy Debate at <http://www.naturaledgeproject.net/TheGreatSustainabilityDebates-NuclearPower.aspx>. Accessed 14 April 2007.

⁷⁴ EPRI consultants report for *the Nuclear Review*.

debate you are on that we get the facts right about the degree to which nuclear power could make a difference to Australia's greenhouse gas emissions. Australia is not a large economy, by global scale, hence we need to ensure that whatever is spent by government or business is spent wisely to reduce as much of Australia's greenhouse gas emissions as possible.

The Switkowski report says that 25 nuclear power plants by 2050 would supply 30 percent of Australia's electricity needs⁷⁵, and assumed that by 2050 electricity generation would count for 60 percent of Australia's greenhouse gas emissions.⁷⁶ Even with 25 new plants the reduction in Australia's greenhouse gas emissions by 2050 would only be 18 percent per annum by 2050. Currently the electricity generation sector only contributes 35 percent of Australia's greenhouse gas emissions. Hence this report for the National Business Leaders Forum has focused a great deal on other more cost effective technical and policy options to reduce future electricity demand. These demand management approaches - energy efficiency, smart meters, tariff reform, incentives to reward electricity utilities for selling less electricity - can significantly reduce Australia's peak and base load electricity demand and greenhouse gas emissions from the electricity sector by 2050. The Deep Cut studies listed in Appendix 1 of this report show that Australia can achieve deep cuts to greenhouse gas emissions this way, and thus negate the need to invest in nuclear energy.

16) Is nuclear power needed for helping Australia to address the 'Peak Oil' issue?

Nuclear power advocates, nevertheless, argue that nuclear power is inevitable to help Australia address the world oil production peak. However, the Rocky Mountain Institute (RMI) study *Winning the Oil Endgame: Innovation for Profits, Jobs, and Security*,⁷⁷ shows that it is possible for nations to reduce oil dependency and address peak oil issues without needing to build nuclear power plants.

This study was co-funded by the Pentagon to research how to make US oil-free, but the lessons apply equally to other OECD nations. The plan outlines how US industry can restore competitiveness and boost profits by mobilising modern technologies and smart business strategies to displace oil more cheaply than buying it. *Winning the Oil Endgame* proves that at an average cost of US\$12 per barrel (in 2000 dollars), the US can save half its oil usage through efficiency, then substitute competitive bio-fuels and saved natural gas for the rest. Furthermore, it shows that by 2015, the US can save more oil than it gets from the Persian Gulf; by 2025, use less oil than in 1970; by 2040, import no oil; and by 2050, use no oil at all. The RMI report states that by 2015, more efficient vehicles, buildings and factories will turn oil companies into broad-based energy companies that embrace biofuels as a new product line.

Winning the Oil Endgame demonstrates how cellulosic biofuels (wood-based rather than from starchy or sugary plants like corn) can replace one-fifth of current oil use, more than triple farm income, and create 750,000 agriculture jobs. 'Europe produces 17 times more biodiesel than we do', said Amory Lovins, co-founder of RMI. 'The EU has shifted farmers from subsidies to durable revenues, and now oil companies compete to sell their petroleum-free fuel.' *Winning the Oil Endgame* demonstrates that half of US natural gas consumption can be saved at less than a fifth of its current price. Two-thirds of that figure comes from saving electricity, especially at peak times when it's inefficiently produced from natural gas. 'For the first time, RMI's report adds up the new ways to provide all the services now obtained from oil, but without using oil—which will save us \$70 billion a year', concluded Lovins. 'Forging the tools to get our nation off oil forever is the key to revitalising industry and farming.'

Also, many security experts are predicting that access to key raw resources, like oil and water, will be a significant source of conflict this century. Today, the US imports 50 percent of their oil and Europe 70 percent. It is estimated that China will import 50 percent of its oil within 15 years.⁷⁸

Two nations, Sweden and Iceland and one USA state (Hawaii) have committed to getting off oil over time.⁷⁹ Iceland wants to make a full conversion and plans to modify its cars, buses and trucks to run on renewable

⁷⁵ *The Australian* (2007) 'Would you be prepared to have a nuclear power plant near you?', *The Australian newspaper*. Available at http://blogs.theaustralian.news.com.au/yoursay/index.php/theaustralian/comments/would_you_be_prepared_to_have_a_nuclear_power_plant_sited_near_you/. Accessed 14 April 2007.

