



EnergyWatch

The Journal of the Sustainable Energy Forum Inc

"Facilitating the use of energy for economic, environmental and social sustainability"

Issue 52, April 2009

Published by The Sustainable Energy Forum Incorporated, PO Box 11-152, Wellington

Email: info@sef.org.nz

Web: www.sef.org.nz www.energywatch.org.nz

Editor: John Blakeley

ISSN: 1173 5449

EDITORIAL

Limiting Carbon Dioxide Emissions

During its first 100 days in office, the new National-led Government has rolled back a number of the previous Government's initiatives to limit or reduce carbon dioxide emissions.

These have included cancellation of the \$1 billion insulation fund for retrofitting low-quality housing, removing the phase out requirements for incandescent light bulbs, removal of the ban on building new gas-fired power stations, repeal of the Biofuels Sales Obligation, and the apparent abandonment of the National Policy Statement on renewable energy.

It is also noteworthy that in a draft new Government Policy Statement on Electricity Governance released on 2 March, all references to the New Zealand Energy Strategy (NZES) and the NZ Energy Efficiency and Conservation Strategy (NZECS) have been deleted.

In an editorial comment (9 March) the NZ Herald said:

"Mr Brownlee's no-nonsense approach to the power supply has seen all at the previous government's climate change and other environment goals ruled out – literally. His draft policy statement is a re-publication of the previous government's policy with lines ruled through passages referring to its "energy efficiency and conservation strategy", its "transformation agenda", "sustainable development programme", its emissions trading scheme and wind generation".

To be fair, the present Government had signalled at least some of these initiatives in the run-up to the General Election in November, but to date they have been remarkably silent on how they intend to limit or reduce the present rate of increase in New Zealand's annual greenhouse gas emissions.

In early December, Green Party Co-Leader, Jeanette Fitzsimons claimed that the National Party has opposed every energy efficiency proposal she could think of in recent years. She said that National's apparent lack of commitment to energy efficiency makes a mockery of its climate change target of a 50% reduction in greenhouse gas emissions by 2050, adding that "National doesn't seem to have the slightest idea of how it will reduce emissions".



Energy Watch Editor John Blakeley

Contents

Editorial..... 1

Limiting Carbon Dioxide Emissions
Security of Electricity Supply
Auckland Needs World-Class Energy Supply
Proposed Conference

SEF Feedback.....6

The Die is Cast
A Cry from the Heart
SEF Briefing to Incoming Government
SEF Press Statement on Transport Alternatives
Revised SEF Subscription Rates

Electricity Matters..... 11

"Bombshell" to Hit Generators?
Continuing Saga of Power Price Rises
NZ Renewable Energy Generation
Whirinaki in the Wrong Place
Consent for Mill Creek Wind Farm

Climate Change/Global Warming..... 15

Excerpt from ETS Submission
Australia Faces Emissions Cut
A Middle Ground on Climate Change?
Poznan Conference Outcomes
Climate Change and Economic Recession
Commission Warns "Carbon Cowboys".
West Blamed for China's Emissions
Climate Change News Snippets

Vehicles.....23

Electric Car Progress....
....and the Plug-in Hybrid
New GM Battery Plant
Calamity for Plug-in Cars?
Hydrogen Cars - a "Hollywood Folly"?
Hybrid Car Sales Plummet in US

Fuels.....26

World Oil Demand Falls
Oil Price Below US\$45
Oil and Gas in NZ Still Buoyant
Mangahewa Shows Promise

Climate Change Minister, Hon. Dr Nick Smith, seemed to be clutching at straws in late February when he called on officials to re-calculate New Zealand's greenhouse gas emissions because they are now growing more slowly as a result of the global economic recession. He said that the Government will not set short-term targets for reducing emissions until he has an accurate picture of what future emissions will be.

New Zealand has less than four years now to trim 26% off its man-made greenhouse gas emissions if it is to reduce them to its Kyoto Commitment of 1990 levels by 2012. Current projections are that we will overshoot the target by a quarter, leaving a substantial bill for carbon credits to cover the shortfall (possibly NZ\$1 billion or more - see EnergyWatch 51, pp 18-20).

As indicated in the diagram in the previous issue (EnergyWatch 51, page 19) our greenhouse gas emissions were already more than 25% above 1990 levels when the present global recession began and are probably still above that level, so it is highly doubtful that the economic recession will reduce this figure to much less than a quarter above 1990 levels.

A Parliamentary Select Committee is at present reviewing the Emissions Trading Scheme (ETS) but the Government has not actually suspended the ETS as had been signalled in the confidence-and-supply agreement with the ACT Party.

This review has placed in some doubt the emerging carbon market as forest owners prepare to start trading carbon credits. In the absence of any law change, trade in these NZ emissions units is due to start in April 2009.

Under Kyoto rules, pre-1990 forests cannot earn credits, but under the ETS, they will be given credits to compensate for Kyoto penalties incurred at harvesting time.

National campaigned on sending the previous Government's ETS law back to a Select Committee for a second round of public submissions, with amendments to be completed by September. No amendment Bill has yet been forthcoming and the Prime Minister, John Key,

has indicated that it won't be necessary if the present review is concluded quickly.

The above would suggest that perhaps the present Government intends to keep the present ETS with only minor changes? It seems that its greenhouse gas emissions reduction policy must rely very heavily on adopting the ETS, because there is as yet precious little evidence of any other initiative to reduce our emissions.

The ETS is based on a cap-and-trade scheme. Around the world, present evidence suggests that these schemes will be an almost completely ineffective way of reducing gross greenhouse gas emissions within individual countries. This is because in Western developed countries, most individual people and organizations will opt to pay increased costs by way of purchase of emissions credits, rather than to make any sacrifices or investments to reduce their own emissions.

The ETS in New Zealand must be seen as primarily a revenue-gathering exercise to try and recover most of the cost of purchasing from overseas large amounts of emissions credits, rather than as a likely way of reducing our own gross greenhouse gas emissions.

So if the present National-led Government is going to rely on the ETS to try and trim 26% off our present greenhouse gas emissions by 2012, it will be making a very big mistake.

References: NZ Energy and Environment Business Week, 5/12/08, page 1

NZ Energy and Environment Business Week, 25/2/09, pp2-3

Security of Electricity Supply

In Auckland on Tuesday 3 February, electricity supply was cut for over an hour to a large area involving about 75,000 people (including supply to the shopping centre of Newmarket and a large part of the Eastern Suburbs) when a transformer developed a fault and tripped out at the Penrose substation.

There were three transformers on this particular circuit and at the time of this incident, one of the three was out of commission for maintenance and repairs, leaving the circuit entirely

dependent on the other two transformers. When one of the other two suddenly tripped out with a fault, the third transformer could not cope with the resulting overload and tripped out as well causing the blackout.

It took a couple of days of hard work by Transpower to get one of the two unavailable transformers back into service. In the meantime, the third transformer had to cope with the required load, which meant involuntary power cuts for some people on the day following the original incident at around lunchtime, when the load grew to a level when some of it had to be shed in order to keep that third transformer in operation.

Transpower later confirmed that it had knowingly compromised its own security of supply standards by having one transformer turned off for maintenance with only two available as backup when it required two transformers to take all the likely load. The "n-1" standard for operating a secure electricity supply is intended to ensure that the system can cope with the failure at any given time of pieces of critical equipment.

The risk of transformer failure is legitimately regarded as being low (although the transformer in question was later reported as being about 35 years old), and there are times when Transpower can elect to operate less securely than the n-1 standard, but this event showed the extent of the public backlash awaiting Transpower if and when it gets such a calculated risk wrong again.

During the 3 February event, some people were trapped in lifts, traffic lights stopped working, and from a business point of view, all electronic cash transfers ceased. One business leader later said that will have cost retailers millions of dollars in lost sales.

In the aftermath of the event, the public generally and some business leaders in particular said that they felt strongly that at the electricity prices they are now expected to pay in New Zealand, they have a right to expect a secure power supply.

The Mayor of Auckland, Hon. John Banks, in particular, and other civic and business

leaders as well made comments on the “third world” nature of our electricity supply and in particular, the under-investment in maintaining our electricity transmission system over the last two decades.

By the following week, the debate had moved on from the maintenance of the present electricity supply, to the issue of the provision of a second (complementary) power supply route through the Auckland isthmus. At present there is only one 220kV transmission line providing electricity supply to the Auckland Region north of the Harbour Bridge and to the whole of the Northland Region.

The present vulnerability is immediately apparent of all these electricity consumers if a major incident should occur to interrupt power supply on that one transmission line, causing an outage for several days or weeks.

The CEO of Transpower, Dr Patrick Strange, appeared before a sub-committee of the Auckland City Council (see article below) and explained to them that for several years now, Transpower has been developing proposals for an alternative Penrose-Albany route including using the existing tunnel operated by Vector from Penrose to the Victoria Park area and then to suspend the transmission cables beneath the Harbour Bridge across to Northcote.

However, recently an interim decision by the Electricity Commission (EC) had refused to approve this proposal for Government financial support, because the EC believed that there were cheaper solutions to the problem, including provision of significant new electricity generating capacity north of Auckland.

Commenting on electricity supply to the North Auckland and Northland region (NAaN) in a recent SEFNews posting, Steve Goldthorpe wrote:

“Don’t blame Transpower. They have to work with one hand tied behind their backs by the EC. Transpower has been working for years on a solution to the impending NAA problem, which is due to reach crunch point in 2013 (at

predicted demand growth rates). Transpower’s solution is to build a second supply route into the NAA region using the Auckland Harbour Bridge to take a 220kV supply from Penrose to Albany. Some of the necessary infrastructure is already in place and an orderly programme of permits and works was taking its course.

