



EnergyWatch

The Journal of the Sustainable Energy Forum

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

Issue 44, April 2007

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

Transport Energy - Questions of Scale

Editorial

Getting Cars off the Road

In announcing the new solar water heating initiatives (see EnergyWatch Issue 43, pg 21) the Government Spokesperson on Energy Efficiency and Conservation, Jeanette Fitzsimons said that this will see approximately 15,000 to 20,000 systems installed by 2010. Assuming electricity for heating would otherwise have been supplied by coal or gas-fired power stations, the estimated carbon dioxide savings are equivalent to getting 5000 to 7000 cars off the road, a worthy objective.

That sounds good until you realise the size of the carbon dioxide emissions problem which we face with the present numbers of cars and trucks on NZ roads. At the end of 2005, there were 2,671,375 cars registered in NZ and 486,843 trucks (see EnergyWatch 43, pg 14).

So getting even 7000 cars off our roads would represent only 0.26 percent of our present number of cars. It would be a mere "drop in the bucket" compared with the problem we face with carbon dioxide emissions from the excessive existing numbers of cars and trucks on the road.

In fact, we had a considerably larger number of registered cars in NZ in December 2005 than the eligible votes cast in the September 2005 general election! (One source states that there were 2,286,190 eligible votes cast).

Contents

Transport Energy - Questions of Scale.....	1
Outcomes of Seminar.....	3
Carbon Neutrality an "Aspirational Goal"	3
Over-emphasis of Climate Change Impacts?	5
Electronic Version of EnergyWatch.....	5
Outcomes of SEF/EFNZ Seminar	6
Background.....	6
Programme.....	6
Introductory Session.....	7
Energy and Climate Change.....	7
Low-Carbon Transport	8
Lunchtime Presentation.....	10
Electricity Supply, Demand and Security.....	10
Low Emissions Power and Heat.....	12
Gaps in the Policy Documents.....	13
Vehicles and Fuels.....	14
Future Cost/Availability of LNG.....	14
The Hard Truth About Ethanol.....	15
Honda's Plans for Fuel Cell Cars.....	17
More on the Chevrolet Volt	17
NZ Ministers Urged to Change Cars.....	18
Diesel Beats Hybrids.....	19
Car Prices Rise with Import Age Limit?.....	19
Foreign Brands Gaining in US.....	20
Japan Wants Greener Cars.....	20
Japanese Fuel Saving Rules	21
NZ New Car Sales Increase	21
Pathway to a Sustainable Energy Future.....	22
Is there a Looming Energy Crisis?.....	22
Availability of Fuel Supplies	24
Carbon Pricing.....	27
Buildings Energy Efficiency.....	28
Carbon Trading	29
Electricity and Gas Transmission	29
Distributed Generation.....	30
Electricity Matters	30
Review of Electricity Market.....	30
Energy Generation up by 1.6%.....	31
Minister Supports Geothermal Power	31

Getting More People to Use Public Transport

Another scale issue is the amount of money being spent on improving public transport in NZ to make it more attractive for use by commuters, compared with the difficulty in getting more people to use public transport to get to and from work.

On census day (7 March 2006), only 1% of employees travelled to work by train and 3% by bus (refer EnergyWatch 43, pg 14). This compared with 58.6% driving themselves to work plus 4.6% as passengers in vehicles, a total of 63.2% using their own four wheeled motor transport.

Commenting on these figures, the Auckland Regional Council (ARC) transport policy chairman, Dr Joel Crayford, noted that although central government is spending \$301 million on public transport this year, that was only enough to keep treading water against the amount of money spent on providing roads for cheap imported cars.

As if the problem of getting people to use public transport wasn't bad enough already, early in January 2007 the ARC announced fare increases on Auckland's public transport at a time when petrol prices had been falling!

Getting More Economical Vehicles

There has been a lot of publicity over the last 3 years about the rapidly rising numbers of petrol-electric hybrid cars being sold in the USA. But this is starting from a very low base of around 2% of new car sales. In NZ the percentage of new car sales of hybrids is less than 1% but we also import some used hybrids from Japan.

And now sales of hybrid cars in the US have slowed since the price of petrol settled down (refer NZ Herald, 10/3/07). US consumers bought 254,545 hybrids in 2006, up from 199,148 in 2005. The Toyota Prius was the biggest seller at around 43% of sales. But the percentage growth of hybrid sales was the second lowest since 2000. In January 2007 in the US, Toyota began offering its first sales

incentives on the Prius, including interest-free loans for 24 months.

Changing to Alternative Fuels

There has been much talk recently of converting the NZ transport fleet to run on alternative fuels such as biofuels and hydrogen, or battery-electric vehicles. But what would be the hurdles in actually converting the majority of our vehicles to run on alternative fuels?

Biofuels

Small amounts of bioethanol can presently be added to petrol and biodiesel can be added to diesel without affecting the operation of most present-day cars and this is reflected in the Government's proposal for a Biofuels Sales Obligation of 3.4 percent by 2012 (based on the energy content of the fuel). But higher proportions of biofuel will generally require engine modifications and from a practical viewpoint, it will only be economic to introduce this biofuel capability into new vehicles rather than converting large numbers of existing vehicles.

Hydrogen

Hydrogen fuel cell vehicles introduce a new method of motive power as well as a new fuel. The introduction of hydrogen powered vehicles is therefore a greater challenge, especially as the hydrogen fuel cell power source is still many times higher in price than the internal combustion engine (see pg 17 of this issue).

Battery-Electric

Battery-electric vehicles may soon be reasonably economically competitive with new internal combustion engined-vehicles. But questions remain over the longevity and replacement price of their batteries, suggesting that a further breakthrough in battery technology is still required.

Rate of Conversion

To introduce even a limited number of any of the above alternatively fuelled vehicles into the NZ transport fleet will be a significant challenge indeed.

As an example, starting from a base of 10,000 such vehicles, it would take 40 years at an annual growth rate of 30% before almost the entire NZ transport fleet could be running on hydrogen.

Even at the height of the government-assisted programme in the early 1980's to convert existing vehicles to run on compressed natural gas, a growth rate in the order of 30% per year in CNG conversions was not achieved on a continuing basis.

Outcomes of the SEF/EFNZ Seminar

An article by SEF Convenor, Tim Jones follows summarising the outcomes of the one day seminar on Energy Policy organised as a joint SEF/EFNZ event.

Over 100 people registered for the event held on 16 February and some lively discussion ensued.

Tim has identified a number of gaps in the government policy discussion documents released in mid-December and I reiterate here three important questions to be raised about these documents.

- Why is there so little emphasis on reducing greenhouse gas emissions (GHG) from transport as compared with "stationary energy"? Tim notes that the transport sector is a rapidly-rising source of GHG emissions, and that domestic transport carbon dioxide emissions rose by a staggering 62% between 1990 and 2005.
- Why is there a lack of emphasis on reducing NZ's financial liability over the Kyoto five year commitment period (2008 to 2012 inclusive), and in particular on specific measures which could be taken to reduce this liability (which is likely to extend to more than \$1 billion)?
- Why do the documents appear to be "out of sync" with the Prime Minister's 13 February speech to Parliament (see below), with its emphasis on a commitment to greater

sustainability in NZ's resource use with the "aspirational goal" to be carbon neutral in our economy and way of life? Could it be that the views set out by public servants and other bureaucrats in these documents have been somewhat overtaken by the goals since enunciated by the Prime Minister?

Carbon Neutrality an "Aspirational Goal"

About five years ago the political buzzwords for New Zealand's aspirational goals were "Economic Growth and Transformation", "Top Half of the OECD" and "Knowledge Wave". Now these have been replaced by "Sustainability" and "Carbon Neutrality".

On 13 February, Rt Hon Helen Clark presented the Prime Minister's annual statement to Parliament for 2007 setting out the government's priorities for the year ahead.

She said that NZ's future is dependent on long term sustainable strategies for our economy, society, environment, culture and way of life.

She noted that the invisible hand of the market doesn't deliver a sustainable nation, as an earlier era of NZ politics showed only too well.

Now the quest for sustainability has taken on a new urgency because of the scale of the environmental challenge which the world faces.

Traditional patterns of development and fast growing populations have put an intolerable strain on the planet. The future economic costs of doing nothing are dire.

That's why issues around sustainability and climate change have become the compelling issues of our times, dominating international forums and agendas.

Ms Clark said that without a commitment to greater sustainability in our resource use and way of life, we risk not only damaging our own environment, but also exposing our economy to significant risks. She said that she

believed that NZ can aim to be the first nation to be truly sustainable - across the four pillars of the economy, society, the environment and nationhood.

Ms Clark said she believed that we can aspire to be carbon neutral in our economy and way of life.

She said she believed that in the years to come, the pride that we take in our quest for carbon neutrality and sustainability will define our nation, just as our quest for a nuclear free world has over the past 23 years.

More than any other developed nation, NZ needs to go that extra mile to lower greenhouse gas emissions and increase sustainability. In our high value markets in Europe, we face increasing pressure on our trade and tourism from competitors who are all too ready to use against us the distance our goods must travel to market, and the distance tourists must travel to us.

By lowering our carbon footprint, we strengthen our position against that kind of protectionism.

Ms Clark said that she believed that NZ has the potential to lead the world in its commitment to renewable energy. On biofuels the time has come to implement a sales obligation.

Biofuels can replace diesel or petrol, and reduce our greenhouse gas emissions. With domestic production, they can also be positive for NZ's current account. The government has decided that a Biofuels Sales Obligation will be set at 3.4% of the annual energy content of total annual petrol and diesel sales by 2012. This initial target is considered sufficient to encourage the uptake of biodiesel and the development of infrastructure for ethanol distribution.

This measure complements decisions already made to ensure that cars imported into NZ in future meet higher emissions standards and that consumers have proper information on the fuel efficiency of cars they are purchasing.

Response to the PMs Speech

Responding to this speech, financial commentator Rod Oram (Sunday Star-Times, 16 February) noted that the Prime Minister

had been wise not to set a deadline for carbon neutrality because this is a journey to a distant goal and no other national leaders have come close to setting their countries so big a challenge.

Over the next couple of decades we can reduce our output of carbon dioxide and other greenhouse gases such as methane, and we can partially absorb the gases we do emit with forest sinks and other forms of offsets.

But almost half our greenhouse gas emissions are generated by the agricultural sector, methane from animals being the biggest contributor to that.