⁷⁶ Kerr, J. (2007) 'Proposal for 25 nuclear power stations by 2050', *The Australian Newspaper*, http://theaustralian.news.com.au/story/0.20867.20800026-30417.00.html?from=public_rss. Accessed 14 April 2007.

⁷⁷ Lovins, A. et al (2004) *Winning the Oil Endgame: Innovation for Profits, Jobs, and Security*, Rocky Mountain Institute, Earthscan Publishing, London.

⁷⁸ Only Punjab (2007) China to Import 50% Oil, Gas Requirements By 2020. n.d <http://onlypunjab.com/fullstory2k5-insight-news-status-25-newsID-5657.html>. Accessed 14 April 2007.

energy - with no dependence on oil. Iceland has already started by turning water into fuel - hydrogen fuel. By the middle of this century, all Icelanders will be required to run their cars only on hydrogen fuel, meaning no more gasoline.

Hawaii has also committed to dramatically reducing its oil dependency. Republican Governor Linda Lingle's 'Energy for Tomorrow' bill is a comprehensive energy policy package that incorporates many of RMI's *Winning the Oil Endgame*⁸⁰ policy recommendations, and has the potential to transform Hawaii (the most oil-dependent state in the nation and the one with the highest energy costs) into a state with a low-cost, sustainable, locally-produced, and secure energy system. The 'Energy for Tomorrow' bill establishes a bold and strategic energy policy framework of measures to encourage and support market-based development of reliable, cost-effective, and self-reliant energy systems. The bill's five major components include:

1. 'Savings through Efficiency'
2. 'Independence through Renewable Energy'
3. 'Fuels through Farming'
4. 'Security through Technology'
5. 'Empowering Hawaii's Consumers'

17) Public transport, not highways, helps economic growth

One of the reasons that governments have not acted to reduce oil dependency in the past is that most have believed that building roads is good for the economy, while public transport is a financial drain. A report to the World Bank (*Sustainability and Cities*⁸¹) prepared by researchers at Murdoch University is dramatically changing this way of thinking. One of the report's key authors, Professor Peter Newman, states:

We've found that cities which emphasise walking, cycling and public transport are healthier financially and spend less of their wealth on transport costs. The six cities that came out the best were cities like Zurich, Copenhagen, Stockholm - very wealthy cities now that spend only 4 or 5% of their wealth on transport, and yet they're the cities that are putting their money into public transport. And the cities still pouring money into freeways use up to 17% of their wealth. Australian and US cities like Perth and Phoenix are wasting far more of their valuable wealth on just getting around. Our data would really question that freeway building has any economic rationale; unless you're building up the rail system (as in Perth) you are not going to help it economically. As soon as you put in big roads then you create a market for city sprawl and this is very expensive. If you build railways, particularly light rail, it concentrates a city as developers like building around it so it helps to stop the real costs of different transport options, including hidden subsidies involved with each option. Then you get a whole lot of flow-ons. We now have major studies properly costing the the mechanisms driving this additional cost, include the following:

1. *The land required to build the infrastructure and its subsequent requirements for parking; a single lane of railway can carry up to 50,000 persons per hour, a bus way can carry 7,000 persons per hour and a highway lane just 2,500 persons per hour.*
2. *The direct cost to households of owning a car is considerable, especially if it is a second or third car. A study in Australia showed that a household could save AUD\$750,000 over a lifetime if a second car could be avoided.*
3. *The opportunity cost of such capital and land can be considerable if seen on a whole-city basis. The difference between the most competitive cities, in terms of their transportation costs as a proportion of city wealth, and the least competitive (5-8% compared to 12-18%) can be equivalent to an extra day a week of work in car dependent cities.⁸²*

⁷⁹ Swedish Government (2007) *Making Sweden Oil Free*. Available at <http://www.sweden.gov.se/content/1/c6/06/70/96/7f04f437.pdf>. Accessed 14 April 2007.

⁸⁰ Kyle Datta, one of the lead authors of the RMI *Winning the Oil Endgame*, is based in Hawaii and no doubt has played a key role in the Government of Hawaii taking such a prominent leading exemplar role.

⁸¹ Newman, P. and Kenworthy, J. (1999) *Sustainability and Cities*, Island Press, Washington, DC.