Then, just before Christmas, the EC made a surprise announcement that it proposed to decline (or at least postpone) permission for Transpower to make further investment in the NAA upgrade. One reason given by the EC for this decision was that some smaller projects might push the NAA crunch point out to 2016. However, the main reason given was that the lifting of the moratorium on new gas-fired power stations meant that the Rodney Power Station could be built in the NAA region, thus reducing net demand in the grid. The EC is holding a seminar in Auckland on February 13th to defend their rationale for this decision.

But reliance on a single large generation unit to provide security of supply on a 24/7 basis, conflicts with the criterion for security of supply. A more rational explanation for the EC’s decision is that delaying the creation of the cross harbour transmission link would create a need for early building of Rodney Power Station, which would support the new Government’s electricity-from-gas policy.

Hence, in this case, it is the new Government’s energy policy direction that is creating a barrier to progress with building essential infrastructure, not the previous Government’s red tape”.

Subsequently, the Chair of the EC, David Caygill, has said that the interim decision by the EC will be reviewed again before a final decision is made on the NAA situation.

In your Editor’s view, one of the major problems which we have with the present market-driven electricity system in New Zealand is that it does not take fully into account the true cost of non-supply of electricity. Customers do not have the right to sue to recover from their electricity supplier the full costs of a supply interruption,

and electricity suppliers would strongly resist any such move because of the commercial risk it would expose them to.

There is also the political risk to be considered. Like it or not, the Government of the day tends to get blamed by the public for any electricity supply interruptions, especially since over half of the generating system is at present owned by the Government, and Transpower is wholly owned by the Government as well.

I would predict that when the EC reconsiders their interim decision on the NAaN situation, there will be a change of heart because of the public backlash followed by the backlash from central and local Government politicians after the incident on 3 February. This backlash was such that the EC must now realise that the present risks to electricity supply north of the Auckland Harbour Bridge are such that they have no option but to approve the new Penrose-Albany transmission line now, and not defer it until predicted demand growth rates make it eventual construction inevitable.

In an editorial commenting on this situation (9 March) the NZ Herald said:

“As a market monitor, the EC’s main task should be to ensure that network projects reflect the scale and configuration of transmissions that suppliers and users are willing to pay for. If they face the true costs of total security of supply, they might think it higher than it is worth”.

Try telling that to a person trapped in a lift during a power cut!

John Blakelely

References: Transcript of TV3 News, 3/2/09.
NZ Energy and Environment Business Week, 11/2/09, page 2.

Auckland Needs World-Class Energy Supply

Failure to invest in a secure supply of energy would be catastrophic for Auckland, says Councillor Aaron Bhatnagar, chairperson of the City Development Committee.

Mr Bhatnagar made the comments in a submission to a public hearing of the Electricity

Commission, after they declined to invest in Transpower’s North Auckland and Northland (NAaN) project. NAaN would considerably bolster energy supplies through Auckland city to the north, via new transmission cables circuits, which would back up the existing circuit lines.

The council’s submission stated that failure to permit proper investment would cause significant economic hardship on energy users - small and large - as well as deterring large businesses from investing in the region.

“We want the Commission to permit Transpower to invest in security of supply for Auckland and Northland not just for today’s requirements, but to also anticipate the growth of the Auckland region into the future”, Mr Bhatnagar said.

He said the council looked forward to the Electricity Commission changing its mind on investing in NAaN “to ensure Auckland gets the world-class energy supply we deserve”.

Reference: Auckland City Council “City Scene”, 8/3/09.

Proposed Conference

Preliminary notice is given of a proposed joint one-day conference of Engineers for Social Responsibility and SEF, to be held on a Saturday in the July-September period, on the recently announced amendment to the Government Policy Statement on Land Transport Funding.

The conference will consider the application in New Zealand of land transport policy in an increasingly carbon-constrained world, in which energy security issues and rising fuel prices from 2010 onwards will play an increasingly important role.

Further information will be presented in the next issue of EnergyWatch and through SEF News. The main topics to be addressed will be

- Regional Transport Issues
- National Transport Policy Issues
- Technical Issues of Alternative Transport Fuels

SEF Feedback

The Die Is Cast

By Steve Goldthorpe



Last year I prepared a discussion paper called “A Period of Consequences”, which was published in Energy Watch 50 in September (www.energywatch.org.nz). In that paper I observed that New Zealand was at a crossroads in its electricity and energy supply planning and that decisions made in the near future would have long term consequences. Whilst many future scenarios could have been constructed, I focused on two main alternative pathways; a Business-As-Usual scenario founded primarily on increased fossil fuel use, and a Renewable Energy scenario founded on the energy policies that were then being assembled by the Labour government.

Since then, New Zealand has had a change in Government and with it an abrupt change in the direction of New Zealand energy policy. The pre-election promise of greater reliance on natural gas for power generation expansion is now manifest in scrapping of the moratorium on new gas fired power stations, supported by plans to castrate the RMA and stepping back a decade in the Climate Change debate.

An early example of the consequence of this change in policy direction is the recent decision by the Electricity Commission to withdraw support for the well-advanced new transmission infrastructure needed to ensure security of electricity supply north of Auckland. The principal reason given for that decision is the preference for a North Auckland gas-fired power station, for which both water supply and gas supply are problematic.

It is clear that the die has now been cast and the decision has been made to put policies in place for New Zealand to follow a business-as-usual fossil energy strategy for the foreseeable future.

In my earlier analysis I concluded that consequences of that course of action would be:-

- New Zealand would effectively be abandoning its international climate change obligations;

- New Zealand would probably get locked into competing for imports of globally scarce LNG; and
- New Zealand would become increasingly exposed to international energy prices for the imports of coal oil and gas.

Since publication of my earlier analysis I have had no challenge to it. I hope that I am wrong, but fear that I might not be.

A Cry From The Heart

SEF has received the following email on 11 March 2009.

*To: info@sef.org.nz
Subject: Wind Energy*

Hi,

I heard a snippet recently on the national radio program that you had suggested to the Energy Minister that domestic energy generation should be encouraged.

I heard too that Gerry Brownlee had dismissed the idea on the basis that consumers would be unlikely to pay more for it.

Anyway, no doubt there is more to this, but as a small guest house operator in the windiest part of NZ, I'm often at a loss as to who I can go to for support in erecting my own small wind turbine.

It appears, that despite all the talk, everyone and everything is against me. There are onerous resource consent issues to consider. There is no one willing to lend capital at reasonable rates or offset against my power bill savings. There is no discounting of GST etc. etc.

And there is nobody, other than perhaps yourself, to stand as an advocate for the likes of myself.

Good luck with your endeavours.

Andrew

Bluff Homestead.

SEF Briefing to the Incoming Government

December 2008

The Context

During its term of office, the incoming Government will need to confront the twin energy sector challenges of climate change and depleting oil supplies. At present, oil is comparatively cheap, and the effects of climate change are only beginning to be felt. Now is the right time for New Zealand to be planning ahead and investing in infrastructure — but that investment must be in infrastructure that meets the challenges of a carbon-constrained world.

Policy responses and infrastructure investment decisions favoured by traditional energy producers which deny or ignore these issues of climate change and depleting oil supplies will worsen New Zealand's chances of adapting to a world in which our present heavy reliance on fossil fuels is not appropriate, and in time will not be possible. As the real costs of energy rise, New Zealand must pay more attention than ever to balancing both the costs and risks of new energy supply, against those of reducing energy demand.

Oil and Transport

Global oil prices in recent years have reflected the increasingly tight balance between supply and demand. Over the past few months, as current and projected demand has fallen, prices

have declined sharply from their July 2008 peaks — despite the fact that there have been no significant increases in world oil supplies, or discoveries of major new oil fields.

As the International Energy Agency's recently-released World Energy Outlook 2008 makes clear, the world is facing an increasing challenge simply to maintain current levels of oil production, let alone increase them. According to the IEA, even if world oil demand remains static till 2030, 45 million barrels per day of gross oil production capacity — four times the current capacity of Saudi Arabia — would need to be built worldwide just to offset the decline in existing oil fields. Even if this were possible, massive investment would be required to achieve it, and current world economic conditions make this investment increasingly less likely.

Therefore, it would be short-sighted to assume that oil prices will remain at or near their present comparatively low levels for long, especially as and when world economies recover from the present downturn. Transport and infrastructure policies should make it a high priority to reduce our present dependence on fossil oil, and reverse the 64% increase in domestic transport greenhouse gas emissions since 1990.

Climate Change

Alternatives must be found to oil, and other fossil fuels, not only because they are becoming scarce, but because the greenhouse gas emissions they produce have resulted in a rapid increase in greenhouse gas concentrations, and consequent warming. This is most severe at present in polar regions, leading to the threat of sea level rises as land ice in these regions melt, and will increasingly come to affect other regions of the world as well.

Within your Government, there is a range of views on the science of climate change. For much of the rest of the world, however, and in particular for many of our key trading partners, that argument has already been settled. Other governments and international consumers are reacting to reward those countries that have strong policies to counteract climate change, and to punish those that do not. With

the election of Prime Minister Kevin Rudd in Australia and President-elect Barack Obama in the United States, and their commitment to much stronger action on climate change than their predecessors, the argument that we must not get ahead of our major trading partners on climate change policy has lost any validity it may once have had.

New Zealand can no longer be regarded as a leader on climate change policy; now it must scramble to catch up. As long as we remain in this position, our international image, trade access and tourism potential will suffer. The reaction in the United Kingdom to your Government's proposed climate change policy changes, together with the harm this policy uncertainty has already done in the forestry sector, shows that this damage is already occurring.

Electricity

The incoming Government has already announced that it will lift the ten-year ban on building new baseload thermal electricity generation plants, and National's energy policy offers only lukewarm support for the previous Government's target of New Zealand having 90% of its energy generated from renewable sources by 2025: the policy says that National will "Support the 90% renewables target but not let it get in the way of security of supply".