While there is a fair amount of research going on into ruminant animals, their feed and how they digest it thereby reducing methane emissions, practical answers are still a long way off.

Editors Note: It is unclear at present whether or not the carbon neutrality goal includes methane emissions - see EnergyWatch 43, pp 22-23.

Rod Oram said that the steps announced so far, such as requiring biofuels to account for 3.4% of the energy content of petrol and diesel by 2012 are incredibly modest. Meaningful progress will require making some very tough fundamental decisions such as pricing the use of carbon across the economy, capping emissions and enabling a large-scale carbon trading market to develop.

Business for example is coming up to speed on carbon trading so it can debate with government on how far and fast to apply it through the economy.

But expect mainstream business to baulk at any measure imposing short-term costs with no equally speedy benefit.

In one crucial sense, business does not help itself. Vast sectors of it are still production-driven rather than market-led. They have little idea of overseas consumers' rapidly rising demands on environmental issues, let alone any idea of how to play to them.

Rod Oram said that as a result, the companies are seeing only the cost, not the opportunity,

of meeting these demands. Federated Farmers and Fonterra are the biggest culprits.

Rod Oram said that the Prime Minister is unwise to invoke the spirit of the nation's anti-nuclear stand in suggesting carbon neutrality could be an equally powerful shaper of national identity.

While it was brave to go anti-nuclear - particularly in the face of US hostility, it was relatively easy. It was a passive one-off act. All we had to do was deny ourselves the dubious benefits of nuclear power and weapons.

In contrast, carbon neutrality will require decades of multiple, often challenging, actions. Many will require us to give up something, at least in the short-term.

Over-emphasis of Climate Change Impacts and their Likely Time Scale?

Two British scientists who accept that global warming/climate change is now occurring and largely caused by human activities are nevertheless concerned that the over-emphasis of the likely effects of global warming, especially in the near future, is harming the credibility of the arguments being advanced.

In particular, they note that certain Hollywood-produced movies lead people to think that every severe storm or flood event which now occurs can be directly attributed to global warming.

Instead they say that the public should be educated to understand that based on available evidence, climate change/global warming is a gradual process so it is the long term trends which are important.

Reference: Radio New Zealand, 18/3/07

Editor's Notes

1. Al Gore's film *An Inconvenient Truth* dwells at some length on the aftermath of Hurricane Katrina as evidence of global warming, which is a questionable assumption (see EnergyWatch 41, page 12).

2. A recent example came after the Northland floods, especially around Kerikeri (NZ Herald 3/4/07). This was linked by a Niwa weather scientist to global warming, although care was taken to point out that "Global warming means more floods like the one which threatened the famous Kerikeri Stone Store and bridge last week could be on the way", rather than this particular flood necessarily being a result of global warming.

3. In comparing the relative urgency of the problems of climate change and peak oil, page 18 of the draft NZ Energy Strategy states that "The government believes that the more serious and immediate challenge is climate change" (rather than Peak Oil). It goes on to say

"The world's atmosphere will heat up dangerously from greenhouse gas emissions caused by the combustion of fossil fuels long before those fuels run out".

Peak Oil is likely to be a serious problem globally by 2030 and will be discussed in the next issue of *Energy Watch*.

Electronic Version of EnergyWatch

Occasionally some readers have expressed a preference to receive only an electronic version of EnergyWatch because they prefer it that way and to save on paper.

We now have procedures in place to enable EnergyWatch to be sent out electronically soon after printing to those readers who have requested an electronic version.

At present SEF cannot offer a reduced membership subscription rate for this electronic-only service but any members who wish to avail themselves of it, please advise us by email to info@sef.org.nz.

John Blakeley

SEF/EFNZ Seminar Summary

Joint Sustainable Energy Forum/Energy Federation of New Zealand (EFNZ) Seminar on Government Energy and Climate Change Policy, Wellington, 16 February 2007

Report by Tim Jones

Background

Just before Christmas 2006, SEF and EFNZ discovered that both organisations were planning to hold seminars or conferences early in 2007 to consider the Government's recently-released set of proposals on energy and climate change policy. The two organisations then decided to hold a joint event, which took place in Wellington on Friday 16 February.

The objective of the seminar was to get comments from a range of perspectives on the five Government energy policy documents released in December, looking at two questions in particular: are the goals of the Government's policies correct, and are the measures proposed the right ones?

All five documents were discussed during the course of the seminar, but the focus was mainly on the draft New Zealand Energy Strategy (NZES) and New Zealand Energy Efficiency and Conservation Strategy (NZEECS), and the Transitional Measures document.

Programme

Welcome – Rob Whitney, EFNZ

Introduction

Powering our Future - David Smol, MED

Session 1 – Energy and Climate Change

Energy and Climate Change - Catherine Beard, Greenhouse Policy Coalition

Carbon Trading – Trustpower Strawman Proposal - Peter Calderwood, Trustpower

International Lessons in Energy Policy - Catherine Mitchell, EECA

Realising the Potential – Wind Energy and the NZES - Fraser Clark, New Zealand Wind Energy Association

Session 2 – Low Carbon Transport

Transport, Mobility, and Access to Services - Tim Jones, SEF

Walking & Cycling in NZ and the Draft NEECS - Carolyn O'Fallon, Pinnacle Research and Policy Ltd

Low Carbon Transport - John Collyns, Bus & Coach Assn

Vehicle Technology: Can it Support the Strategy's Aspirations - Andrew Campbell, CRL Energy

Transport Fuels: First Steps Toward Sustainability - Barry Blackett, BP Oil NZ

Lunchtime Presentation

Climate and Energy: Today's Problem with a Today Solution - Peter Read, Massey University Centre for Energy Research

Session 3 – Electricity Supply, Demand, and Security

The Role for Infrastructure in Meeting the Government's Energy Strategy Challenges - Kieran Devine, Transpower

An Active Demand Side - Doug Clover, Parliamentary Commissioner for the Environment's Office

Electricity Security and Supply - The Role of Demand - Nigel Isaacs, BRANZ

Security Without Subsidy - Murray Ellis, Energy Consultant

Session 4 - Low Emissions Power & Heat

Impact of the NZES and NEECS on Closing the Gap for Realising the Bioenergy Opportunity - John Gifford, Scion Research

Electricity and Energy from Coal: An Environmentally Sustainable Solution - Chris Baker, Coal Association of New Zealand

Presentation on the goals of the NZES and NZEECS: Brent Layton, NZIER

Goals, Trends & Strategies for Low-Carbon Power & Heat - Molly Melhuish, SEF

107 people (including panel members and session. All but one of the presentations are available online at

<http://www.energyfed.org.nz/NZ%20Energy%20Policy-16Feb07.html>

So I will not attempt to summarise each in detail here. Instead, I'll give a quick account of each of the panels, and then discuss the gaps and weaknesses in the Government proposals that were revealed by the seminar.

Introductory Session

Rob Whitney of the Energy Federation welcomed participants to the event, focusing on EFNZ's "three As" of energy: availability, accessibility, and acceptability. He was followed by David Smol of the Ministry of Economic Development, who introduced the Government's suite of energy policy discussion documents. Most of what he said mirrors the introductory remarks in the documents, but a couple of points should be noted here: he commented that renewable energy sources should be favoured until carbon sequestration becomes technically and commercially viable, and said that key issues were

- a) Influencing investment until carbon is priced
- b) Addressing any barriers to renewables
- c) How and which emerging technologies to support

David Smol said that the NZES and NZEECS were closely linked, but that the NZES focused on the Government's role, whereas the NZEECS took a sectoral approach and focused on priorities for action. On transport, he noted

that both CO₂ emissions and the coming peak in cheap oil supplies were of concern, but he expected that climate change would be the main driver of change in the transport sector.

Energy and Climate Change

Chair: Jonathan Boston, Institute of Policy Studies, Victoria University of Wellington

Not surprisingly, Catherine Beard, spokesperson for the Greenhouse Policy Coalition (representing the big emitters), criticised the Government's proposed policies as being unduly biased towards emissions reductions over security and affordability of supply. She also criticised the lack of adequate cost-benefit analysis in the documents - a criticism which was echoed by several other speakers. She also made the point - which has been raised previously in SEF discussions - that increased energy efficiency doesn't necessarily mean emissions reductions, and said that agriculture and forestry need to share the emissions reduction burden.

Peter Calderwood of Trustpower gave more details of their emissions trading proposal, which is on pp. 24-25 of the *Transitional Measures* document, and suggested a transition towards full emissions pricing. Although this proposal has some attractive features, I note that it would delay the introduction of a full price on carbon in electricity generation until 2018, which seems rather too late to me.

Catherine Mitchell, currently seconded to EECA from the University of Warwick's Business School, gave one of the most interesting presentations of the seminar. She had five points:

1. Be clear about your goals, e.g. reducing carbon - how and by when? (She said that, in Europe, this goal was generally one of two strands of a sustainable energy policy, the other being building a sustainable energy system)
2. Stimulate innovation
3. Involve people - an inclusive policy open to new investors tends to be most successful

4. Have a flexible policy design - there is rarely one perfect policy, so rigidity on such matters as price-based measures versus renewable obligations is unhelpful
5. The whole framework matters

A number of these points were teased out further in question time, and over lunch. Regarding innovation, she said that many countries in northern Europe were moving beyond the “regulatory state model” of pure market-based economies which still applied to such countries as the US, Australia and the UK. Put briefly, in these countries, innovation was seen as a normal business risk which emerges from competitive markets. On the other hand, the northern European countries were recognising that the market did not deal particularly well with certain aspects of climate change, energy security, and terrorism, and that those Governments were prepared to take proactive steps to stimulate innovation. In these countries, purely economic goals are no longer seen as the only ones worth adhering to. Until recently, she would have ranked New Zealand as a market-based country, but the PM’s recent “Speech from the Throne” appeared to have moved us closer to the more directed approach.

Over lunch, she also queried the assumption in many of the policy documents that New Zealand would be a “technology taker” or “fast follower”, rather than an innovator. This assumption denies New Zealand’s record of technology innovation and short-changes the potential benefits to New Zealand of action.

The final presentation was by Fraser Clark, Chief Executive of the New Zealand Wind Energy Association. He pointed out that references to wind power as a “promising” technology were outdated: worldwide, there are now 70,000 MW of wind installed, and this is going up by about 25% per year. In New Zealand, by contrast, wind represents about 1.5% of installed generation, and a rule of thumb was that intermittency did not become a problem until wind was about 20% of installed generation.