⁸² Newman, P. (1998) 'Interview ABC Earthbeat Transcript', *ABC Earthbeat*. Available at www.abc.net.au/rn/science/earth/stories/s13083.htm. Accessed 14 April 2007.

An even more recent study of 84 cities undertaken by Kenworthy⁸³ has shown that cities with well designed public transport systems have significantly less total transport costs, as a proportion of their city wealth, than those that rely heavily on freeways and cars.⁸⁴ Kenworthy *et al.* developed these arguments further in Section Four: Chapter 19 in of the book *The Natural Advantage of Nations*.⁸⁵

There are many other benefits to the economy of a shift from the automobile to walking, cycling and taking public transport. All the alternatives to the automobile, including walking, cycling and public transport involve a form of exercise. The amount spent buying and running a motor vehicle, plus the convenience of use, means the car often becomes the default or automatic mode of transport, even for short trips.⁸⁶ This is a significant public health issue, especially considering physical activity is the second greatest preventable risk factor contributing to Australia's ill-health.⁸⁷ Lack of exercise is also known to contribute to obesity, hypertension, cardiovascular disease, stroke, diabetes, cancer and depression.⁸⁸ The latest US research, where there is currently an epidemic of obesity, suggests that for every 60 minutes spent in the motor vehicle, the probability of a participant being obese is increased by 6 percent.⁸⁹ Studies are now showing that the automobile is having a detrimental effect on populations' health. For instance, the World Health Organisation (WHO) has reviewed the various known population health impacts of transport around the globe,⁹⁰ and Australian researchers have begun to research and warn of these consequences in Australia.⁹¹ Automobile dependence in cities also creates further negative externalities from car accidents, road maintenance and pollution.

18) Policy settings to achieve cuts to greenhouse gas emissions

The IPCC 4th Assessment's Working Group III Report: Summary for Policy Makers⁹², the Stern Review⁹³ and the full report of the Clean Energy Future Group's National Study⁹⁴ into clean energy futures for Australia provide comprehensive overviews of the range of policy mechanisms that can assist Australia to address climate change and achieve significant cuts to greenhouse gas emissions. Hence we will not restate this here. Rather we feel it important to emphasise that government climate change policies, incentives and regulation, if designed well and phased in over time, can help competitive advantage and economic growth rather than harming it. Two examples illustrate this well; feebates and the EU's best available technology regulation. Both are helping companies to be more competitive, not less.

Feebates combine both a fee on the most environmentally harmful brands of a certain product, while providing income to governments allowing them to provide a rebate to encourage consumers to purchase the most environmentally benign products. Operationally, feebates are very simple. Take the example of car use: when buying a new car, you would pay an extra fee if it were an inefficient user of fuel, or alternatively get a rebate if it were energy-efficient. The neutral point would be set so that fees and rebates balanced, and so it becomes neither an inflationary measure nor a disguised tax. The fees and rebates may impact at the point of sale or on annual registration fees and usually offset each other ensuring fiscal neutrality. In

⁸³ Kenworthy, J. (2003) 'Transport Energy Use and Greenhouse Gases in Urban Passenger Transport Systems: A Study of 84 Global Cities', as submitted to the International Sustainability Conference: Second Meeting of the Academic Forum of Regional Government for Sustainable Development (2003) Department of the Premier and Cabinet, Perth.

⁸⁴ Kenworthy, J. and Hu, G. (2002) 'Transport and Urban Form in Chinese Cities: An International Comparative and Policy Perspective with Implications for Sustainable Urban Transport in China', *DISP* [Zurich], vol. 151, pp 4-14; Kenworthy, J. and Laube, F. (1999) *An International Sourcebook of Automobile Dependence in Cities, 1960-1990*, University Press of Colorado, Colorado.

⁸⁵ Kenworthy, J. *et al* (2005) 'Sustainable Urban Transport', in Hargroves, K. and Smith, M. (eds.) *The Natural Advantage of Nations*, Earthscan Publishing, London.

⁸⁶ Handy, S. and Weston, L. *et al* (2005) 'Driving by Choice or Necessity?' *Transportation Research Part A: Policy and Practice*, vol. 39, no. 2-3, pp 183-203.

⁸⁷ Stephenson, J. and Bauman, A. *et al.* (2000) 'The Costs of illness Attributable to Physical Inactivity in Australia', Report prepared for the Commonwealth Department of Health and the Australian Sports Commission.