Thus, it appears that the incoming NZ Government will follow a strategy that has been promoted by incumbent fossil fuel generators rather than that of the previous Government. While both energy pathways present challenges and difficulties, SEF contends that a reversion to a strategy more favourable to oil, gas or coal fired thermal generation would be a mistake, as such an approach will greatly worsen New Zealand's greenhouse gas emissions, and increase both our Kyoto liability and our exposure to international criticism on trade, environmental and tourism matters.

Figure 4 from a paper by energy analyst Steve Goldthorpe, "A Period of Consequences", shows the stark difference in CO₂ emissions between the two pathways; the assumptions underpinning this graph are listed in his paper.

The choice before the Government is stark: continue with an energy policy in which New Zealand's ample renewable resources are strongly favoured, even if this is modified somewhat from the policy mix favoured by the previous Government, or increase fossil-fired thermal generation and suffer the consequences of steeply rising greenhouse gas emissions from the stationary energy sector. Although National has claimed that reform of the RMA will make it easier to get renewable generation projects off the ground, the likely effect of favouring fossil-fired thermal generation projects will be to delay, or prevent entirely, new renewable energy generation projects. It is also highly likely that this pathway would result in New Zealand having to import LNG, raising major safety issues, making us dependent on another scarce imported fossil fuel, and exposing our electricity market (for the first time) to international fuel commodity prices.

Heat

An important source of carbon emissions is the use of gas, and especially coal, for heat in industry and buildings – for example, schools and other educational institutions. Wood residues offer a nearly carbon-zero substitute, and in the past year, new technologies and strategies have been demonstrated which show that they can reduce air pollution as well as carbon emissions. The momentum of these developments needs to be maintained.

Household energy generates around 10% of New Zealand's energy greenhouse emissions, most of this from electricity consumption. Domestic electricity prices are rising so rapidly that the Reserve Bank wrote to the Electricity Commission expressing concern that household energy now represents 4% of the Consumer Price Index, fuelling inflation and making their policy settings more difficult. Much of the electricity is used for space and water heating, so improved insulation would go a long way to reducing energy bills and emissions.

Household retrofits are the most cost-effective means of reducing emissions and energy bills. SEF therefore welcomes the initiative by the

New Zealand Business Council for Sustainable Development to promote insulation retrofits as part of the 80,000 house renovations each year. The NZBCSD points to public benefits including reduced hospitalisation and reduced greenhouse gas emissions, both of which will reduce the drain on taxpayers' funds.

Policy recommendations

• The Sustainable Energy Forum recommends that the Government takes the following broad policy approaches in the stationary energy, transport energy and infrastructure fields:

Establish a high-level task force to assess the effects on New Zealand of world oil production reaching its maximum level and subsequently declining, and initiate measures to prepare for these effects.

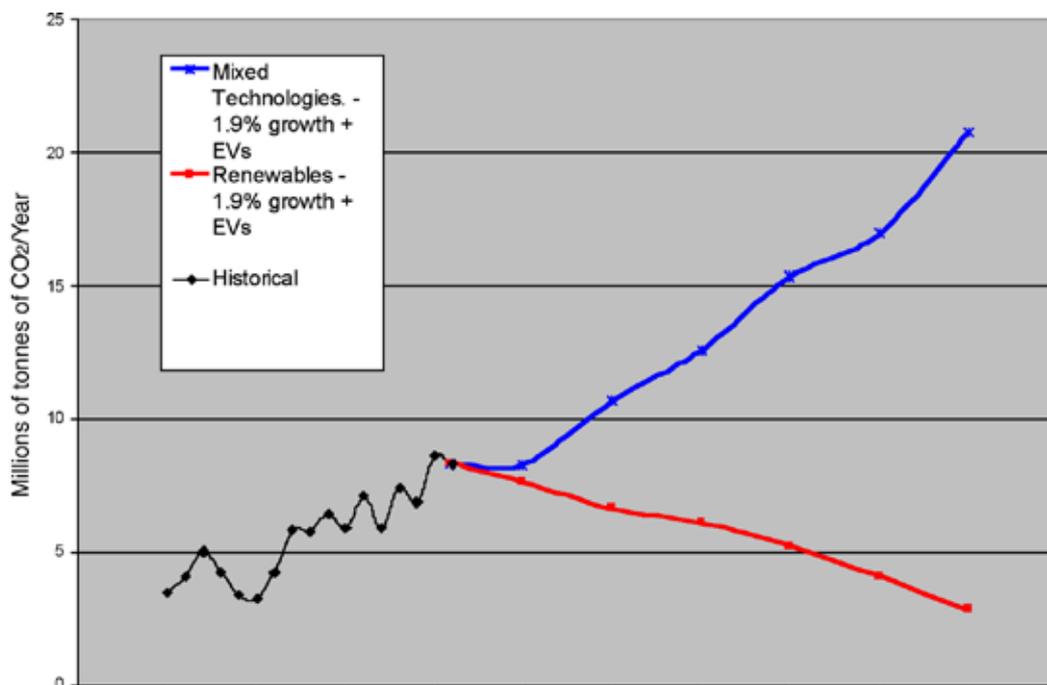
• Focus infrastructure development on areas which will reduce New Zealand's exposure to oil supply shortages and high oil prices, and increase New Zealand's resilience in the face of oil depletion and climate change. Such suitable developments include the roll-out of fast broadband, continuing increases in the extent, range, reliability and quality of public transport systems, and the electrification of the transport system where this is feasible.

• The uptake of electric vehicles of all classes offers the possibility of reducing both oil dependence and greenhouse gas emissions in transport. Other alternative fuel and engine technologies may also have a part to play. The Government needs to remove barriers, create incentives when necessary, and encourage the development of appropriate infrastructure to support the timely and effective deployment of these technologies where they can be shown to increase sustainability and resilience and decrease net greenhouse gas emissions.

• Avoid infrastructure development which makes us more dependent on fossil fuels and leads to further increases in New Zealand's greenhouse gas emissions. Such unsuitable developments include the increasing use of fossil fuels of electricity generation; converting coal to liquid fuels; and continuing to spend money on building new arterial roads unless there is a clear and continuing safety argument for doing so.

• Support conversion of coal boilers to wood firing, and support household (and also commercial) retrofits, to reduce greenhouse emissions and realise public health benefits.

SEF



Comparison of CO₂ emissions from the New Zealand power generation sector under two electricity supply scenarios (from Steve Goldthorpe, "A Period of Consequences")

Press Statement on Transport Alternatives

The Sustainable Energy Forum has criticised the Government's plans to increase state highway funding and make highway construction the centrepiece of transport policy. Tim Jones, Convenor of the Sustainable Energy Forum, said

"The Government is living in a fool's paradise if it thinks that highway construction is the way to improve our transport system. Although the Government's announcement of its continued commitment to the Auckland and Wellington commuter rail systems is welcome, it's the only good news in these announcements. Everything else the Government has announced shows that it regards the private car as the be-all and end-all of our transport system."

"The Minister of Transport obviously hasn't been paying attention to International Energy Agency reports that warn of a supply crunch in world oil supplies approaching 2012. This supply crunch is likely to be worsened by the current low world oil prices, as these discourage investment in oil exploration and production."

"Given all this, you'd think the Government would be interested in other sources of transport energy. That makes it all the more surprising that the Government has just disbanded the Vehicle Energy and Renewables Group (VERG), which was set up in 2008 to explore ways in which New Zealand could promote the uptake of low-carbon fuels and vehicle technologies, focusing especially on electric vehicles."

"I was a member of the VERG, and I'm disappointed that the Government has chosen to end its work so prematurely. New Zealand's transport system is 99% dependent on oil, nearly all of it imported. A move away from this dependence is desperately needed both to reduce our soaring greenhouse gas emissions from transport and to increase our ability to withstand future oil price shocks and supply shortages. All the Government can point to as achievements in this area are decisions to 'equalise the tax treatment of biofuels and

make electric vehicles temporarily exempt from paying road user charges'. That's nowhere near enough," Tim Jones said.

"There is much more work to be done in this area, but it appears the Government would rather place its reliance on oil. Perhaps the Minister of Energy's enthusiasm for coal-to-liquid fuels conversion plants, despite their appalling greenhouse gas emissions, has something to do with this as well. Whatever the reason, the Government's changes to transport policies will lead to increased greenhouse gas emissions, more dependence on fossil fuels, and a transport system that is more hostile than ever to alternative forms of transport," Tim Jones said. "I hope the Government will rethink the direction it is taking the transport system, and will put prudent and environmentally responsible policies in place."

Tim Jones, Convenor, Sustainable Energy Forum

18 March 2009

Revised SEF Subscription Rates

SEF Members are advised that at the most recent AGM of SEF held on Thursday 9 October 2008, it was agreed to increase subscriptions as shown on the table below from 1 April 2009. Subscription invoices sent out after that date will be at the new rates.

	Old Rate	New Rate
Low Income/Student	\$27	\$30
Individual	\$45	\$50
Overseas	\$60	No Change
Library	\$65	No Change
Corporate	\$225	\$250

Electricity Matters

“Bombshell” to Hit Generators?

A “bombshell report” will reveal widespread abuse of market power by NZ electricity companies over several years.

The report by Stanford University economics professor Frank Wolak is with the Commerce Commission (CC) and is likely to be made available during March.

Its conclusions are likely to make uncomfortable reading for the big electricity generators who dominate the market, being state-owned Meridian, Genesis and Mighty River Power; and NZX-listed Contact Energy.

The report is understood to indicate findings that the electricity market is dysfunctional and causes power prices to be much higher than they would be if it was fully competitive.

Wolak’s report was commissioned in 2005 as part of an investigation after the CC received numerous complaints about power prices, excess profits by the generators, and allegations of uncompetitive activity.

His initial report covers the wholesale electricity market - a subsequent report will address the generators’ ownership of retail businesses.

Reference: Sunday Star-Times, 1/3/09.