He queried the objective of the NZES: was it to reduce greenhouse gas emissions (which would lead to such measures as a cap-and-trade system) or to encourage renewables (which would lead to the use of renewable obligation or feed-in tariffs), and he said that wind needs policy certainty. The need for policy certainty was another point which several speakers echoed.

The discussion which followed this panel was wide-ranging. Much of it focused on the urgency and scale of New Zealand’s response, with Peter Calderwood pointing out that New Zealand is about to face the real costs of failing to meet its Kyoto emissions target for the first time, when the 2008-2012 commitment period starts, something which has tended to be overlooked in the discussion on future climate change and energy policy. Ken Piddington noted the NZES’s focus on big projects, and asked where the support was for local energy initiatives of less than 2MW in size.

Closing the discussion, panel chair Jonathan Boston stressed the need for urgent action to avoid dangerous climate change, saying that, to meet the recommendations of the Stern Report, New Zealand as a developed country would need to make something like a 90% reduction on its 1990 level of emissions by 2050. The costs of mitigation are comparatively low, while the costs of inaction are very high. The sooner we start, the better, and while a price on carbon is essential, it is not the only measure that is needed.

Low-Carbon Transport

Chair: Tim Fraser, Ministry of Transport

The transport sector is a rapidly-rising source of GHG emissions: domestic transport CO₂ emissions rose by a staggering 62% between 1990 and 2005. Transport also faces increasing concerns over the security of oil supplies. It is notable that the Government’s paper on transitional measures (those to be taken pre-2012) ignores transport completely.

The presentations to this panel started with alternatives to motorised transport, then covered

public transport (from the perspective of the Bus & Coach Association), then went on to detailed issues of vehicle types and fuels.

I started off the presentations by outlining the principles being proposed in the transport part of the draft SEF submission:

1. Avoid or reduce the use of motorised transport where possible.
2. Where motorised transport is needed, encourage alternatives to private road transport where possible.
3. Provide transport energy in ways which use the minimum possible net emissions profile and the minimum possible quantity of fossil fuels.
4. Where fossil fuels are being used for transport, use them as efficiently as possible, and with the lowest possible emissions profile.
5. Ensure that fossil fuel prices are kept at a level (likely to rise over time) which encourages the transition to lower-emissions alternatives.

I also included a section on teleworking (another name for telecommuting). Teleworking is an effective alternative to physical commuting, and it is comparatively cheap to set up, but its use by New Zealand business is often stymied by cultural factors (“That’s not how we do things here!”) and the perception that broadband services aren’t yet fast or reliable enough to permit it. Government support has been conspicuous by its absence, and this may partly be because teleworking falls awkwardly between policy and funding stools: it’s a transport alternative, but is considered under labour market policy rather than transport policy.

Carolyn O’Fallon of Pinnacle Research and Policy Ltd discussed walking and cycling. Her presentation outlines the latent demand for walking and cycling which is not currently being met, and she commented that there are currently many different Government strategies to promote walking and cycling, which though

good in themselves, aren’t integrated - in particular, those addressing the issue from the transport side aren’t integrated with those addressing it from the public health side. The NZEECS merely states that a target for walking and cycling is “to be developed”. She said that investment in infrastructure by itself won’t do the job – travel behaviour change programmes are also needed.

John Collyns from the Bus & Coach Association commented on two areas of difficulty for his members: the reluctance of bus and coach engine manufacturers to cover the use of biofuels, in particular those made from tallow feedstocks, in their engine warranties, and the resultant liability issue which the Government’s biofuels sales obligation will create; and the current argument between his members and regional councils over procurement rules, which has led to a big reduction in industry investment in new fleet in 2006. If these problems could be overcome, then he was positive about the role his members could play in fulfilling the transport goals of the NZES and NZEECS.

Andrew Campbell of CRL Energy looked at vehicle and fuel technology, from the points of view of their feasibility in New Zealand, the time it would take them to have a significant impact on emissions, and their overall emissions reduction possibilities. He started by cautioning that vehicle technology is a relatively small part of the total picture, and said the CRL modelling showed that fleet emissions would stabilise by 2025 merely from business as usual improvement.

He started by looking at alternative fuels for internal combustion engines, noting some of the same issues with biofuels raised by the Bus and Coach Association, but also suggesting that E85 vehicles deserved more attention than they had so far been given in New Zealand.

Turning to other vehicle technologies, he estimated that, to have a significant impact on the vehicle fleet, all-electric vehicles would have a lead time of 20-30 years, hydrogen vehicles 20 years, and plug-in hybrids 10-20 years (with 5-10 years needed to solve the technical

problems). However, electric vehicles could be piloted in New Zealand now, or very soon. In each case, he said, we need to start planning now to be best prepared for the uptake of these vehicle types.

The final speaker was Barry Blackett from BP New Zealand, who gave a detailed presentation on the chemical and physical properties of various biofuels, looking both at their advantages from an emissions point of view (in terms of their potential to recycle carbon) and their effects on engines.

Although Barry didn't say this outright, I got the impression that BP were somewhat taken aback by the Government's decision to raise the biofuels sales obligation from the 2.25% by 2012 originally proposed to the 3.4% decided upon, but he confirmed that this meant most companies would have to use both biodiesel and bioethanol to meet the obligation.

From the audience, Ray Deacon commented that he was disappointed with the transport section of the draft NZES, asking in particular why there was no mention of congestion pricing. He asked if SEF intended to highlight this, and I said that we would (our submission will discuss this among a range of other measures designed to reduce single-occupant vehicle trips). Other audience members expressed concern at the absence of transport from the *Transitional Measures* document, and also criticised the lack of firm commitment to public transport in the draft NZES. There was considerable discussion of the pros and cons of specific vehicle and engine technologies.

Lunchtime Presentation

Peter Read of Massey University gave a presentation on his strategy for biosphere carbon stock management. His work demonstrates that this strategy makes it possible to return CO₂ levels to pre-industrial within half a century. The core of this approach is to treat greenhouse gas emissions, and specifically CO₂ emissions, as a "stock and flow" problem rather than as pollution. Therefore, we need to extract more CO₂ from the atmosphere, and store it somewhere safe. Peter proposes that this be done by greatly

increased tree-planting, concentrating on those parts of the world in which tree-planting has the best net emissions effect – predominantly in the developing world. Additionally, it involves increased areas of sugar cane in the tropics and fast growing grasses in temperate regions, both co-producing food and biomass. This should be coupled with the greatly increased use of biomass as fuel raw material. Peter recommends that we start preparing for this approach now, so that we can ramp it up quickly if the risks of abrupt climate change are shown to be greater than is currently expected.

The viability of such an approach is not yet universally accepted, and there were a number of questions about the feasibility of it following Peter's presentation, but I think there is growing acceptance that such an approach deserves serious consideration and further investigation.

Electricity Supply, Demand and Security

Chair: Ralph Mattes, Major Electricity Users Group

Leading off this panel, Kieran Devine, General Manager of Systems Operations for Transpower, gave a very interesting presentation on the issues Transpower faces in integrating renewables, and in particular intermittent renewables, into the national grid.

Perhaps not surprisingly, his approach to grid management and to the system's capacity to handle intermittency was conservative. He commented that, at present, the system spills water in preference to wind where that choice is available, and questioned whether this is the right approach to take. Transpower is looking for ways to integrate hydro and wind generation.

Again, it is well worth reading his presentation in full.

Much of the discussion time for this panel was taken up with Kieran Devine's presentation. During the discussion, he pointed out an important gap in the NZES and NZEECS: they neglect the issue that there is no "cash for

negawatts” - in other words, there isn't a way for companies to make money out of reducing electricity demand. Nevertheless, he said, there are an increasing number of businesses looking to get around market rules and find a cashflow in this area. He said that the 10% of controllable load in New Zealand (i.e. ripple control for water heating) is unusual internationally, and is a good feature of the New Zealand electricity system; and he was concerned at the load that extensive adoption of plug-in hybrids would put on the electricity system, asking whether the power would come from - though he was reminded from the audience of the potential for off-peak recharging.

Kieran Devine was also challenged on his inclusion of marine energy, specifically tidal energy, among intermittent energy sources, given that the “intermittency” of tides is predictable - but he joked that what he would really like is tidal power generation that could be relied on to be at maximum during the morning and evening power consumption peaks! He acknowledged the point, however, that multiple tidal power schemes in different parts of the country could smooth out the intermittency of tidal power. Asked about distributed generation, he said that Transpower was somewhat gun-shy about distributed generation at present, and had expected it to be further along by now than it is.

The second presenter for this panel was Doug Clover of the Parliamentary Commissioner for the Environment's Office. Doug said that the PCE's definition of a sustainable electricity system is that “true sustainability is only achieved when production is based entirely on renewable sources of energy that are managed within their natural rates of replenishment.” This in turn requires that an active demand side be developed. Doug pointed out that demand side response provides a means for increasing system security by reducing peak loads, and said that a competitive consumer electricity market should include both power you can buy and demand you can forego (another way of looking at “negawatts”). Doug then pointed out that the draft NZES devotes eighteen pages to electricity supply and only half a page to demand.

Later, responding to a question, Doug said that the focus on the demand side should be on the consumers' need and ability to make choices. The technologies to do this are coming on-stream but how do we access them? For Doug, the key is good price signals which include the costs of externalities. In his personal view, the current system breaks down because of vertical integration - so the Government needs either to regulate to prevent this, or to re-do the electricity reforms.

Nigel Isaacs, of BRANZ and SEF, gave an excellent presentation on how and where energy is actually used in New Zealand homes. He pointed out that the NZES focuses on electricity, largely ignoring the actual way that energy is used. The HEEP (Household Energy End-use Project) research has found that on average 29% of household energy goes on heating water and 34% on heating air - in total just under two thirds of the energy is for low grade heat that does not need to be provided by electricity. The HEEP analysis suggests that contrary to popular belief, the real problem with electricity use occurs at the top end of the market - in big, electricity-hungry homes. He said that we should use non-electricity sources of stationary energy to do those things they do best.