⁸⁸ Mathers, C. and Vos, T. *et al* (1999) *The Burden of Disease and Injury in Australia*, Australian Institute of Health and Welfare, Canberra.

⁸⁹ Frank, L. and Andresen, M. *et al* (2004) 'Obesity relationships with community design, physical activity, and time spent in cars', *American Journal of Preventive Medicine*, vol. 27, no. 2, pp 87-96.

⁹⁰ Dora, C. and Phillips, M. (2000) 'Transport, Environment and Health,' *WHO Regional Publications*, European Series, World Health Organisation, Copenhagen.

⁹¹ Mason, C. (2000) 'Healthy people, places and transport', *Health Promotion Journal of Australia*, vol. 10, no. 3, pp 190-196; McMichael, T. (2001) *Human Frontiers, Environments and Disease*, Cambridge University Press, Cambridge; Kjellstrom, T. and van Kerkhoff, L. *et al* (2003) 'Comparative assessment of transport risks - how it can contribute to health impact assessment of transport policies', *Bulletin of the World Health Organization*, vol. 81, no. 6, pp 451-457; Kjellstrom, T. and Hinde, S. (in press) 'Car culture, transport policy and public health', in Kawachi, I. and Wamala, S. (eds) *Globalization and Health*, Oxford University Press, New York.

⁹² IPCC (2007) IPCC 4th Assessment Working Group III Report: Summary for Policy Makers n.d <http://www.ipcc.ch/SPM040507.pdf> (Accessed May 2007)

⁹³ Stern, N. (2006) *The Stern Review: The Economics of Climate Change*, Cambridge University Press, Cambridge. Available at www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm. Accessed 14 April 2007

⁹⁴ Saddler, H., Diesendorf, M. and Dennis, R. (2004) *A Clean Energy Future for Australia Energy Strategies*, WWF, Canberra. Available at <http://www.our.org.au/ourwork/climatechange/cleanenergyfuture/>. Accessed 14 April 2007.

principle, this can be a cost-neutral program to government, not involving any new taxes being created. Encouragingly, Australian state governments in particular now have many rebate schemes to encourage consumers to purchase water and energy efficient products, but Australia does not have a single feebate scheme. Internationally feebate variations already exist in Ontario (Canada), Germany, Denmark, and Austria. In June 2004 France announced it would be implementing a feebate scheme on cars. The key benefit of feebates is that they ensure industry knows there will be clear market signals to the consumer to purchase more efficient products, thereby stimulating innovation in the right direction for sustainability. However, government will still need to work with industry to phase in feebates to ensure industry has time to respond.

Another example of smart policy relevant to climate change comes from Germany where an ingenious form of regulation has been developed that both helps drive better environmental outcomes while making German industry more competitive. The rest of Europe, including Eastern Europe, have now followed Germany's lead. The German Best Available Technology legislation does not involve mandating specific technologies as many in the USA and other countries assume. Rather, the German government upwardly adjusts standards that industry has to meet based on the performances of the best and most cost effective available technologies. In theory, whenever a new and improved technology is created globally, German industry is expected to meet the environmental standard achieved by that technology. Of course regulatory practice is more flexible, ambiguous, and much less instantaneous, but it is sufficient to provide significant incentive for German firms to develop new technologies that make it cheaper for them to meet the competition from Best Available Technologies globally. This is helping Europe to achieve significant competitive advantage in the field of environmental technologies.

Feebates and Germany's Best Available Technology legislation are just some examples of the range of innovative and flexible approaches on which Federal and State government could take a stronger lead ahead of industry and the community to achieve sustainable development.⁹⁵ These are the sort of clever smart policy that could help Australia become a climate leader and help to bring forth into the market the low carbon technologies we need to achieve sustainable cuts.

While some business and government leaders doubt that 60 percent reductions by 2050 can be achieved, many companies and governments are working towards and are well on the way to achieving such targets. Now thousands of companies and hundreds of governments, around the world, are showing that significant reductions can be achieved. Appendix 1 features a summary of 12 significant studies showing how to reduce greenhouse gas emissions by 60 percent by 2050. As we noted in this paper none of these studies were referenced in any of the submissions to the Prime Minister's emissions trading taskforce enquiry except by Environment Business Australia (Appendix 1). These studies show that business and government is faced with insurmountable opportunities to achieve greenhouse gas reductions.