The first part of the Wolak report will find that there is evidence of market power being used by players in the electricity market, and will point the finger particularly at Meridian Energy’s all-renewable generation assets for allowing this to occur.

Meridian’s portfolio of hydro and wind assets has allowed the company to build its brand around purist “green” credentials, but Wolak concludes that as a result of its generation mix, Meridian’s actions often virtually end up dictating the wholesale electricity spot market prices, and this has often made them higher than they should have been.

If Meridian were to gain some thermal generation assets, and Genesis and Mighty River Power were to gain some of what are currently Meridian’s renewable assets in return, wholesale market dynamics would be less predictable and market power less able to be exploited.

If these recommendations were adopted, it will probably place downward pressure on wholesale market spot prices. But it will also confuse the underlying reality that new generation projects are more expensive than those in the past. It is clear that investment in all the major generation options, wind, gas, hydro, coal and geothermal is marginal on current wholesale prices.

Perhaps this may indicate that it is not possible to have a pricing system based on the cost of generating of electricity at the margin and at the same time have more competition to drive down electricity spot market prices?

Also, changing its generation portfolio will damage the “green” brand which Meridian has built up, but which has never succeeded in driving up Meridian’s customer numbers.

Reference: NZ Energy & Environment Business Week, 4/3/09

Footnote: commenting on this in a SEFNews posting (2 March), Alastair Barnett said that we need to be careful about assigning blame for why the wholesale electricity market is not working properly. If all each electricity producer has done is to follow instructions to work to the short-term advantage of their shareholders (mainly government) the condemnation is hardly appropriate.

Alastair Barnett said that surely the problem is the naivety of the political agendas that the simple removal of regulation would deliver electricity generation into the safe (albeit invisible) hands of the “market”.

“Hopefully we can now return to a more pragmatic approach that when a market need

becomes obvious (such as more generation and transmission redundancy to provide security of supply to Auckland), it can be settled by central government direction, rather than by tinkering, Electricity Commission style, to try and construct ever more complex rules to force the market model to produce the 'right' result. To market purists, any result delivered by a free market must be the right result!"

Alastair Barnett suggests that any attempt to force the market to produce a predetermined result makes the "free" market an oxymoron! Far better to admit this and intervene unashamedly from time to time, when rebalancing is required.

Continuing Saga of Power Price Rises

In December 2008 (Issue 51, pages 1-3) EnergyWatch reported on the early October announcement by Contact Energy of the raising of its power prices from 1 November by 10% or more, a month after they had announced a profit of \$237.1 million for the year ending 30 June and a bid by the Directors to almost double their total fees to \$1.5 million.

The saga continued in early December when Genesis Energy announced plans to raise power prices in parts of Auckland by about 9 percent, citing a range of issues such as excess demand and network constraints.

Earlier, the Prime Minister, John Key had called on Genesis to reconsider the price rises, which it announced after Reserve Bank Governor Dr Alan Bollard, urged power companies to show restraint in the current economic climate.

Mr Key later admitted that there was "no indication" that there would be any rethink and Genesis spokesman, Richard Gordon, declined to comment on the matter.

Mr Key said that repealing the ban on new thermal generation - introduced by the Labour-led Government as part of its Climate Change policies - would help solve the problems with supply of electricity.

"(Genesis's) argument is based around the fact that costs will be substantially increasing in the 2009 period, in part because of things like the thermal ban and because the inability to bring new generation on-stream fast enough is driving up the price," said Mr Key. "We need to get on top of the whole issue in relation to energy, security of supply, the stream of new generation that's coming online, and our new generation system."

But energy consultant, Bryan Leyland, said that the reason prices were going up was not the energy supply but the structure of the electricity industry. *"The way the market is structured now rewards generators for keeping us on the edge of a shortage"* said Mr Leyland. *"There needs to be a thorough and objective review of the electricity market"*.

Energy Minister Gerry Brownlee said that recent price rises were "unacceptable" and would not continue. Reports from the Commerce Commission and the Electricity Commission would include some comment on the structure of the market. *"The problem with the price of electricity is that we've had some years of an energy strategy that hasn't focussed on the fact that demand is growing at a greater rate than supply"* said Mr Brownlee.

Reference: NZ Herald, 16/12/08.

Then in early February, Meridian Energy announced a 7% tariff increase which brought predictable cries of disappointment from Energy Minister, Gerry Brownlee, whose Iam electorate is right in the middle of Meridian's heavy customer base.

What wasn't so apparent was that in December 2008, Meridian was planning a 10% increase in tariffs catchup until a "jawboning" from Gerry Brownlee just before Christmas convinced Meridian executives that their Board-approved double digit increase would cause serious ministerial displeasure.

Ministers are constrained under the SOE Act from directing the commercial tariff-setting decisions by any of the Government-owned corporations.

However the reality is that all these major power companies - Genesis, Mercury (Mighty River Power) and Meridian had “please explain” conversations with Brownlee shortly after Genesis raised its tariffs by 9% in December 2008.

To Meridian it was made clear that double digit power price rises would be politically intolerable.

At the same time SOE Minister, Simon Power, has been issuing “perform now” instructions to all SOE’s, saying that the Government is looking for efficiencies and substantially higher returns from Government owned businesses to help offset the impact of the economic recession on the tax take. He is calling the Heads of SOE’s to the Beehive for a “chat” in early April.

In answer to a question on the effect that this might have on electricity prices, Simon Power said recently on Radio New Zealand’s Morning Report (16 March) that as SOE Minister, he has no authority to control electricity prices which is a “commercial decision” made by the Boards of SOE’s.

So we now have the ridiculous situation of the Minister of Energy busily trying to talk electricity prices down while at the same time the SOE Minister is saying that he has no power to control prices charged by SOE’s and encouraging the SOE’s to increase their returns paid to the Government.

With Finance Minister, Bill English also signalling he fears many SOE’s have lost focus on commercial performance, it appears that Gerry Brownlee’s activist instincts in the electricity sector will increasingly be confined to questions of market structure and regulation.

This pattern of political influence raises fundamental questions about whether NZ’s retail electricity market model is sustainable. Political persuasion is having an impact on commercial decision making which will worry private sector participants, Contact and Trustpower.

Reference: NZ Energy and Environmental Business Week, 11/02/09, page 1 and 18/3/09, page 3.

Footnote: What all of the above demonstrates is that the electricity industry in New Zealand is a huge “cash cow” as far as the Government is concerned. Also it shows that the Government cannot act in an independent manner when considering electricity market reform or other measures to control electricity prices, because it is so hopelessly conflicted by its own vested interest in extracting as much income as it can from its electricity SOE’s.

Because of this conflict of interest, it is just not possible for the Government to be able to be involved in development of processes to determine what is a fair price for electricity that consumers should pay. This needs to be determined by an independent inquiry.

The only constraint on the Government is the political backlash caused by rising power prices.

Stop Press: The Government has recently announced (1 April) a Ministerial Review of Electricity Market Performance.

NZ Renewable Energy Generation

“New geothermal plants, more wind farms and normal hydro lake levels have seen a big jump in renewable electricity generation”, Energy Minister Gerry Brownlee said recently.

Brownlee released statistics up to the end of last year which showed that in December, 74 percent of electricity was being supplied from renewable sources compared with the winter power crisis in the June quarter when renewable generation was down to 56 percent.

“This is a very positive level in renewable electricity generation after a very dry autumn and winter last year; although it still doesn’t mean we can rule out thermal generation being an insurance card in dry years,” he said.

“However, it is pleasing to see the opening of the Kawerau geothermal power station last

year, making geothermal sources a bigger contributor to renewable generation”

Mr Brownlee said the figures also showed a drop in greenhouse gas emissions from electricity generation for the December quarter, reflecting the reduced use of gas and coal generation as the hydro lakes recovered.

Key facts from the statistics:

- 74% of electricity supplied from renewable sources, the highest quarterly level of renewable sources in five years;
- Geothermal generation contributed 11 % in the December quarter;
- Wind farms set a new quarterly record of 304 gigawatt hours, providing 3% of generation; and
- Greenhouse gas emissions from electricity generation were 14% down compared with the previous December quarter, the lowest quarterly emissions since the March quarter in 2005.

Reference: NZ Herald Business Section, 19/3/09 from NZPA.

Whirinaki in the Wrong Place

A review of the 2008 winter electricity shortage has proposed that the \$150 million Whirinaki back-up power station needs to be relocated and run on natural gas rather than diesel if the reserve energy scheme is continued. The report was undertaken for the Electricity Commission (EC).

The report includes a recommendation to review the operation and cost efficiency of the emergency Whirinaki plant.

Other electricity experts have argued that the stand-by plant which was installed as a buffer against energy demand exceeding supply in a dry year was not sensibly located near Napier. Its shortcomings were exposed last year which was one of the driest on record, cutting cheap hydro generation and sending electricity spot prices soaring as the Whirinaki plant was bought into operation.

The situation was exacerbated by the high price

of diesel at that time which was used to fuel the Whirinaki plant.

Energy Minister, Gerry Brownlee said that relocation is one option which will be considered over the next couple of months, along with other recommendations.

While the above report accepts that there was better co-operation within the electricity sector than in previous dry years, it said that the EC's security of supply policy of maximising thermal generation to conserve water did not happen. Clarifying the EC's role in the security of supply area should sharpen incentives on electricity suppliers and users to manage their security risks.

Reference: NZ Energy and Environment Business Week, 28/1/09, pg 2.

Consent for Mill Creek Wind Farm

Meridian Energy has obtained resource consent with relatively little difficulty for 29 of the 31 wind turbines it was seeking to build at its Mill Creek wind farm site. The site is in the Ohariu Valley, north of Wellington City.

The consent application was lodged in April 2008 and hearings were held in August. The development was promoted by a group of local farmers who established the concept 10 years ago for this wind farm. The project is relatively close to the much larger West Wind project.