Analysis of HEEP data shows that shifting to high efficiency electric heat pumps does not alter the overall residential electricity demand and actually makes the peak demand worse - this is a consequence of the importance of solid fuel for space heating. It is only as a result of the HEEP work that we now understand the relative importance of different fuels and the purposes for which they are used. His key point was that policy should be based on data, not assumptions - and the evidence revealed in BRANZ's HEEP shows that stationary energy policy is being based on assumptions that are badly wrong. Nigel argued that demand should be given equal treatment to, and equal priority with, supply.

The final presenter in this session was Murray Ellis, Energy Consultant and SEF. Murray's presentation was on “Security without Subsidy”.

Here, Murray summarises his presentation: Security can be gained by actions on the demand side as well as supply. Demand that the consumers can manage without for a period can be just as valuable as additional supplies in providing security, and often much cheaper. Its limits are that the cost to the user will rise if the period of interruption is prolonged, and that transaction costs are involved for small consumers, unless their participation is compulsory. Improving technology is mitigating both constraints. On the supply side, diversity of supply is usually more beneficial than increased supply by reducing the size of problems instead of installing additional capacity that is rarely used.

The NZES addresses security, but in a very confused manner. It looks for it from:

- energy efficiency, which has only a transitory effect on security;
- DSM which is mostly about peak reduction, but can help if it includes interruptibility;
- diversity, which is described only as not including coal, nuclear or lignite;
- regulation, which is described only in terms of price control; and
- proactive information supply, which is not described at all.

This is illustrated with the actions taken, but these consist only of various subsidies to increase supply, plus leaning on generators to act non-commercially.

What is needed is a competitive market-based mechanism to provide security services which does not specify the means to provide them. This can be achieved by a system of call options. At least to get this going, the buyer would need to be the system operator, acting under an obligation to sustain security, and calling for tenders at regular intervals. The sellers could be both generators and large consumers or aggregators of small consumers. The market would operate somewhat similarly to the present reserves market, but over longer time periods.

Low Emissions Power and Heat

Chair: Peter Neilson, New Zealand Business Council for Sustainable Development

The first speaker was John Gifford of Scion Research, who gave due regard to the positive elements of the strategies, and also looked at key barriers to the uptake of biofuels. These he identified as the (poor) health of the forestry sector, the fact that change was not easy and was complicated to implement, and the need for demonstration plants. He concluded that the strategies went some of the distance required in the area of promoting innovation and growth in the biofuels area, but not far enough.

Chris Baker of the Coal Association said that coal with carbon capture and sequestration (CCS) was a vital part of meeting the climate change challenge. He focused on the global context of increasing generation capacity from coal, and claimed that CCS is the only way to make a significant reduction in global atmospheric CO₂ emissions, given that coal currently makes up 39% of world electricity generation. He looked at New Zealand's involvement in international 'clean coal' research, and said that, in his view, Government investment in low emissions technologies, rather than market mechanisms, would be the key driver of future emissions reduction. In response to my question, he said that CCS should be commercially available for gasification plants by 2015, but that he didn't know when retrofitting of existing coal generation plants with CCS would be possible, or what this would cost.

Brent Layton of the NZIER, whose presentation is not available online, was the only panellist to question how serious a problem climate change was – he also criticised the discount rates used in the Stern Report, and a number of other aspects of the current public discourse on climate change. He also provided an amusing dissection of the expressed goal of the NZES, saying that it would not have passed muster in a first-year economics class due to its vagueness and imprecision. Therefore, although coming

from a very different perspective, he echoed the calls by many of the speakers and audience members for the documents to be given clear, unambiguous, measurable goals. Replying to a question from Robin Brasell, he said that the strategy ought to set out high level principles, and clearly identify tradeoffs.

The final panelist was Molly Melhuish of SEF. Molly covered goals, trends and strategies for low-carbon power and heat, and she gave a detailed analysis of the documents' inadequacies in these areas. Her conclusions were that:

- GHG emissions are increasing especially in the residential sector, and major policy change is needed to reverse the trend
- Affordability to domestic consumers is reducing, but the government has a conflict of interest in power sector profits
- Investments today are mainly in large-scale energy projects; so the priority now is to support local renewables, energy efficiency, and price-responsive demand
- The present deforestation trend must reverse: we need trees for multiple use including carbon sequestration, water and soil conservation, energy, recreation, timber for low-carbon building, and (importantly) biodiversity
- A price on carbon should begin now, and be targeted to those best able to manage emissions (not avoid costs or shift them on to others).

In conclusion, Rob Whitney and myself gave brief closing addresses and thanked the participants, the organisers, and the sponsor, Transpower.

Gaps in the Policy Documents

While the good points of the various policy documents were acknowledged, a number of gaps and weaknesses in the policy documents were identified. These included:

- Lack of clear, unambiguous, measurable targets

- Lack of emphasis on New Zealand's financial liability over the first Kyoto commitment period (2008-2012), and measures to address this.
- Lack of clear price signals
- Lack of cost-benefit analysis
- Emphasis put on financial costs to existing and/or large players rather than potential benefits to small and/or new players
- Goals, objectives and policies based on either no data, inadequate data, or wrong data
- Not taking the carbon constraint issues seriously enough, and therefore moving too slowly
- Downplaying of the demand side (in both stationary energy and transport) relative to supply
- Taking too long to get a price on carbon into the market
- No cash flow for negawatts
- No way for builders of distributed generation to capture the saved costs of transmission
- Lack of emphasis on regional roles and responsibilities
- Lack of real-time price information in both transport and stationary energy
- Distorting effects of expenditure on roads ignored
- The wide gap between what the strategies propose and what the Prime Minister is calling for.

Vehicles and Fuels

Future Cost/Availability of LNG

By Stephan Heubeck

In previous postings I have expressed my scepticism regarding future liquefied natural gas (LNG) imports to NZ - mainly based on the rapidly expanding LNG demand in Japan, Europe and the U.S.A. - powers who will always be able to outbid NZ on international markets.

A recent article <http://www.energyandcapital.com/articles/renewables-oil-energy/377> indicates that in addition, lots of supply side issues are currently adding to the unhealthy brew. Most interesting are the following statements:

- ExxonMobil announced that the costs of its much-anticipated \$15 billion LNG project in Qatar were running out of control and so it decided to scrap the project altogether “Right now, every one around us is postponing and delaying projects”, Qatari Oil Minister, al-Attiyah said.

This is a severe blow to those who have predicted a massive expansion of the LNG industry. One week ago, PriceWaterhouseCoopers released a report saying that LNG will deliver 31% of global natural gas by 2010, a doubling of the production level of 2005. About two thirds of that production was to come from Qatar.

- Royal Dutch Shell’s Sakhalin II field is the world’s largest combined oil and natural gas project and Russia’s first LNG plant - a very, very big deal. But in what has become a well-worn ruse in the ongoing ploy of Russia renationalising resources, the project was accused of environmental negligence and threatened with lawsuits until Shell was forced into a minority role, with Russia back in control. Among the shoddy shenanigans and nasty allegations surrounding the project is the revelation that Shell executives had known for some time about the ballooning projected costs of the project, but kept the information

secret. When the project was taken over by the Russian government, Shell dropped that poison pill, revealing that costs were actually going to double: not \$10 billion but \$20 billion. Russia’s President, Vladimir Putin was reportedly furious. The costs over-run is definitely going to slow things down in Sakhalin.

- Due to the danger and uncertainty, major oil companies have announced that they will postpone projects planned in the Nigerian swamps including LNG plants worth about \$20 billion. Those plants have been highly anticipated as critical sources of future imports for the US and the UK.

- If we add to this the declining LNG output from Indonesia due to increased domestic consumption, Russia’s decision to pipe gas from the yet-to-be developed Stockman field to Europe rather than going LNG, and announcements from Norway to do the same with gas from the Troll field and future Coeup north projects, the picture of the LNG supply side becomes quite ugly.

Conclusion

Here we have another indicator that playing around with the LNG import option for NZ is unwise, if not dangerous, and a complete waste of money and resources. Especially in the light of our continued inability to better utilise our plentiful and green domestic energy options.

Reference: SEF News Posting, 13/3/07.

Editor’s Note

The PriceWaterhouseCoopers Report mentioned above predicts the global expansion of LNG production will be driven by Qatar, Nigeria and Australia. Despite the report’s optimism about LNG, it warns of the “enormous ups and downs” of the LNG sector.

While gas produces about 60% fewer CO2 emissions per unit of electricity compared with coal-fired generation, critics of LNG point out it

is not as greenhouse friendly as natural gas. This is due to the energy used in liquefaction, transport and regasification. This results in roughly the same CO₂ emissions for LNG as for oil.

Reference: NZ Energy & Environment Business Week, 21/3/07

The Hard Truth About Ethanol

Farmers in the Midwest of the USA are sending billions of bushels of corn to refineries which turn it into billions of gallons of fuel.

Car makers in Detroit have already built millions of cars, trucks and SUV's that can run on it, and are committed to making millions more.

In Washington DC, politicians have approved generous subsidies for companies that make ethanol. And recently, President Bush arranged with the President of Brazil for their two countries to share ethanol production technology.

The problem is that the only economical way to make ethanol right now in the US is with corn, which means that the burgeoning industry, is literally eating away at America's food supply. And most analysts conclude that its environmental benefits are questionable.

Proponents acknowledge the drawbacks of corn-based ethanol, but they think that it can help wean America off imported oil and help the country make the necessary and difficult transition to an environmentally and economically sustainable future.

Virtually all the ethanol produced in the US comes from corn that is fermented and then distilled to produce pure grain alcohol.

Any car will burn petrol mixed with a small amount of ethanol. But cars must be modified with special equipment to burn fuel which is more than about 10% ethanol. Major US car companies are already producing flex-fuel cars that can run on either petrol or E85, a mix of 85% ethanol and 15% petrol.

As a result of incentives from the US Federal Government, US car makers are committed

to having half of the cars they produce run on either E85 or biodiesel by 2012.

Ethanol production in the US has doubled in the last three years, reaching nearly 5 billion gallons in 2006. With 113 ethanol plants operating and 78 more under construction, the country's ethanol output is expected to double again in less than two years.

Petrol is a remarkably efficient fuel. The energy required to pump crude oil out of the ground, refine it and transport it is about 6% of the energy in the petrol itself. Ethanol is much less efficient, especially when it is made from corn. Just growing corn requires expending energy - ploughing, planting, fertilising and harvesting all require machinery that burns fossil fuel.