⁹⁵ These ideas, and many more practical ones like them, are further discussed in Hargroves, K. and Smith, M. (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan Publishing, London. Available at www.naturaledgeproject.net. Accessed 14 April 2007.

19) Where to from here?⁹⁶

So, you can see there are some big challenges coming... and you have a pretty good idea that your company might be able to gain some competitive advantage if you move now rather than later. A commitment such as achieving 60% reductions in greenhouse gas emissions by 2050 will require a strong focus on innovation and creativity, you know there is an expertise and skills out there that you might need to tap into... but where do you start? Who do you call?

As this paper argues, the major challenge to business in the next decade will be to innovate sustainable solutions, in technologies, processes and methodologies. Innovating solutions for sustainable prosperity is already among the fastest growing markets in the world. The scale of innovation required means '*all hands on deck*', but where is the best place to start? How can business and government get the most from their investment to effectively move forward to catch the so called 'next wave of innovation'?

The pursuit of answers to these questions inspired our team of early career Australians to form *The Natural Edge Project* (TNEP) in 2002. Our team has focused on expanding the sustainability solution space through collaboration with a range of partners and clients from Industry, Business, Universities and Government. Drawing on this experience, we are confident that humanity possesses both the technological innovations and design know-how to tackle many sustainability problems cost effectively and in many areas very profitably. The challenge is to figure out how to transition at the right time and pace towards more sustainable practices, by balancing the market pull with the organisations push.

Time and time again through our work with partners and clients we see similar factors emerging in successful sustainability innovations and initiatives and we are starting to connect the dots. Now that the demand for sustainability related research and services is skyrocketing it is important that small teams like ours choose our partners and clients very carefully. The first thing we look for is a clear commitment to sustainability at the senior level, balanced with an understanding of the reality of implementation - this is now becoming more common. We then ask the following questions;

1. Do you have a capable Sustainability Officer? It is essential that there is a person in your organisation who has good communication, engagement and accountability with Senior Management, and who can coordinate and drive sustainability initiatives. This person needs to be able to engage effectively with the appropriate people across the organisation to assist in the implementation of the organisation's strategy and sustainability initiatives. A sign of a good Sustainability Officer is the strength of their team. Townsville City Council's Environment Manager, Greg Bruce, is a stand-out example of this and he is adamant that, '*even though I am the one that is responsible for the team's direction and output, it is ultimately the success of our team that determines the outcomes*'.
2. Do you understand the reality of implementation? A key concern for TNEP is whether our clients and partners know the difference between strategy and implementation, the difference between a 'business case' and a 'business plan'. TNEP associate Dan Atkins, Director of Sustainable Business Practices believes that, '*Developing an appropriate strategy and articulating a vision that meets the relevant stakeholders' expectations is becoming a critical component of shareholder value. How that vision and strategy is integrated within the organisation is largely dependent on getting the frameworks in place and a culture to execute the strategy in a way which is aligned to the overall business objectives and values.*'
3. Do you use consensus-building processes? It is important that you can readily draw on internal and external collaborations with experts, advisors, trainers and mentors to assist in delivering sustainable strategies and practices. Two industry groups that TNEP works with demonstrate a commitment to this process. The Australian Plantations Products and Paper Council (A3P) recently created a 'Sustainability Action Plan' through collaboration with a wide range of stakeholders, delivering a well-balanced outcome. Rob Lord, Chairman of A3P said that, '*The plan was prepared in consultation with A3P members and leading environmental NGOs and is based on the best available research.*' This process is also being used by the Plastics and Chemical Industries Association (PACIA) in the first steps in the development of their 'Sustainability Framework'.

⁹⁶ An edited and condensed version of this part has been published as a 'Thought Stream' article in the Feb/Mar 2007 Edition of Waste Streams (www.WasteStreams.com.au)

4. Are you committed to Capacity Building? There is currently a lag in professional development in sustainable technologies, innovations and opportunities. Organisations committed to more sustainable outcomes understand the need for training and capacity building. Although *The Natural Advantage of Nations* contained a wealth of information, we quickly realised the need to repackage the material for use in universities and company training programs. With the support of Engineers Australia and UNESCO, TNEP has developed a number of courses on operationalising sustainable development, focused on engineers and built environment professionals. TNEP is also working with the CSIRO Energy Transformed Flagship and the National Framework for Energy Efficiency to develop capacity-building materials in energy efficiency and low carbon technologies in collaboration with Griffith University, Australian National University and Engineers Australia.
5. Is your organisation an effective communicator? Through the development of our first book, *The Natural Advantage of Nations*, we were surprised to find many quiet achievers working on internationally leading work that had not found ways to communicate their story. Gathering these stories for our books, and for publication in magazines like CSIRO's ECOS Magazine, we found that in most cases successful organisations were those who could send us succinct articles and summaries about their work. Receiving acknowledgement through the number of awards for sustainability such as the Banksia Awards, Eureka Awards and the Queensland EPA Sustainable Industries Awards also demonstrates that not only is your work of merit but also that you know how to communicate.