A decision on construction for Mill Creek is still some time away and Meridian will await possible appeals before beginning work on a business case for the development. The economics of wind energy have changed significantly recently, owing to the falling of the NZ dollar and the new National-led Government's apparent abandonment of the National Policy Statement on Renewable Energy.

Reference: NZ Energy & Environment Business Week, 25/2/09, pg 1

Climate Change/Global Warming

ETS Submission Excerpts

Below is an excerpt from your Editor's own personal submission to the Parliamentary review of the Emissions Trading Scheme (ETS).

TERMS OF REFERENCE ITEM 8 –
EXAMINE THE RELATIVE MERITS OF
AN EMISSIONS TRADING SCHEME OR
A TAX ON CARBON OR ENERGY AS A
NEW ZEALAND RESPONSE TO CLIMATE
CHANGE.

A.....THE FLAWS IN CAP-AND-TRADE SCHEMES

The basis on which the ETS in New Zealand is built is the provision in the present Kyoto Protocol agreement for trading of greenhouse gas emissions credits.

FLAW ONE

A recent article in NewScientist magazine (Reference 1), notes that Kyoto's fundamental flaw is that it is based on "cap-and-trade". Such schemes might look good on paper but they are doomed to fail when it comes to weaning the world off its addiction to fossil fuels.

The article goes on to say *"For starters, without a strong enforcement regime, any cap is meaningless. Under the Kyoto Protocol, for instance, countries that do not meet their targets just increase them next time around. It is a joke"*.

As a local example of the problems with cap-and-trade schemes, in a written answer to a parliamentary question on 29 August 2008, the previous climate change minister, Hon David Parker, reported that the projected reduction in New Zealand's gross greenhouse gas emissions during the period 2008 to 2012 as a result of the previous Labour-led Government's Emissions Trading Scheme was only 1% of total gross emissions for the period. This is an almost negligible change, which would be achieved

at very considerable cost to the New Zealand public in increased charges. It is therefore not at all surprising that the present Government is reviewing the scheme.

FLAW TWO

Fraudulent Credits There remains serious concern about the fraudulent nature of some UN certified emissions credits. As noted in the above article in NewScientist magazine -

"Companies in China are claiming carbon credits for hydroelectric schemes, which they'll sell to polluters in Europe. But these schemes were going to be built anyway, so the overall change to emissions is zero. The UN is cracking down, but many think the whole offsetting approach is flawed."

The Sunday Star-Times article (Reference 2) states

"An Indian company that produces refrigeration gases at a sprawling chemical plant in Rajasthan, stood to make 300 million pounds (UK) from selling certificates to overseas companies including Shell. The Indian company had spent just 1.4 million pounds on equipment to reduce its emissions – and was using the profit to expand production of another greenhouse gas, a thousand times more damaging than carbon dioxide."

(I understand that the above problem relates to companies that build factories that produce chlorofluorocarbons as a by-product.)

"Russian Hot-Air Credits" Another serious concern is whether the New Zealand Government will allow so-called "Russian hot-air credits" to be purchased as part of the ETS. These arise from the collapse of the Soviet Union (mainly Russian and the Ukraine) economies, leading to a big reduction in greenhouse gas emissions from those countries.

This economic collapse occurred just after the date when liabilities under the Kyoto Protocol

were set (from the base year of 1990). But such credits arise from an “accident of history” and purchasing them will do absolutely nothing to reduce global greenhouse gas emissions – if the Kyoto base year had been set at 1995, such credits would disappear entirely.

Allowing these emissions credits to be purchased will weaken the environmental integrity of the ETS in New Zealand, even though such credits are approved under the Kyoto Protocol, and further reduce the possibility that the ETS will lead to any real, verifiable greenhouse gas emissions reductions.

The only possible reason for purchasing such doubtful credits under the ETS would be that they are available at a lower price than emissions credits from other sources.

B. COST/EFFECTIVENESS OF THE ETS

I strongly submit that if the cost to individual consumers and organisations of implementing the ETS up to the end of 2012, is compared with the likely reduction in New Zealand’s gross greenhouse gas emissions resulting from the ETS by the same date.

FIRSTLY The ETS cannot be seen as a genuinely cost/effective means of reducing New Zealand’s gross greenhouse gas emissions.

SECONDLY The ETS can only be seen as a revenue gathering exercise to try and recover most of the cost of purchasing large amounts of emissions credits obtained from overseas which will be required under the Kyoto Protocol agreement.

The cost of implementing the ETS up to the end of 2012 is likely to be of the order of 10-15 times the value of gross greenhouse gas emissions reductions achieved in New Zealand.

Assuming an average cost of emissions credits of NZ\$30 per tonne -

- The total emissions liability for New Zealand under Kyoto is likely to be in the order of \$1 billion to \$2 billion up to the end of 2012.
- The cost saving actually achieved by the ETS

in reducing gross greenhouse gas emissions up to the end of 2012 is likely to be in the range of \$75 million to \$120 million.

(Refer to Minister’s written reply to a Parliamentary question, 29 August 2008, in which Hon. David Parker states that:

“Assuming there will be an ETS or similar measure in 2013, then the reduction in gross emissions is in the range of 2.5 to 4.0 million tonnes. This is around 1% of total gross emissions for the period 2008 to 2012”.)

CONCLUSION In summary, my concern about the ETS is that when it is implemented, individual consumers and organisations will find the price for basic necessities including electricity and petrol rising considerably, and yet the ETS will have very little impact in reducing New Zealand’s own gross greenhouse gas emissions and some of the revenue obtained from the increased prices under the ETS may then be spent on purchasing UN certified emissions credits which are in fact fraudulent and/or will do nothing to reduce global greenhouse gas emissions.

I believe that with either a carbon tax or an energy tax, much more effective measures can be implemented to actually reduce New Zealand’s own gross greenhouse gas emissions, and the revenue obtained from the tax can then be gathered in by the New Zealand Government and used on implementing genuine emissions reductions projects within our own country. This seems to me to be far preferable to remitting the money overseas to purchase carbon credits of a questionable nature, as will be the case if the ETS is implemented.

John Blakeley

REFERENCES

1. Yes You Can Mr Obama. Article by Michael Le Page in NewScientist, 6 December 2008, page 20.
2. The Fools Gold of Carbon Trading. Article by Jonathan Leake, The Sunday Times (UK), published in Sunday Star-Times, 7 December 2008, page C5.

Australia Faces Emissions Cut

Australia could have to pay an extra \$870 million for greenhouse gas emissions after Kevin Rudd's ratification of the Kyoto Protocol and a new UN target for carbon dioxide emissions.

After a year-long review by the UN, Australia has been given a tougher target to cut its greenhouse gas emissions. The figure has been reduced by 6.6 million tonnes per year over the five year period of the Kyoto Protocol.

If Australia is above its emissions target in 2012, it will be required to make up any shortfall by purchasing carbon credits from other nations. One estimate is a potential extra cost to taxpayers of \$870 million in 2012.

The credits which Australia would buy are left over from the economic restructuring of former Soviet satellite countries after the fall of the Berlin Wall and hold little or no environmental integrity.

The Australian Government is finalising an emissions trading scheme that is due to begin in 2010.

Reference: NZ Energy and Environment Business Week, 18/2/09, pp 2-3.

A Middle Ground on Climate Change?

In a thoughtful opinion piece, former Environment Minister, Simon Upton, has emphasised the need for more political consensus in NZ on climate change policy.

He noted that the machinations of the last decade reflect little credit on any of the political parties. Labour's handling of its proposed carbon tax was clumsy and when that fell over, it moved into high gear and enacted the most comprehensive ETS in the world.

But it did so without making a serious effort to build a multi-party consensus.

On the other hand, National spent six years denouncing a carbon tax and promoting the joys of cap-and-trade. When the Labour-led Government did a U-turn and adopted precisely that policy instrument, National worked overtime to find ways to distance itself from the detail!

Upton says that it is pointless to apportion blame. But for the sake of environmental credibility and business certainty, the plea has now surely to be that our legislators try to build some constructive middle ground.

Upton notes that this is not just a domestic issue, as our exporters will increasingly have to disclose their carbon footprints. If they find that in NZ, they are based in a country that just can't get its climate change policy sorted out, it won't make their access to export markets any easier.

He says that the present National-led Government will have to work much harder than its predecessors if the Parliamentary Select Committee review (at present under way) is to assist a more consensual approach. While reconsidering a carbon tax may be interesting, it won't prove any easier to implement than an ETS".

Whatever the policy instrument, there will be no shortage of businesses whose analysis will show that, at least for them, now is not the right time to act. (If it wasn't the right time to act during the long boom years you can bet it won't be the right time to act now).

Upton concludes that the odds are that the ETS will survive in some form. What emerges will probably be less comprehensive. If the Government wants to claw back some ground, it could always bring liquid fuels into the ETS immediately. Their deferral to 2011 was a purely political gesture in the face of high oil prices. These prices have since collapsed.

He says that it is too early to predict the likely outcome, but unless we can build a broader coalition of support for our emissions reduction platforms, we risk continually revisiting square one.

Responsibility for this rests, ultimately, with National and Labour. National needs Labour's support more than anyone else's - and it hasn't set itself up well to secure it.

Reference: Dominion Post, 2/12/08.

Poznan Conference Outcomes

In the December 2008 international negotiations for a successor to the Kyoto agreement held in Poznan, Poland, it became clear that any new agreement is unlikely to be anything like the present Kyoto arrangements and will call for a "broad shared vision" for co-operative action including targets for 2020 and 2050. There is unlikely to be any agreed global target relating to 2013 following the expiry of the present Kyoto agreement, and even the 2020 arrangement is likely to be a target for individual countries to achieve, not a quota.