Modern agriculture relies on large amounts of fertiliser and pesticides, both of which are produced by methods that consume fossil fuels. There is also the energy used in transporting the corn to an ethanol plant where yet more energy is consumed in the fermentation and distillation processes.

Finally there is the cost of transporting the fuel to the retail filling station, and because ethanol is more corrosive than petrol, it can't be pumped through relatively efficient pipelines but must be transported by rail or tanker trucks.

In the end, even the most generous analysts estimate that it takes the energy equivalent of three gallons of ethanol to produce four gallons of the product.

The environmental benefits of making ethanol from corn are limited. When you consider the greenhouse gases that are released in the growing and refining process, corn-based ethanol is only a slight improvement on petrol, as far as greenhouse gas emissions are concerned. Growing corn also requires the use of pesticides and fertilisers that cause soil and water pollution.

There is some environmental benefit at the exhaust pipe of a car. When blended into petrol in small amounts, ethanol causes the fuel to generate less carbon monoxide.

Making ethanol is profitable only when corn is cheap and oil is costly. It is profitable at present thanks to the 51 cent a (US) gallon federal government subsidy but oil prices are down from the peaks in 2006 and corn has doubled over the past year from about US\$2 to US\$4 a bushel, thanks mainly to demand from ethanol producers.

High corn prices are now causing social unrest in Mexico, where the government has tried to mollify angry consumers by putting price controls on tortillas. US consumers of corn-based products will soon feel the effects as well.

Also farm animals eat more than half the corn produced in America and recently the US Agriculture Department announced that beef, pork and chicken will soon cost consumers more thanks to the demand for corn to produce ethanol.

Many US agricultural economists believe that rising demand for feed corn has squeezed the supply and doubled the price of not just sweet corn, but also wheat, soybeans and several other crops.

Last year ethanol used 12% of the US corn harvest, but it replaced only 2.8% of the nation's petrol consumption.

Ethanol would be more beneficial, both environmentally and economically if scientists could work out how to grow it from a non-food plant that could be grown without the need for fertilisers, pesticides and other inputs. Researchers are currently working on methods to do that, making ethanol from a wide variety of plants including poplar trees, switchgrass and corn stalks.

But plant cellulose is more difficult to break down than the starch in corn kernels. Though it can be done, making ethanol from cellulose-rich material presently costs at least twice as much as making it from corn, so much further research is necessary to try and reduce the cost.

However from an energy efficiency point of view, studies suggest that cellulosic ethanol could

yield at least 4-6 times the energy expended to produce less greenhouse gas emissions because much of the energy needed to refine it could come not from fossil fuels, but from burning other components of the very same plants that contained the cellulose.

The US Department of Energy estimates that the USA could produce more than 1 billion tonnes of cellulosic material annually for ethanol production, from switchgrass grown on marginal agricultural lands and wood chips and other waste produced by the timber industry. In theory, that material could produce enough ethanol to substitute for about 30% of the country's oil consumption.

However there could still be some economic effects. If farmers find it is more profitable to grow switchgrass rather than corn, soy or cotton, the price of those products is bound to rise in response to falling supply. Although a lot of ethanol could be produced from cellulose without competing with food, if you wanted to get half of the US fuel supply from it, undoubtedly it would still compete with food agriculture.

Conclusion

Ethanol is certainly a valuable tool in efforts to address the economic and environmental problems associated with fossil fuels, but even the most optimistic projections suggest that it can only replace a fraction of the 140 billion gallons of petrol that Americans consume each year. It will take a mix of technologies to achieve energy independence for the US and reduce the country's production of greenhouse gases.

If the US is serious about achieving energy independence and mitigating global warming, experts say that one of those solutions must be conservation.

Reference: Article by Matt Cremon, The Associated Press, 11/3/07.

Honda's Plans for Fuel Cell Cars

Japanese car maker, Honda, believes that it can mass produce environmentally friendly fuel cell cars by around 2018.

Honda, which is Japan's third biggest vehicle maker, plans to begin leasing a very expensive hydrogen-powered fuel cell car in Japan and the USA in 2008.

Honda President, Takeo Fukui said that by evolving a next model from that to be produced in 2008, he thought that the level of technology will become very close to that of mass-produced ordinary vehicles within 10 years or so, and that in 2018 the development of a fuel cell car will have become very advanced.

He noted that the world's leading car makers are developing fuel cell cars which drastically cut emissions. But the high price of such cars, currently estimated at more than 100 million yen (US\$840,000) each, has been a major barrier to the commercialisation of hydrogen-powered cars.

Fuel cells produce electricity through a chemical reaction between hydrogen and oxygen, leaving water vapour as the only by-product.

Fukui said that there are many customers who would want to buy a fuel cell car if it goes on sale for 10 million yen (US\$84,000) in the general market.

But before that next-generation car becomes more common, Fukui said that there are still some technological challenges which need to be overcome, including:

- How to reduce the amount of noble metals used for fuel cells;
- How to improve hydrogen storage; and
- How to make the hydrogen at lower cost.

Reference: World Business Council for Sustainable Development from Agence France-Presse(AFP) 29/12/06.

More on Chevrolet Volt

In the previous issue (EnergyWatch 43, pg 30) brief comment was made about the new Chevrolet Volt prototype plug-in hybrid electric vehicle unveiled at the Detroit Motor Show in January 2007. Further information has since come to hand.

This vehicle will be driven purely by electricity but its batteries can be recharged "on the go" using a constant-speed 1.0 litre internal combustion engine which might run on E85 ethanol, biodiesel or petrol to extend the range.

It is proposed that the batteries will require a six hour charge, which can be done at home overnight to give a range of 65km before the engine is needed or it needs to be plugged in again to the mains. This should be sufficient for most people's daily commuting distance.

Even when the conventional engine is running, the Volt's drive system remains all electric: the battery is the one and only method of propelling the car. This makes it different from petrol-electric hybrids like the Toyota Prius which never need to be plugged in but can only run for a very short distance (around 2km) solely on battery power.

(The Prius uses solely electric power for very short periods at low speed. Most of the time, its battery is used to supplement the petrol engine).

However, to get the Volt-style propulsion system into production will require further breakthroughs in battery technology to ensure faultlessly reliable operation and the right range.

Although the Volt is a concept vehicle only at this stage, it is thought that General Motors (GM) has plans to launch a new vehicle platform using this technology as early as 2009, which might involve a range of different vehicles.

The EV1

The Volt grabbed headlines when it was released at the Detroit Motor Show partly because of an

obsolete electric car produced by GM called the EV1, introduced in 1996 as America's first production electric car.

It was GM's response to an impending quota for Zero Emissions Vehicles (ZEV's) to be imposed by the California Air Resources Board. The EV1 was handicapped by its unattractive styling and limited range but GM produced 1,100 of them, all offered on three-year lease deals. The car attracted a loyal following, especially amongst eco-conscious celebrities.

But GM axed the EV1 in 2003 when the last of the leases had expired and the ZEV quota no longer existed.

GM then turned its back on the whole idea of a battery-powered production car, leaving Toyota and Honda to occupy that market with new-generation petrol-electric hybrids like the Prius and the Civic.

GM never intended to offer the EV1 for sale, saying that such new technology would not be reliable in the long term. But many former "owners" who leased the vehicles were still outraged when the end-of-lease cars were very quietly destroyed by GM.

Conspiracy theorists delight in the EV1 story, citing influence from the oil industry in the cancellation of the programme. The EV1 issue was further explored last year in the Chris Paine film *Who Killed the Electric Car?*

GM predictably argues that the demise of the EV1 was because of more practical, less sinister concerns such as low demand from consumers, the cost of subsidising the car and the limitations of the technology.

In the launch speech for the Volt at the Detroit Motor Show, GM said that the EV1 "died" because it had limited range, limited room for passengers or luggage, couldn't climb a hill or run the air-conditioning system without depleting the batteries, and had no device to get you home when the battery ran low.

"The Chevrolet Volt is a new type of electric vehicle. It addresses the range problem and

has room for four or five passengers and their luggage. You can climb a hill or turn on the air-conditioning and not worry about it".

References: Herald on Sunday 4/2/07 and 11/3/07.

NZ Ministers Urged to Change Cars

NZ Cabinet Ministers will be under pressure to change their present cars in favour of more economical options as part of the Government's drive to be carbon neutral.

This move comes as the Government looks to change its chauffeur-driven fleet of limousines - mainly Ford Fairlane Ghias - with cars that are more emissions-friendly but look just as distinguished.

It follows a Transport Ministry Report in December 2006 which found that a greener fleet could save 550 tonnes of carbon dioxide emissions and \$500,000 in fuel costs every time the fleet is rotated.

The 45 car chauffeur fleet is for official Crown business and is used by Ministers, judges and the Governor-General and guests of the Government. These vehicles are replaced every 27 months regardless of distance covered.

The Ford Fairlane Ghia's fuel consumption is rated at 12.4 litres of fuel per 100km (22.9mpg) and 260 grams of CO₂ per kilometre. The average chauffeur driven car in the fleet, emitted 269grams of CO₂ per kilometre and used 12.3 litres of fuel per 100km.

The government is looking to replace the chauffeur fleet with one of three spacious luxury options - all diesel. These are the Chrysler 300C, the Peugeot 607 and the Skoda Superb, which all have a similar retail price to the Fairlane Ghia (\$71,990). The Peugeot is rated at 6.4 litres of fuel per 100km (44.2mpg), the Chrysler at 8.1 litres (35.0mpg) and the Skoda at 7.8 litres (36.3mpg). Their carbon dioxide emissions range from 170grams to 216grams per kilometre.

Cabinet Ministers will be under pressure to follow suit with the rest of the vehicles in the parliamentary VIP fleet - vehicles they choose themselves.

The report applauded the choice of some ministers but criticised others as “less informed”.

“As the self drive fleet are renewed or replaced, ministers will be offered fuel-efficient options” a spokesperson for the Prime Minister’s Office said.

The present 43 self drive vehicles fared somewhat better than the chauffeur-driven fleet, averaging 9.24 litres of fuel per 100km (30.6mpg) and emitting 227grams of CO₂ per kilometre on average.

Reference: NZ Herald, 15/2/07

Diesel Beats Hybrids

In a recent fuel economy competition from Greenlane, Auckland to Marsden Point and return with a good mix of urban and rural driving, a new Fiat Punto 1.3 litre diesel proved to be more economical than two examples of the Toyota Prius - one being a new second generation model, and the other an older first generation model at about half the price provided by the Clean Green Car Company (which specialises in selling imported used hybrid cars).