As a team we realise that our society face some pretty overwhelming challenges in the coming decades. Rather than despair, we focus on what we can influence, our team's ability to contribute. We are strategically engaging with partners and clients, choosing those initiatives that will have large-scale, long-term impacts that can be shared with the world open-source.

We invite you to consider partnering with us and our network on our journey.



The Natural Edge Project (TNEP) is a partnership for research on innovation for sustainable prosperity. TNEP's mission is to contribute to and succinctly communicate leading research, case studies, tools and strategies for achieving sustainable prosperity across government, business and civil society. TNEP initiatives are not-for-profit. Our main activities involve research, creating training material and producing publications, which are supported by grants, sponsorship (both in-kind and financial) and donations. Our other activities involve delivering short courses, workshops, and working with our consulting associates as we seek to test and improve the material. All support and revenue raised is invested directly into existing project work and the development of future initiatives.



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Appendix 1: Further Reading and Online Resources

General

- The Climate Group (2007) *Profits Up, Carbon Down* (3rd ed.), The Climate Group. Available at http://theclimategroup.org/assets/resources/cdpu_newedition.pdf. Accessed 14 April 2007.
- The Climate Group (2007) *Low Carbon Leader: Cities*, The Climate Group. Available at http://theclimategroup.org/assets/resources/low_carbon_leader_cities.pdf. Accessed 14 April 2007.

Australia

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- Turton, H., Ma, J., Saddler, H. and Hamilton, C. (2002) *Long-Term Greenhouse Gas Scenarios: a pilot study of how Australia can achieve deep cuts in emissions*, Australia Institute Paper No 48, The Australia Institute. Available at (http://www.tai.org.au/documents/dp_fulltext/DP48.pdf) . Accessed 14 April 2007.
- Prime Minister's Science, Engineering and Innovation Council (2002) *Beyond Kyoto - Innovation and Adaptation*, Department of Education, Science and Training, Australia. Available at www.dest.gov.au/sectors/science_innovation/publications_resources/profiles/beyond_kyoto_innovation_and_adaptation.htm. Accessed 14 April 2007.

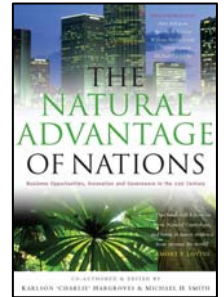
Canada, UK and USA

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- Mintzer, I., Leonard, J.A. and Schwartz, P. (2003) *US Energy Scenarios for the 21st Century*, Pew Center on Global Climate Change. Available at http://www.pewclimate.org/global-warming-in-depth/all_reports/energy_scenarios/index.cfm. Accessed 14 April 2007, and <http://www.pewclimate.org/docUploads/EnergyScenarios.pdf>. Accessed 14 April 2007.
- Pascala, S. and Socolow, R. (2004) 'Stabalization Wedges: Solving the Climate Problem for the Next 50 years With Current Technology', *Science*, vol. 305, p 968.
- Torrie, R., Parfett, R. and Steenhof, P. (2002) *Kyoto and Beyond: the low emission path to innovation and efficiency*, Report for David Suzuki Foundation and Canadian Climate Action Network, Canada. Available at http://www.davidsuzuki.org/files/Kyoto_Beyond_LR.pdf. Accessed 14 April 2007.

Appendix 2: The Natural Edge Project – Open Source Resources

1) Achieving profitable reductions in Greenhouse Gas Emissions

i) Hargroves, K. and Smith, M. (2005) *The Natural Advantage of Nations (Vol I): Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London, (Chapter 17: Profitable Greenhouse Solutions www.naturaledgeproject.net/NAON_ch17.aspx)



ii) CSIRO ECOS magazine is featuring a series of articles by The Natural Edge Project on how to achieve sustainable cuts to greenhouse gas emissions. The following short articles provide new insights into some of the most exciting and effective ways to profitably reduce greenhouse gas emissions.