A significant factor here is that the only penalty provisions in the existing Kyoto Protocol agreement relate to tougher targets being applied in a subsequent agreement, to signatory countries which do not meet their emissions reductions targets in 2012. If the successor agreement does not have firm quotas for individual countries from 2013 onwards, the penalty provision in the existing Kyoto agreement becomes meaningless.

Writing in the New Zealand Herald from Poznan on 11 December, Barry Coates said "Japan and Canada promised to reduce emissions of greenhouse gases under the Kyoto Protocol but they are now threatening to renege."

Perhaps there may also be a number of other countries signed up to the present Kyoto agreement who also likely intend to renege but are unwilling to say so at present for fear of upsetting their European trading partners?

The marathon UN Climate Conference at Poznan received a boost on 13 December when a landmark new European pact was agreed unanimously by the 27-nation EU summit in Brussels.

The new pact, setting down a 20% reduction in EU greenhouse gas emissions by 2020, was a test of whether the EU could continue to lead the way or fail in the face of the world's financial crisis.

Activists however were unimpressed, complaining that the EU package had been diluted "This was a moment in time when real leaders would have stepped up and taken the position that would combat the economic and climate crisis at the same time" said Kim Carstensen of the nature conservancy group WWF.

"Instead, industrialised countries preached sermons about the importance of climate protection in the Poznan plenary while lacking or attacking policies to make it happen at home - a serious sign of climate hypocrisy".

The Poznan talks were tasked with clearing some of the "technical undergrowth" blocking the way to an agreement at another major climate change conference in Copenhagen in December 2009. They went into overtime amid discord over the operations of a planned very large fund to help poor countries to cope with the impact of climate change.

But delegates were confident that this problem would be overcome and not block the main decision of launching a work programme towards Copenhagen.

Ministers were expected to decide that a mountain of proposals for the Copenhagen Treaty's content be honed down to a negotiation blueprint by June 2009.

If all goes well, the Copenhagen treaty will take effect from the end of 2012 when the Kyoto Protocol's current roster of commitments runs out.

But a minefield lies ahead during 2009, especially the key question of who should cut their emissions of heat-trapping greenhouse gases, by how much and when.

Reference: Sunday Star-Times, 14/12/08.

Footnote: Within the European Union, problems are now emerging in agreeing on the form of any post 2020 climate treaty. The New Zealand Herald (2 February) reports that earlier drafts of the EU plan (to be advocated at the climate change talks in Copenhagen) had recommended wealthy and industrialised countries “commit to 30 billion Euros in new annual public funding by 2020”. But it appears that this specific figure has now been scrapped, because of pressure to shift EU funds to fight economic recession.

(Amounts of money of this magnitude could be necessary annually to fund actions in developing countries, which will be needed under a new global agreement to reduce greenhouse gas emissions. This must be resolved at the talks in Copenhagen).

Climate Change and Economic Recession

In a thoughtful editorial, the NZ Herald notes that “green” politics seen to be a luxury during times of economic recession.

Just when a change of government in the USA promises some leadership on Climate Change, countries like NZ are beginning to backslide.

The new National-led Government has ordered a review of Labour’s Emissions Trading Scheme and moved to cancel three steps agreed to by the previous Labour-led government - a moratorium on additional fossil-fuelled power generation, a compulsory biofuels quota, and the banning of incandescent light bulbs.

Meanwhile, in Australia newly announced carbon emission reduction-targets are a fraction of those expected. It is a striking reversal of Kevin Rudd’s trip to Tokyo immediately after his election. Now his Government’s commitment for the period beyond the term of the Kyoto agreement would cut emissions by only 5% below 2000 levels, unless most other countries agree to do more.

At present there is not much prospect of a bolder consensus. Even in Europe, where efforts to meet climate change are farthest advanced, the recent summit conference at Poznan in Poland made little evident progress towards a post-Kyoto programme. In the current economic climate, the reason is not hard to determine - economic recession has eclipsed all other concerns, particularly costly ones.

“Green” organisations around the world have been enjoying success in the debate over climate change, marginalising remaining sceptics and convincing most governments that industrial emissions of carbon dioxide have to be contained. The present recession shows how shallow the conviction has been.

If most people believed the consequences of climate change to be catastrophic, and believed emissions reductions to be the best response, governments would not hesitate to act. Recession would seem a minor temporary risk in comparison.

Even the Labour-led Government in this country postponed emissions trading for the oil industry until 2011 when petrol prices spiked briefly in mid 2008, and it backed off home shower regulations as soon as they caused embarrassment to Labour’s election campaign.

If governments are able to soft pedal on proposed solutions whenever their economies turn sour, the public will be left to wonder whether climate change is really to be taken seriously.

Reference: NZ Herald, 18/12/08.

Commission Warns “Carbon Cowboys”

The Commerce Commission (CC) has warned “carbon cowboys” that they may face fines of up to \$200,000 if they are caught falsifying carbon credits.

Such activity could include selling credits twice for the same trees, or taking money to plant trees that never find their way into the ground.

The CC has issued draft guidelines on carbon claims in an attempt to rein in some of the wilder claims made by emissions credits schemes. Feedback on the draft guidelines will close on 3 April.

The CC has warned companies offering “carbon neutral” products, offsets for air travel, or carbon neutral credits (conferences etc) who could not prove their claims that the CC will be “vigorously pursuing” complaints from customers.

Purchasing credits to help plant trees, build wind farms or capture greenhouse gases from landfills, has become steadily more popular in NZ. However, little regulation specifically targets carbon offset schemes.

But the CC has warned companies that such activity falls squarely within the fair trading laws.

CarbonNZero programme business manager, Mike Tournier, whose employer, Landcare Research, provides more than 90 percent of NZ’s carbon offsets, said that guidelines were needed to rein in “carbon cowboys”. He said that a lot of players had seen this as an opportunity to make some quick money. *“It has been the Wild West”* he said.

Mr Tournier said that “chequebook certification” schemes were swapping meaningless credits for money. *“We’ve had clients come to us who’ve spent over \$25,000 and bought junk credits”*.

Mr Tournier said that the Kyoto Protocol rules said that projects that did not directly absorb carbon (as trees do), counted towards reducing emissions only if they would not have happened anyway.

“A wind farm built as part of a country’s normal electricity supply does not count towards carbon offsets, but one that could not have been built without the carbon credits system does count.

Carbon offset schemes have been criticised as giving the purchasers a licence to pollute. But Green Party Co-Leader, Russell Norman said that the schemes were an important step towards

making people aware of their emissions and starting to put a price on carbon.

Mr Tournier said that CarbonNZero’s focus was on getting an accurate picture of a person’s (or organisation’s) carbon emissions and reducing them, rather than just on buying offsets.

Reference: NZ Herald, 4/3/09.

Among the examples quoted in the CC report are the following:

- Inappropriate or poor quality offsets can place you at risk, as can the absence of adequate insurance on offsets, such as forestry plantings which are subject to fire risk.
- You can’t claim carbon reduction gains for upgrades or replacements that you were going to undertake anyway. This concept of “additionality” - doing more than the status quo - is crucial to achieving carbon reduction and to the truthfulness of claims in this area.
- Always ensure you are buying “retired” carbon offsets. If you don’t, there is a risk that they will be re-traded and your contribution will be negated by what is in effect, double dipping on the same set of offsets.
- If your offsets are for activities occurring in the future, you need contractual commitments from the supplier that these actions will occur, or if they do not occur there will be a replacement offered.

Reference: NZ Energy and Environment Business Week, 11/3/09, pg 3.

West Blamed for China’s Emissions

A new study shows that half of the recent rise in China’s carbon dioxide emissions is caused by the manufacturing of goods for other countries.

Last year, China officially overtook the USA as the world’s largest carbon dioxide emitter. But this new research shows that about one third of China’s total man-made carbon dioxide emissions are the result of producing goods for export.

The research identifies “offshored emissions” as a key unresolved issue in the run up to this year’s crucial Copenhagen summit in December, at which world leaders will attempt to reach an agreement to replace the Kyoto Protocol from 2013.

Developing countries are under pressure to commit to binding emissions cuts at the Copenhagen conference. But China is resistant, partly because it does not accept responsibility for the emissions involved in producing goods for foreign markets.

Reference: NZ Energy and Environment Business Week, 25/2/09, Page 4.

Climate Change News Snippets

Obama and Climate Change

European enthusiasm for President Barack Obama’s ambitious programme of US renewal does not hide deep uncertainty over the likelihood of his delivering on measures to combat climate change.

Nine months before the UN talks in Copenhagen, Denmark, where world leaders will try to finalise agreement on a new climate change treaty to succeed the Kyoto Protocol which expires in 2012, there are real fears that events will prevent Obama from delivering.

The depth of this disaster which has befallen the US economy in particular, and the difficulties Obama faces getting Congress to approve his financial rescue plans, underscores significant obstacles ahead.

Besides, given the US failure to meet its Kyoto commitments - the Kyoto protocol was signed by the Clinton Administration in 1997 but subsequently overwhelmingly rejected by the Senate - European Countries retain bitter memories of promises broken.

Several European Environment Ministers, including those from Denmark France and Poland, this week met separately with the new team in charge of the environment and climate issues for Obama’s administration.

Asia’s Important Role

Asia needs to wake up to the threat of global warming and play a leading role in climate change negotiations, a leading policy expert, Simon Tay, said. He noted that the current UN climate negotiations under the Kyoto Protocol have become bogged down because of deep differences between rich and poor countries on how to fight climate change.

“When we look at the Kyoto regime, it cannot be seen to work because it is limited to Annex I developed countries” says Mr Tay who is also chairman of the Singapore Institute of International Affairs.

Under Kyoto’s first (and only?) phase, only 37 industrialised nations are committed to cutting emissions by an average of 5% from 1990 levels between 2008-2012.

Nearly 200 nations will meet in Copenhagen at the end of 2009 to try and seal a broader agreement to replace Kyoto and bind big developing nations, and the USA, to emissions curbs.