Results obtained were:

Car	lt/100km	mpg	cost
Fiat Punto Diesel	4.7	60	\$18.91*
Toyota Prius II	5	56	\$26.68
Toyota Prius I	5.2	54	\$27.72
Ford Falcon lpg	12.03	23	\$34.40
Honda Jazz	6.78	42	\$36.15

* Excludes road user charges.

The Ford Falcon LPG was included to give a comparison of fuel cost and was judged to provide the most enjoyable drive of the exercise, and actually cost less for fuel than the Honda Jazz.

Also included in the competition was a 5.7 litre Chrysler 300C Hemi V8 which has displacement-on-demand engine-management software that shuts down one bank of cylinders when it is surplus to requirements, effectively turning the 5.7 litre V8 into a 2.9 litre inline four cylinder. This car recorded 14.31 litres/100kms (20mpg) thus demonstrating that displacement-on-demand has more relevance as a marketing tool than in the real world!

Reference: NZ Autocar, October 2006, pp 52-54

Car Prices to Rise with Import Age Limit?

As reported briefly last year (EnergyWatch 42, pg 24), prices of imported used cars could rise sharply because of Government plans to get older vehicles off the roads.

The government has directed the Ministry of Transport to consider options to reduce greenhouse gas emissions from vehicles, including setting minimum fuel economy standards and a limit on the age of imported cars. Wellington sources say that the Government agencies are looking at adopting a Japanese standard on emissions set in the year 2002.

This could result in a 20 to 30 percent increase in the price of used imports from Japan because dealers would have to bid against rivals from many more countries for newer vehicles. More than 100 countries now import used cars from Japan.

Some important points:

- NZ’s rate of car ownership has increased from 200 cars per 1000 people in 1961 to 627 cars per 1000 people now.
- The country now has more than 3 million motor vehicles. Of these, more than 750,000 are over 15 years old, of which one third (250,000) are at least 20 years old.
- The single biggest thing which the NZ Government could do to reduce carbon dioxide emissions from the road transport

sector would be to restrict and reduce the number of vehicles on the roads. But don't hold your breath waiting for this to happen!

- The transport industry accounts for 86% of NZ's oil consumption (compared with 70% in the USA and less than 40% in China).
- Road transport uses 87 percent of the oil consumed by the NZ transport sector (leaving only a combined 13 percent for domestic air travel, rail and local shipping).

An age restriction would probably allow importers to bring in from Japan only cars made after 1999, when new emissions standards were introduced there. Cars made before 1996 when frontal impact regulations were toughened, are already banned.

So all this proposed restriction would do is place a temporary "blip" on the age of used imports in the way that the frontal impact regulations did a few years ago.

From 27 October 2006, a visible smoke test has become part of the warrant and fitness check but Climate Change Minister, David Parker said that further action was needed to meet climate change objectives.

Mr Parker said "The energy outlook for 2030 shows that if we do not change our policy settings, transport greenhouse gas emissions will increase by 45 percent over the next 25 years. We cannot - and will not - let that happen".

Associate Transport Minister, Judith Tizard, said a rise in second-hand car prices was not inevitable, as buyers could be forced to buy smaller cars which met fuel economy and emissions standards (but she did not elaborate on how they might be forced to do this).

"We are trying to achieve better health outcomes, better fuel efficiency and better carbon dioxide efficiencies" Ms Tizard said. "I think that the (higher) price of petrol has meant that a lot of people are realising that a cheaper car may not, over the life of the car, be a good choice.

(Editor's Note: A problem with this line of reasoning is that most people purchasing a car for their own use are looking only 2 or 3 years ahead - not for the lifetime of the car).

New car sales actually fell slightly in the first half of 2006. Between January and June, 37,116 new cars were sold. In the first six months of 2005, the figure was 37,263.

Reference: NZ Herald, 16/10/06

Footnote: The new restrictions could come into force on 1 January 2008, and could mean the flow of second-hand cars imported from Japan would be slashed.

The draft NZES released in December said the Government would consider measures to improve the fuel efficiency of vehicles on NZ roads, including restricting the import of less efficient second-hand vehicles in conjunction with air quality control measures. This could involve consideration of restrictions based on age.

Climate Change Minister, David Parker, says the Government sees the need to keep the benefit of cheaper second-hand cars "because it's very real" but also wants to ensure the elimination of the worst excesses of inefficiency which can come in through completely unregulated second-hand imports.

Reference: NZ Energy & Environment Business Week, 21/3/07

Foreign Brands Gaining in US Auto Market

During 2006 for the first time in US automobile history, sales of cars with foreign-based brands have outsold American nameplates in retail outlets within the USA. In May, sales of brands originating from Japan, Korea and Europe reached 52.9 percent of retail sales.

Retail registrations in May of the US brands of Ford, General Motors and Chrysler were down 7.2 percent compared with May 2005.

When direct fleet sales are included, the

“big three” US brands reached 54.7 percent of total new US auto registrations but retail registrations are a good indicator of what the natural marketplace is demanding.

Much of the big three’s decline in new vehicle sales can be traced to rising fuel prices and declining demand for light trucks (including SUV’s). US sales of new pickups fell 9.9 percent, minivan sales were down 8.3 percent and traditional SUV sales were down 12.3 percent in the first six months of 2006 compared with the same period of 2005.

The declining popularity of these vehicle types has been bad news for the big three US auto makers because during the 1990’s the car makers in Detroit built up their sales of these vehicles and especially the SUV business.

Ford’s overall US automobile registrations in May slid 5.7 percent, GM’s were down 7.7 percent and Chrysler down 8.0 percent compared with May 2005. Of the mainstream import brands, Honda sales were up 9.3 percent and Toyota 12.5 percent compared with May 2005.

Reference: NZ Herald 29/9/06

Japan Wants Greener Cars

The Japanese Government has drawn up an action plan to help develop the next generation of more environmentally friendly motor vehicles and batteries.

A panel set up by the Ministry of Economy Trade and Industry (MITI) says that the focus should be on hybrid, electric and fuel cell vehicles (Biofuel-powered cars do not appear to be included).

MITI plans to offer incentives to make use of such vehicles widespread in Japan. By 2010 Japan will aim to mass-produce two-seater electric vehicles capable of running about 80km per electricity charge, as well as making hybrid cars 30 percent more fuel-efficient.

Reference: NZ Energy and Environment Business Week, 6/9/06

Japanese Fuel Saving Rules

The Japanese Government aims to introduce rules this year to require car companies to make their new cars 24% more fuel-efficient by the year 2016.

Car makers in Japan will have to build cars in 2016 that can travel an average of 16.8 km for each litre of petrol used. This is an improvement from the present average of 13.6 km for each litre of petrol used (as at March 2005).

These figures equate to 5.95 litres/100 km (47.6 mpg) in 2016 compared to the present 7.3 litres/100 km (38.7 mpg).

Reference: NZ Herald, 10/2/07

NZ New Car Sales Increase

New vehicle sales in NZ for January 2007 were 8432 units; the best January figures for 23 years.

Car sales of 6732 were up 6.6% and commercial vehicles sales of 1700 were up 14.6%.

The Motor Industry Association noted that it was pleasing that new vehicle sales records were being established at a time when the market in NZ for used imported vehicles continues to decline.

Reference: NZ Herald 10/2/07

Editor’s Note:

Traditionally January has always been a popular month for new car registrations in NZ as some purchasers delay their purchase or registration until the new calendar year, in an effort to decrease the immediate depreciation effect.

Pathways to a Sustainable Energy Future

Below is a summary of a panel discussion on the above topic chaired by Chris Laidlaw which was broadcast on 26 November 2006 in the Ideas section of his Sunday morning programme on Radio NZ.

The discussion tended to focus more on energy security issues rather than sustainable energy issues.

Is There a Looming Energy Crisis in NZ?

Laidlaw: Wind, water, gas, coal, biomass. What all these have in common is their ability to generate energy, whether it is energy for transport, heating or industry. NZ currently derives its energy mainly from oil and hydro power and other significant sources from coal, gas and geothermally generated electricity. Renewable energy sources such as wind, solar, biogas, industrial waste and wood all contribute as well. NZ's energy mix has changed markedly over time and it is likely to evolve further in response to the price of imported oil, the availability of gas and the new emphasis being placed on renewables, particularly wind energy. But the big question remains, are we going to hit an energy supply wall in the immediate future?

At the annual Resource Management Law Association Conference recently, I hosted a panel discussion on this very topic and today we are going to hear excerpts from that discussion.

Speakers on the panel were research fellow with the Sustainable Energy Research Group at Unitec and convenor of the Sustainable Energy Forum, John Blakeley; a man who was previously chair of Cultus Petroleum which was responsible for the commercial discovery of the Maari oil field in 1998 and who is now of chair of Greymouth Petroleum, Mark Dunphy; power industry consultant and climate change sceptic Brian Leyland; and senior lecturer at Victoria University of Wellington School of Government and Co-chair of the Environment

and Conservation Organisation (ECO), Cath Wallace.

John Blakeley begins by talking about the all-time peak in power usage on 29 June this year:

Blakeley: It got very little publicity but it was during the cold snap we had. At that particular time both the peak power usage and the average daily usage reached all time highs and that created very tight situations in both Auckland and in Christchurch in terms of available electricity. We do have one new power station coming on line early next year at Huntly, a combined-cycle gas plant, that will only help us with two or three years of demand growth, so I believe that we will have a continuing tight situation in terms of available electricity in NZ for the foreseeable future.

I believe that that is going to be compounded about 2015 by a downturn in available natural gas in NZ and I am most interested to see once again the issue of possible importation of liquefied natural gas (LNG) being raised by selecting New Plymouth as the potential port for such a facility. LNG is not a desirable option in many ways and it increases our dependence on overseas countries for our energy, but if we have to choose between LNG and coal on a large scale for electricity generation, then I would actually prefer LNG. This is a personal view.

But in the broader sense, in terms of our vehicle fuels availability, we are very dependent on overseas sources of supply for all our motor vehicles to run and although the oil price has come down recently, it could go up just as quickly and from my reading of the position, it's a very volatile world situation politically (particularly in the Middle East and globally), in terms of the future availability and price of oil.