Downloadable from www.naturaledgeproject.net/TNEPArticles.aspx

- Smith, M. and Hargroves, K. (2006) 'The First Cuts Must be the Deepest', CSIRO ECOS, Issue 128, pp 8-11.
- Smith, M. and Hargroves, K. (2006) 'Wood - another low carbon footprint solution', CSIRO ECOS, Issue 129, pp 12-13.
- Smith, M. and Hargroves, K. (2007) 'Smart Approaches to Electricity Use', CSIRO ECOS, Issue 135, pp12-13
- Smith, M. and Hargroves, K. (2007) 'Climate Leaders: The New Corporate Standards', CSIRO ECOS, Issue 136, pp 26-29.



2) Emissions Trading Schemes – “Prospering in a Carbon Constrained World”

How can business best profit when operating in an emissions trading scheme? This key question is addressed in detail in a report commissioned by the Chicago and European Climate Exchanges in May 2005. This report was developed by Natural Capitalism Solutions (NCS) and The Natural Edge Project for the Chicago Climate Exchange (CCX) and the European Climate Exchange (ECX). The report was researched and prepared by Karlson 'Charlie' Hargroves and Michael H. Smith of The Natural Edge Project, and supervised, reviewed and edited by Hunter Lovins and Christopher Juniper. (<http://www.naturaledgeproject.net/KeyAchievements.aspx>)



3) Engineering Sustainable Solutions Program - Critical Literacies Portfolio

The ESSP Critical Literacies Portfolio was developed by The Natural Edge Project with the support of Engineers Australia and UNESCO. It forms part of the UN's Decade of Education in Sustainable Development, which runs from 2005-2015. This Portfolio is a comprehensive resource to help engineers help business and industry make the transition to a low carbon economy. It features courses designed to help business achieve deep cuts and various parts of the program have been trialled and reviewed by 15 universities across Australia. The entire package is freely available online. Available at <http://www.naturaledgeproject.net/ESSP-CLP.aspx>



4) Engineering Sustainable Solutions Program – Technical Design Portfolio

The first module of the Design Principles Portfolio has been completed with funding from the Australian Department of Environment and Water Resources, and is focused on Whole Systems Design (WSD), and showing the detailed calculations for whole systems design options compared to traditional design. Whole Systems Design approaches for buildings, cars, cities, industry plants, motors, farming and agriculture, lighting systems, are increasingly being seen as the key to achieving cost effective reductions in negative environmental impact.

Available at http://www.naturaledgeproject.net/Whole_Systems_Design_Suite.aspx



5) Engineering Sustainable Energy Solutions – An Online Training Package

The project will deliver an effective toolkit for capacity-building engineers and other key technical professions to help business and industry find the cost-effective low-carbon energy approaches and energy efficiency options. TNEP is leading a collaboration with Griffith University (Centre for Environmental Systems Research) and the Australian National University (Institute for Environment), as well as being supported by the Institution of Engineers Australia, to develop education and training material which is funded as part of the CSIRO Energy Transformed Flagship in 2006/07. Additional funding to enhance to the project has been received from the National Framework for Energy Efficiency to support a survey of universities, additional academic review of the modules and end user engagement activities.

By the end of 2007, three advanced training programs will be made available online addressing the following issues to help business achieve sustainable cuts to greenhouse gas emissions:

1. Identifying, quantifying and implementing energy efficiency opportunities for Industrial/Commercial users.
2. Integrated systems based approaches to realising energy efficiency opportunities for Industrial/Commercial users.
3. Integrated approaches to energy efficiency and low emissions electricity, transport and distributed energy.

6) The Nuclear Energy Debate

Over the last two years there has been renewed debate about nuclear energy. To help you make up your mind on this complex issue firstly we present the key points of both the Pro-Nuclear Case and the Anti-Nuclear Case followed by further information from TNEP that synthesise TNEP secretariat's findings to date on this important debate along with a shortlist of additional reading. These opinion pieces by TNEP secretariat are the result of detailed consideration of both sides of the argument.

<http://www.naturaledgeproject.net/TheGreatSustainabilityDebates-NuclearPower.aspx>

7) Stay Informed – Subscribe to ECarbon News

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