The new deal is due to be finalised in Copenhagen in December but is at risk of failure because poorer nations won’t commit to emissions curbs unless richer nations do much more to rein in carbon dioxide pollution and pay for adaptation and transfer of clean energy technology.

World is Falling Behind

The global community is failing to meet the treat of climate change, says the chairman of the Intergovernmental Panel on Climate Change (IPCC) Dr Rajendra Pachauri.

Pachauri says things have gone backwards since the first global commitment to reduce greenhouse emissions was signed at the Earth Summit in Rio de Janeiro over 16 years ago.

“Despite that commitment at the 1992 Rio Earth Summit, between 1972 and 2004 global greenhouse gas emissions rose 70% and carbon dioxide alone rose 80%.”

Greenhouse gas form a natural layer in the atmosphere which helps control heat radiated

from the sun and thereby the Earth's climate temperature, making the planet habitable.

A wide range of human activity, and especially the burning of fossil fuels in transport, industry and electricity generation has greatly increased greenhouse gas emissions and scientific consensus today is that this process is causing climate change.

Reference: New Zealand Energy & Environment Digest, 4-10/3/09, pg 1.

Reducing Greenhouse Gas Emissions

A very old news item but still relevant- Writing in SEF News, Mike O'Connell asked if there is any evidence which demonstrates that any country or region is reducing its total greenhouse gas (GHG) emissions over time?

In reply, Murray Ellis said that there are three main methods of doing this.

Send your Economy Into Reverse

The collapse of the Soviet Union in 1990 resulted in major reductions in economic production, living standards and GHG emissions

The photo below relates to the lead story on the next page. It shows Mitsubishi Motors electric car the i MiEV. Mitsubishi says the i MiEV employs a highly energy efficient electric motor powered by recyclable lithium-ion batteries and that it produces no emissions.



Convert from Coal to Gas

This has worked well in Europe in terms of GHG emissions reduction, but they have now well exceeded the limits on local gas supplies and are importing large quantities of gas from Russia and North Africa, raising questions about increasing gas dependence as Europe's gas resources shrink.

Get your Energy Made Somewhere Else

This seems to be the basis of California's "success" in limiting GHG emissions. California now imports a large proportion of its electricity from neighbouring states, and a lot of its petrol from other countries and states.

Murray said that what he cannot yet find are examples of countries or regions which have reduced GHG emissions by increasing energy efficiency faster than economic production.

Reference: SEF News Postings, 8/12/05

Vehicles

Electric Car Progress ...

On Tuesday 10 February the prospect of mass-market electric cars in NZ moved closer with the launch of what is claimed to be our first commercially available electric vehicle.

Minister for the Environment, Hon. Nick Smith, said that the Government plans to waive road-user charges on electric vehicles. At present electric vehicles are classed as diesels for the purpose of road-user charges, resulting in a cost of about 4.5 cents per km.

The Blade Electron is a Hyundai Getz retrofitted with an electric motor, speed controller and lithium-ion phosphate batteries converted by an Australian company, Blade Electric Vehicles.

The plug-in car has a top speed of about 110km/hr, a range of about 120km and can be charged in as little as five minutes, although fast charging shortens battery life.

Each charge will consume about 15 kilowatt-hours of electricity costing about \$3.45 or roughly 3 cents per kilometre travelled.

However the price tag of \$45,000 to \$50,000 means that the Blade is unlikely to find many buyers outside of enthusiasts.

The launching of the Blade coincided with the start of trials of the Mitsubishi iMiEV, billed as "the first mass-produced, new generation electric vehicle to come to New Zealand".

Mitsubishi NZ has secured two prototypes of the four door hatch back which has a maximum speed of 130km/hr, and a range of up to 160km. The vehicles will be evaluated and demonstrated around the country over the next two months.

Reference: NZ Herald, 11/2/09.

The appearance of electric cars in numbers on NZ roads is still a long way off. The iMiEV will be built in Japan from August 2009, initially priced at around NZ\$60,000.

Most of the first year's production will remain in Japan. Buyers there will be offered government price incentives.

Mitsubishi NZ hopes to sell 200 iMiEV cars in 2010, mostly to Government and utility companies. It expects worldwide demand for the plug-in-car to gradually bring down the price to the point where iMiEV can eventually compete in the mini car market.

Mitsubishi says that the iMiEV takes seven hours to fully charge the batteries, at a cost of between \$3 and \$4 per charge. A fast-charge unit will do the job in under 60 minutes, but the fast-charge unit itself costs many thousands of dollars and would likely be cost-effective only to iMiEV fleet buyers. (However to commuters needing to charge their batteries overnight, a slow charging rate should not be a problem).

Reference: NZ Herald 14/3/09.

... And the Plug-in Hybrid

General Motors (GM) has for some time expressed the wish to become the world's first mass-producer of plug-in-hybrid cars. The Chevrolet Volt which is said to be coming to Australia and New Zealand in 2012 will likely have a smaller battery pack than the current demonstration model pack, which weighs 180kg.

GM hopes to halve the size and cost of the lithium-ion batteries prior to the launch of the Chevrolet Volt.

GM says that improving range of the car is not a priority because, it believes that 64km is sufficient for a day's driving on battery power alone.

Meanwhile, Toyota has been working on making its Gen III Prius plug-in ready for launch, hoping to beat GM to the market with a similar concept, running on lithium-ion batteries as well.

Reference: Sunday Star-Times, 22/2/09.

New GM Battery Plant

General Motors (GM) is to invest \$30 million in a new plant to build the next generation of batteries for its Chevrolet Volt plug in hybrid car.

The plant, due to open in Michigan in 2010 will assemble lithium-ion battery cells manufactured by a South Korean company LG Chem.

A spokesman for GM said that the company is aiming to make the Volt a mass-production car. It is being designed to run more than 60km on a single battery charge without using its internal combustion engine, and has become a key part of GM's attempt to re-establish itself.

Reference: NZ Energy and Environment Business Week, 28/1/09, pg 3.

Calamity for Plug-in Cars?

In the USA, General Motors, Ford and Chrysler are spending billions of dollars to develop plug-in electric cars at a time when the price of petrol has now dropped below US\$2.00 (NZ\$3.70) per US gallon.

If their fears come true, fuel prices will be so low when they start rolling out these cars next year, that people won't buy them and all the high-priced research will have gone to waste.

These companies can't afford to make mistakes in spending limited research and development dollars, but they can't predict the future either.

In the five month period from July to December 2008, average fuel prices in the USA fell 58% from US\$4.11 per gallon to US\$1.74, creating a huge problem for car makers to predict what vehicles to design or build to match consumer demand.

Fuel price swings have trapped US car makers before, especially since last US summer (mid 2008) when the price spike caught them with too many pick-up trucks and SUV's and too few smaller, more fuel-efficient cars. The changing market slammed car maker's profits, especially among the Detroit Three, starting their slide towards financial doom.

In the USA, car makers continue to pursue everything from electric and hydrogen-powered cars, to hybrid gas-electric cars, to improved fuel economy for the internal combustion engine.

At the Detroit motor show in January, Daimler AG showcased its Blue Zero concept, which offers the same model of car but with three possible power trains : one with a hydrogen fuel-cell, one with a battery-electric drive, and a petrol electric hybrid car.

Reference: NZ Herald, 17/1/09.

Hydrogen Cars - A "Hollywood Folly"?

Joseph J. Romm, the author of "The Hype About Hydrogen", asks people why they would buy a car that costs ten times as much as a Toyota Prius but has only half the economy, no refuelling stations, and doesn't even outperform the Prius on greenhouse-gas emissions".

Romm suggests that the realities of the hydrogen car, and these obvious drawbacks appear to have been overlooked by the media and glossed over by car makers.

The latest example of a hydrogen-powered car to reach the US market is the new Honda FCX Clarity. In photographs this car bears a passing resemblance to the Prius and it has replaced the Prius as the "green car" for Hollywood celebrities.

At present, each car costs several hundreds of thousand US dollars to produce but Honda suggests that "within a decade" such cars should sell for very much less than this and perhaps "less than five figures".

However Romm suggest that unless this hydrogen car can generate significant societal benefit, demand for it will remain low and prices will remain high. He points out that hydrogen refuelling stations cost \$US 2 million each to install, so it is no wonder that oil companies are hardly rushing to offer hydrogen on their forecourts!

Romm notes that the US media continues to buy into the belief that the fuel cell/hydrogen car will “save the planet”, whereas the electric car will help to kill it. This is because in the USA and many other countries, electricity to charge batteries is largely derived from generation in coal-fired power stations, which releases a lot more greenhouse gas than electricity generated from other sources.

Also there are huge practical problems to be overcome before widespread adoption of hydrogen fuelled cars can become a reality. In the first place, hydrogen is not readily available whereas electricity is. The cost of fuelling an electric car is about one quarter of that for a hydrogen fuel-cell car, and everyone has electricity outlets at home.

Also, the primary source of producing hydrogen is from natural gas. The process releases carbon dioxide, so running a car on hydrogen does not necessarily reduce net greenhouse gas emissions.

Hydrogen is not only expensive to produce, but also to store, transport and transfer to the car itself. And then it has to be run through a fuel cell to be converted back into electricity again, which is then used to drive an electric motor, similar to what you will find in any electric car.

Romm concludes that hydrogen cars are highly inefficient compared with electric cars. He suggests that if car company executives are pushed, they will all “express doubts about the ability of hydrogen fuel cells for mass-market production”.

He says that most car company executives now believe that electric cars (and plug in hybrids) will prove to be a better way than hydrogen cars to reduce fuel consumption and cut exhaust emissions on a large scale in many countries.

“In the not too distant future, General Motors and Toyota are both expecting (or making promises at least) to deliver plug-in hybrid, vehicles. They won’t be especially cheap initially but they are a more realistic solution

to a future less reliant on petroleum than any hydrogen powered vehicle is likely to be”.