Wallace: We have got two or three elements here. One is if we look at the supply side of energy availability, and we are talking here about transport very much as well as electricity, we haven't got enough diversification in supply

sources. We also don't have enough measures to actually organise our demand. For instance, we could be using other methods to flatten out some of those big peaks, but the really major crisis is not at all about the resources. It is about the impact that we are having on the climate and the evidence is that really we are heading into dangerous climate change already.

We've already had 1.6 degrees C of warming and so what we are now looking at is a very short period of about 10 years where we have to get a grip. We've got to try and avoid the concentration of CO₂ in the atmosphere going up beyond about 450 parts per million. We are already at 380 parts per million. The evidence from the bulk of the scientists around the planet and from lots of different sources is that we have a major problem on our hands and we have got to start responding.

So that means that what we have to do is look at the forms of energy we use, trying to move away from the fossil fuels and into biofuels in the transport sector and into renewables for electricity generation and into much more efficient use.

There are lots of things we can do. We've got to use a variety of policy mechanisms including economic instruments, but really thinking about our immediate supplies is the least of our problems. It's the impact we are having on the planet that is the thing that demands the greatest attention.

Leyland: Energy crisis? Yes we've got one, its man made and it's due basically to a lack of planning and a lack of common sense. John Blakeley and I were doing biennial reviews of power generation in NZ since 1992 and it went on until 2003. Every review said that soon Maui is going to run down and we must prepare for it. Everybody said "No, no - the market will provide."

So here we are, with people running around beginning to think about drilling in the great southern basin when we should have been getting exploration done 10 or 15 years ago. So part of our crisis is man made. The other which

is man made is that we have got a vast amount of hydro capacity still but the Government has decided it is bad idea.

Existing hydro capacity is environmentally pretty good. In many cases if you balanced up, it might be an advantage. Our rowing courses are entirely due to our hydro development, not to mention a lot of our tourism.

We've got huge amounts of coal and only if you believe in the output of totally unproven and un-validated computer programmes have you any reason to fear for the future in the terms that Cath was talking about. The fact is that as far as I know the world has warmed 0.6 degrees C in the last century, not 1.6 degrees. It hasn't warmed any more since 1998. None of the computer programmes predicted that this would happen and it was warmer in the middle ages warm period.

And finally as far as biofuels are concerned, I've spent enough time in Africa and other places, flying over Borneo looking at the effects of deforestation, looking at clearing for palm oil in Malaya, to not want to see more of those forests cut down for subsidised biofuels. It won't make much difference anyway.

Dunphy: I don't think there is any doubt that some time, either in our lifetimes or in the lifetimes of our children, we'll face a peak in global oil production and obviously that's a key issue. And we have got all of the issues associated with global climate change. So no doubt we need to work on supply, we need to work on the fuels equation and we also need to work on demand. We need to work on efficiency issues.

But I personally think the position in NZ from a specific fuels point of view is as secure as we want it or need it to be. I am not a pessimist when it comes to the question of gas and oil. We just haven't done much work with the drill bit. I think that NZ is incredibly well placed to manage our fuel situation and the key to me is getting more efficiency in terms of the way that we use our energy.

There are a lot of issues in the debate here. I think there is a real need for a different form of economic planning. The sort of long run economic planning that maybe is the key to the issue.

Availability of Fuel Supplies

Laidlaw: I want to come back to that in due course. I for one am confused about where we are going in terms of planning. So let's look specifically at the availability of fuel supplies in this country in the immediate term. John you've done some work on the outlook for gas production and gas reserves in this country. Where do we stand?

Blakeley: I have recently looked at the published available data from the Ministry of Economic Development plus what I have seen written in the newspapers that looks to be reasonably authoritative, added up all the gas fields, assumed rates of depletion which would be reasonable and reached the conclusion as a lot of other commentators have too, which is that somewhere around 2015 or 2016, there will be a significant drop off in gas availability.

This means that not only will we not have enough gas for new power stations, but we may not have enough gas to keep existing power stations going which we now have on gas and can't run on anything else, unless we contemplate importing gas from overseas. This would likely be LNG but other people are talking about compressed natural gas (although I understand that probably the transporting distance which is economically feasible for compressed gas rather than liquid gas will only take us to Australia or perhaps Papua New Guinea).

So I think there is a looming problem here. Already Contact Energy and Genesis are making some provisional planning towards importing LNG through the port of New Plymouth, and I would assume they are thinking about 2015 or thereabouts.

Laidlaw: Mark, I know through Greymouth Petroleum that you are actively involved in oil and gas exploration. Is there a general consensus in the prospecting industry, as to roughly what we can expect not just from the great southern basin but nationally?

Dunphy: If you look at NZ, in the last two years what we know is that the mining companies have increased reserves by about 400 million barrels of oil equivalent.

Our annual consumption of oil and gas in NZ is about 66 million barrels. That is all of the oil and gas expressed in barrels of oil equivalent. So we know that in the last two years alone, increased reserves equate to 6 years of consumption. So actually in the last two years we have gone forwards not backwards.

We consumed last year about 165 petajoules of gas. It was the first year since 2002 that the gas consumption in NZ increased. The reason that gas consumption increased last year was because we actually had two dry years in the hydro system and the thermal power generating part of the electricity generation equation increased from 34 percent to 44 percent in the years 2004 to 2006.

But based on last years rate of consumption, we think that there is probably somewhere between 12 and 15 years of available gas in NZ.

So this is not a crisis situation, far from it. The real issue is that there has actually been very little exploration going on. We know that we have had good exploration success in the last two or three years and that is in part because of the rundown at Maui, as previously the oil and gas exploration and production companies had no incentive actually to go and find more gas because they didn't have all of their existing gas contracted.

So I think we could be very confident about our oil and gas position in the same way as we can be confident about our position with other resources.

Laidlaw: Assuming the oil price stays at something above US\$60 a barrel, the incentive to drill is immeasurably higher than it was a couple of years ago and does everybody assume that the oil price will stay high even though there is a blip at the moment?

Dunphy: Obviously if you find oil you are in good shape because you can produce the oil and

sell it as there is a world market for it. But if you find gas, then you're in a queue. For those of us in the gas and oil exploration business, if we find gas we know we have got to build the market, so what comes into play here is the extent to which we allow gas to be produced and manufactured into methanol for example, because we would have much more gas now in NZ had we not exported so much methanol in the last 10 to 15 years.

The balance in the gas picture (as opposed to oil) is picking the extent to which we say we want to have a reserves cushion, so we don't want to have that gas exported as methanol. Or maybe instead of exporting it as methanol, we should add the methanol to petrol and reduce the amount of petrol or oil that we import from overseas.

Laidlaw: Why are Contact and Genesis taking this belt and braces approach? LNG is horrifyingly expensive to import. The cost of the terminals is extraordinarily high. The consentability of a terminal wherever it is in New Plymouth will be difficult. Why are they pursuing this? Is it a genuine alternative strategy, or is it just a sort of straw horse?

Leyland: I think that it is genuine strategy. Although Mark is confident that more gas exists, what we should be doing right now is building another gas-fired power station in Otahuhu. The reason Contact are not building it is that they haven't got a gas contract.

And gas suppliers are not in a position to give it to them. It's the sort of thing the Government could have done and did do in the old days, but now we can't provide a guarantee of gas supply.

Laidlaw: No the market dictates now. Thus we turn to coal and the people's attention is being turned to the vast lignite deposit and series of deposits down in Southland. Now my understanding is that in terms of the technology of sequestration of carbon, we are not going to have anything available to this country before about 2020. How realistic is it to assume that the mining of that lignite in Southland for energy purposes is rational?

Blakeley: Studies I have read recently suggest that carbon sequestration is a long way into the future before it will be economic. If we do not have sequestration, and if we are going to have a climate change policy that is meaningful in this country, we cannot look at coal because coal's carbon dioxide emissions are so much worse than natural gas

There have been suggestions about using those Southland lignite deposits for liquid fuels but I don't really see those Southland lignite deposits as being viable to exploit as long as we have a climate change policy on carbon dioxide emissions which we seem to be heading towards under the Kyoto Protocol and whatever follows it, post 2012.

Wallace: I totally agree that we shouldn't be going the lignite way because of the greenhouse gas emissions. I also agree that a lot of our problems are lack of planning and I have an indelible memory of sitting in the Energy Advisory Committee with a room full of people.

I was there as an Environmental Rep but most of the people there were heads of their various industries - gas and coal and electricity and so on. And this entire room full of people were talking to the Minister of the day in the mid 1990s (or it might even have been the early 1990s) We went right around the room, each person expressing a view. All of us asked for some energy planning and the Minister folded his arms, leant back in his chair and said "Oh that would be Stalinist planning." For him planning equalled "Stalinist" and therefore don't do it! And I think we are reaping the results of that sort of "hands off" attitude.

Leyland: It is still there!

Wallace: Well it is still there to some extent, but I do think we need to look forward to the NZ Energy Strategy and to have some national energy standards (including things that bite under the RMA) in the sense of having some statutory authority.

I'm looking at the Royal Society of NZ's August 2006 report on "Energy Opportunities for NZ." They are quite clear that there is enormous scope for biofuels for transport fuels. Obviously we

do not want to go to cutting down Papua New Guinea's old growth forest, but that is not in fact a problem. We are not proposing that and it's not something that we have to face.

According to the Royal Society's analysis, there is a large amount of marginal land that is not competing say with dairying or food production except with dry stock - dry beef and sheep, which would be available for growing biofuel feedstock, but the other thing is that the really high yield is actually small algae, the micro algae. That's where you get a very high yield from and there is some quite successful work going on in that regard. So to think that we always have to look to fossil fuels for liquid fuels is increasingly a kind of out-dated view.

There are lots of options we can look at - both biodiesel and bioethanol. Some of them we can actually adopt immediately. If we had a regulatory regime that said we will have 5 percent of biodiesel in diesel for instance, then that would be something we could do now more or less straight away.

Laidlaw: Isn't that what the Government has already signalled it is going to require?

Wallace: It's talked about possibly doing this, but I think that they have talked about 2.5 percent ethanol as their bench mark.

Blakeley: Over about 5 years!

Laidlaw: Who is doing the work on this? Is it being done by the Ministry of Economic Development?