Reference: Sunday Star-Times, 21/12/08.

Hybrid Car Sales Plummet in US

Americans have cut back on buying vehicles of all types as the economy continues its slide. But the slowdown has been particularly brutal for petrol-electric hybrid cars.

They were industry’s darling during last summer (mid-2008), but sales have collapsed as consumers refuse to pay a premium for a fuel-efficient vehicle now that the average price of petrol has slipped below US\$2 per gallon.

When petrol prices came down, the priority of buying a hybrid fell off quite quickly. Yet even as consumer interest declined, the manufacturers continued to increase production.

In February 2009, only 15,144 hybrids sold nationwide, down almost two thirds since April 2008 when hybrid sales peaked and petrol price averaged US\$3.57 per gallon. That drop is far larger than the overall drop in sales of the US motor industry, and scarcely better than January 2009, when hybrid sales were at their lowest level since early 2005.

Yet car makers believe that they have little choice but to make more hybrids. Though car buyers are losing interest, politicians are pushing them as a key to reducing US dependence on foreign oil and limiting the greenhouse gases that cars emit into the atmosphere.

In January 2009, President Obama called on the US motor industry to “thrive by building the cars of tomorrow” and prepare for federal and state regulations that could push average fuel economy above 40 miles per gallon by 2020.

Building the hybrid car marks a lasting commitment to a powertrain technology that currently represents only about 2% of US vehicle sales and which is by most accounts, deeply unprofitable.

Toyota said last year that it was finally making money on Prius after nearly a decade of producing it, but executives of other car makers acknowledge that they lose money on every hybrid sold.

As evident on the streets of Los Angeles and San Francisco, hybrids have an almost cult-like

following, but getting the masses to buy them with any consistency is another matter.

A car sales executive summed up the situation when he said “the price of petrol dictates what people buy and since that price fall to US\$2 per gallon, now my lots are filled up with fuel-efficient cars that aren’t moving”.

Reference: Los Angeles Times, 17/3/09.

Fuels

World Oil Demand Falls

The International Energy Agency (IEA) suggests that world oil demand will contract in 2009 as the global economic slowdown further erodes consumption.

The IEA has revised its 2009 estimate down by 940,000 barrels per day (bpd) from 86.24 million bpd to 85.3 million bpd, a 500,000 bpd year-on-year fall from the 2008 figure of 85.8 million bpd.

The IEA says estimated global GDP growth in 2009 has been roughly halved to 1.2%, given the worsening outlook in both OECD countries and non-OECD countries. A two year contraction in oil demand is expected through to the end of 2010 for the first time since the early 1980’s.

Total non-Opec oil production is now forecast to be 50 million bpd in 2009 compared with forecast average Opec oil production at around 35 million bpd.

Reference: NZ Energy and Environment Business Week, 21/1/09, Page 3

Oil Price Below US\$45

Oil prices fell below US\$45 per barrel after Opec decided not to further cut production levels at its most recent meeting in Vienna. Members of Opec said that they would strive to adhere more closely to the group’s current output quotas.

Cuts agreed to since September 2008 were meant to take a daily 4.2 million barrels off the

market, but Opec is at present overshooting its current daily target level of just under 25 million barrels per day (bpd) by about 800,000 barrels. Prices had risen from under US\$35 a barrel in February as investors anticipated that Opec would cut production by up to a further 1 million bpd.

Also Russia, a non-Opec member and the world’s second largest oil producer after Saudi Arabia has said that it will reduce crude oil sales. But analysts are sceptical that Russia will follow through with production cuts, given that country’s reliance on oil income.

Oil traders will now likely turn their attention to global crude demand and the possibility of an economic recovery in the second half of 2009. Oil has traded at near US\$40 a barrel since December 2008 after plummeting from US\$147 in July 2008 as demand for crude oil fell amid the worst global economic recession in decades.

Oil investors often look to share markets as a measure of sentiment in the overall economy, but crude oil has risen from below US\$35 a barrel since February, despite the US equity indexes plunging to 12-year lows in early March.

Opec’s decision not to cut production was sure to be welcomed by the USA and other major oil-consuming countries, because setting lower output limits could have jolted the world economy through a sudden oil price increase.

It also reflected the realisation by Opec that any action more drastic than calling for quota

compliance at a time of global economic recession could ultimately backfire, by further depressing demand and driving down prices.

Cheap oil has been a rare bright spot in the otherwise gloomy world economic picture. But while benefitting consumers, those low oil prices have forced many Opec members to revise spending and warn that they cannot invest in further oil production for future years.

Reference: NZ Herald, 10/3/09 and 17/3/09.

Oil and Gas in NZ Still Buoyant

Expanding production in the petroleum sector is helping to ease the pain of NZ's economic downturn.

- The \$500 million Maari oil project off Taranaki is due to come on stream in the next few weeks and is expected to produce 35,000 barrels of crude oil per day. The field is estimated to contain 50 million barrels and have a life of 15 years.
- The \$1.1 billion Kupe gas/condensate development is due to be commissioned in the third quarter of 2009. The Kupe field has reserves of 254 PJ of gas (all of which is contracted to Genesis Energy) and Kupe also holds around 14.7 million barrels of light oil and 1.1 million tonnes of LPG.
- The Tui oil field is continuing to surpass expectations, producing 25,000 bpd, well above the 10,000 to 12,000bpd which was forecast for this period in the production cycle. (As reported in EnergyWatch 46, pg 27, this field opened in July 2007 with production running at 40,000 bpd, rising to around 50,000 bpd in November 2007 before falling away again.

The Tui partners are planning to bring a drilling rig to NZ for a campaign to explore prospects near Tui, which together could contain another 50 million barrels of light oil.

The existing Tui field remains on track to produce 9 million barrels, during the year

ending 30 June 2009. The field is estimated to contain about 50 million barrels, of which about 23 million barrels will have been used by June this year.

Reference: NZ Energy and Environment Business Week, 4/2/09, pg 2.

Mangahewa Shows Promise

Todd Energy is planning to drill three wells in the next 18 months to check whether the onshore Mangahewa gas field, 18 km southeast of New Plymouth, could become a major producer. In the past, gas in this field has been considered to be held tight and difficult to extract. But a well drilled in 2007, and brought into production last year using modern techniques, has led to a reappraisal of the field's potential.

Offshore from Taranaki in the same area, Pohokura is at present the country's largest gas field on annual production, with P50 reserves presently estimated at 1063 petajoules (PJ), as the Maui gas field continues with its winding down phase. If Mangahewa turned out to be as good as is now hoped, it could possibly end up as having more than 1000 PJ of gas reserves, making it four times as the size of the offshore Kupe gas field at present being developed.

Todd Energy estimates that without Mangahewa, NZ has enough P50 gas reserves - those having a 50% chance of being technically and economically productive - to take us past the year 2022 on current demand levels, which is a lot more optimistic than some others in the industry say and who see known reserves as having a shorter lifespan.

However, if Mangahewa reached these possible expectations, Todd Energy suggests that it could push NZ's P50 gas reserves out towards 2030 or beyond.

Reference: NZ Herald, 19/3/09

Join our sustainable energy news & discussion group!

SEF Membership provides discounted access to the annual SEF conference, and a copy of our quarterly EnergyWatch magazine. However many members find the SEF email news and discussion facility an easy way to keep up to date with news and views as it happens. And the discussion by the group of sustainable energy “experts” who have joined the service offers an interesting perspective.

Non-members are invited to join the SEFnews email news service for a trial. To do this send a blank email to: <SEFnews-subscribe@yahoogroups.com>. To help us stop spammers, non-members need to supply a name and contact details, and a brief statement of their interest and/or involvement in sustainable energy issues, before their trial is approved.

As with all Yahoo groups, SEFnews emails can be received “individually” (as they are sent) or as a “daily digest” (grouped into one email per day). If you have a Yahoo ID you can also switch emails on and off, or read the news on the web – a handy option for travelling Kiwis. And YahooGroups saves all of our text emails for later reference, and there is a search function so that you can review the thousands already stored over the last 5 years.

Some busy people using a work address prefer to use the Rules function in their email software to automatically save SEFnews emails to a separate folder for later reading. If you do not want a Yahoo ID, the SEF Office <office@sef.org.nz> can select the ‘daily-digest’ option for you.

For climate change news, join the Climate Defence Network email news group: climatedefence-subscribe@yahoogroups.com

EnergyWatch

Permission is given for individuals and educational or not-for-profit organisations to reproduce material published here, provided that the author and EnergyWatch are acknowledged.

While every effort is made to maintain accuracy, the Sustainable Energy Forum and the editor cannot accept responsibility for errors. Opinions given are not necessarily those of the Forum.

Publication is normally four or five times a year, and material is posted on the SEF website (www.sef.org.nz) as a PDF file, within three months after publication.

Contributions Welcomed

Readers are invited to submit material for consideration for publication.

Contributions can be either in the form of Letters to the Editor or short articles addressing any energy-related matter (and especially on any topics which have recently been covered in EnergyWatch).

Material can be sent to the SEF Office, PO Box 11-152, Wellington, or by email to editor@sef.org.nz, or by directly contacting the Editor, John Blakeley, care of Department of Engineering, Unitec New Zealand, Private Bag 92-025, Auckland 1142.

SEF membership

Memberships are for twelve months and include four copies of EnergyWatch. Membership rates are:

Low income/student	\$30
Individual	\$50
Overseas	\$60
Library	\$65
Corporate	\$250

Mail the form below, with your payment or order, to The Sustainable Energy Forum Inc, P O Box 11-152, Wellington. A receipt will be sent on request.

Name:

Organisation:

Address:

.....

HomePhone:

Work Phone:

Mobile Phone:

E-mail:

Membership type

Amount enclosed: \$.....