Wallace: There are a range of people working on it, Prof. Ralph Sims at Massey University for instance. He is currently with the International Energy Association but he has had a whole group of people working on bio- transport fuels. There are a range of people in universities and I think there are possibly some people in Landcare working on it as well.

Leyland: I have seen it said that if all America's agricultural land was turned over to biofuels it would produce either 12 percent of their oil or 12 percent of their petrol. So you are not

talking about something that can make a major difference. It's another little drop in the ocean like wind power. It is expensive and I happen to know that in Malaya now they are chopping down rubber trees to grow palm oil to make subsidised fuels. This is done because of subsidies, and its not going to make a big difference.

On coal, people around the world are building coal-fired stations at a rate of about 1 a day. Whether or not we burn more coal in the South Island isn't going to make any difference to the world. If you look at the output of the computer programmes, if the world adopted Kyoto completely, the world would be .06 of a degree cooler in 2050 than otherwise.

Blakeley: On biofuels, there has been a lot of talk that we have these products coming out of our agricultural industries, including tallow from the meat works which could be used to make biodiesel; and whey from the dairy industry which could become ethanol; but what I noticed in reading recently, is that the international prices of those products at the moment are such that it may be more economically attractive to sell them than to convert them to biofuels, so according to the article I read, it could be that we still continue exporting products and at the same time importing biofuel because our agricultural industry wouldn't be able to respond quickly enough to meet a Government requirement of say 2.5% biofuels in five years time.

Wallace: We need to tackle future fuel needs in a whole range of ways, including looking at what is the fuel efficiency of the vehicle we use and what is the scope for transport switching from using private vehicles to public transport; to much more active transport in the form of walking and cycling; but we also need to look at the fuel efficiency of our fleet and one of the problems as is well known is that our vehicle fleet is relatively old. It has got lots of Japanese imports and one of the things we could be doing is using economic or other instruments to actually send signals about fuel efficiency. We could be using mandatory labelling for fuel efficiency and there are a whole lot of issues around making sure that "business as usual"

doesn't continue in terms of our very inefficient use of transport fuels.

On the point of "Oh well why don't we backslide and not play our part internationally, because of us being relatively small players?" Almost every country could say that. The point is that in international relations you need mutual assurance. The world negotiated the Kyoto agreement on the basis that the developed countries would do their bit and then the developing countries would come on board. We know that the dominant player on the planet, the US, at a federal level defected and so did Australia at a federal level, but the reality is that at state levels those two countries are actually doing quite a lot to combat global warming and it is NZ that has done virtually nothing.

So that if you go below the federal levels, the sense that Australia and the US are not doing anything is actually dispelled. You can see this with Schwarzenegger taking the US federal Government to court over the policies that they have. So I think we should not be tempted into the idea that we can just backslide and that anything we do differently now will have no impact. It's quite clear from the work that the IPCC is doing that we can make a difference if we all take action and reduce our emissions.

Dunphy: I agree with Cath. The key issue that we've got to address is to break the current link between energy use and economic growth. The issue with turning lignite into liquid fuels is that the energy required to do that is incredibly high. That is the same situation really as turning vegetable matter into biofuels. There is no doubt that the key technology that we need to develop is to be able to change the way that we use energy.

We have to move to more efficient technologies. Clearly we want to focus on all the different forms of renewable energy and that means there is no one cure. There are so many different things that we can all do and it's about doing all the right things such as the move towards the introduction of biofuels in petrol. Whilst the oil companies don't like it, this is an incredibly positive signal telling us that this is the way that we are moving in NZ.

We are going to need to ensure that there are incentives for people to develop the biofuels industry. Now that doesn't necessarily mean dealing with vegetable matter but why wouldn't we find a way of making use of the tallow? It's not a big percentage but it's a meaningful percentage if we address all of the opportunities that are around us in that way.

Laidlaw: Do you think its worthwhile setting a formal target for a biofuel percentage as part of the total mix say to 2015 or 2020.

Wallace: Well the energy seminars that the Victoria University School of Government and Institute of Policy Studies recently ran, basically concluded that NZ could have a fossil fuels-free transport system by 2025.

Laidlaw: How?

Wallace: With a whole range of different alternatives and particularly going to electric cars as that technology becomes more available. Obviously a lot of this is governed by price. We have fuel technologies that are not paying their full environmental costs, in the form of greenhouse gas emissions (or for that matter in the case of coal, of biodiversity destruction). If we get the pricing rules right, we may well get a much more effective set of choices.

Carbon Pricing

Laidlaw: Does that depend on having at least nominally or formally a price for carbon in this country? A lot of people and columnists keep talking about the price of carbon. We don't know what it is. How important is that?

Wallace: It is essential and also inevitable, because even if some people in NZ want to go on saying "Oh well we won't do our bit" I think things have changed. First of all, the scientific debate about climate change is largely over and secondly, the recent announcement by the National Party of their climate change policy.

The rest of the world is moving to a carbon price, Europe already has a carbon price and that's been operating for several years now and most of the European countries are factoring that into their decision making. This is also

happening in parts of the USA and essentially NZ stands to do itself a huge disservice if we don't start putting that carbon price into our investment decision making now.

As long as we don't do that, we will be making the wrong decisions and we will end up with either some very big liabilities or some seriously stranded assets. That's actually going to cost us a whole lot in health care and education spending, and spending on other things that most NZers think are really important. So bad energy decisions are really costly in terms of the opportunity costs of what we are giving up.

Buildings Energy Efficiency

Laidlaw: The recent announcement by the Government that there would be higher thermal insulation performance requirements for new homes; steps to make it easier to install solar water heating systems; improved lighting in commercial buildings; and improving heating, ventilation and air conditioning systems in commercial buildings. I thought we had all that. It is happening. But how slowly?

Leyland: It is all happening.

Laidlaw: Well I guess the question has raised an important point? How much scope is there for further efficiencies?

Blakeley: About 5 years ago, the Energy Efficiency and Conservation Authority set a target. I think it was a 20 percent increase in economy-wide energy efficiency by 2012. They had to report annually on how far they had been getting with it and at the last report they had got to about 1 percent increased efficiency. And then they said they were going to have to revise the whole thing and do another strategy, which is what they are still working on.

Wallace: I think that there are several things here. If you've got solar water heating as a base, then you are only using electricity as a booster. But you can also have systems using for instance, solid wood in wood burners with a wet back which can provide some of that boost. Molly Melhuish has done quite a bit of work on this and has shown that with the space heating

in homes, this can be very important.

Of course solar water heating is also really important for people, if you can get over the high up-front costs, in terms of people not having continuing outgoings. And that's enormously important for people on low incomes, especially retired people. I think we should be encouraging it but the problem has been that one of the big bottlenecks has been getting people who are competent to install them.

And the plumbing industry fiasco of the extra investment in training plumbers, which then didn't produce any more plumbers, and caused the Government particular grief, is something we need to get over. So one of the problems with installing solar water heating, is simply availability of the technical people to do it.

We could have a regulation like the one in South Australia where you cannot build a new house unless you've either got gas water heating or you've got solar water heating. You cannot solely use electric water heating. And that is something in terms of our building codes, that we could be doing and of course also more energy efficiency in our houses to go with that.

Laidlaw: Well the Government has signalled that the review of the building code is under way.

Wallace: Indeed

Laidlaw: And that early next year they will "lay an egg" on this and that there will presumably be a whole set of incentives. It is one thing to legislate codes and basic requirements. It is another thing to change people's behaviour and actively encourage them to put in a solar water heater.

Wallace: But the problem with that is the capital market problem, which is that most of the houses are built not by the people who will live in them. So you actually need regulations to get over that kind of disjunction.

Carbon Trading

Laidlaw: I remember a few years ago, Simon Upton saying that by about 2006/2007 there would be a very robust viable international

carbon trading regime. We're about half way to that from you seem to be saying.

Wallace: Well Europe has certainly got a carbon market operating with 23 countries, so you know that they're learning. They have been doing this since the 1990s and they are starting to learn these lessons whereas NZ hasn't started, and we are going to be suffering as a result of being the laggards.

Leyland: There is a fundamental problem with carbon trading. In the electricity market everybody knows how much they generate to an accuracy of 1½ percent or better. Now if I was running a coal-fired power station and wanted to predict or measure my carbon dioxide output I could give you figures of a range plus or minus 20 percent and you would never prove me wrong.

Electricity and Gas Transmission

Dunphy: One area where we have difficulties, and where we may be at crisis point is in transmission. We've got real problems in our electricity transmission

Laidlaw: I was coming to that

Dunphy: There are also questions about the extent to which there will be further investment in gas transmission given the approach of the regulator in this area. The reason why we should be encouraging solar water heating of homes is because that's a form of distributed power generation. We've got power being essentially generated on site and I think it's important for us to encourage activities that will involve more of that form of generation. So we should be encouraging more power generation behind the fence. We should encourage more co-generation and I think in terms of some of our newer housing and commercial developments, we should be encouraging power generation where we collect the heat and maybe distribute it through houses or alternatively use it in air conditioning. If there is a crisis in NZ in energy provision at the moment, it's about transmission.

Laidlaw: Well let's deal with that. We see all sorts of threats of what will happen in the

Waikato if Transpower presses ahead with the 400kV upgrade. We are seeing the first stage of an upgrade and a kind of rationalisation of that. How important is that? Let me put it this way. If you were devising the Government's energy policy, how far would you go in terms of the upgrade of the National Grid through the North Island, as against setting objectives for distributed energy?

Are the two at odds with each other? I don't know the answer to that.

Blakeley: I do not think that they are at odds with each other. On the whole topic area of electricity transmission, the Sustainable Energy Forum has had quite a debate recently about whether we need a robust national grid for renewable energy and the answer is yes.

If we are going to have lots more wind farms and other forms of renewable energy including geothermal and hydro, then we will need an effective way of transporting the electricity to the major cities because unfortunately the wind farms and other renewable energy projects aren't going to be close to the major cities. So from the point of view of all forms of renewable energy generation, we do need a robust national grid.

As far as distributed generation is concerned, that's another issue because clearly the more people can generate their own energy within their own home, or in their own neighbourhood, the less we need a national grid.

But we do need both an upgraded transmission system and more distributed generation.

Laidlaw: Any other thoughts on this Brian?

Leyland: We do need a decent transmission system. We're not getting on with it and the main reason why it's in such a mess is that we don't have co-ordinating planning. If we decided to build new power stations north of Auckland then we don't need the 400kV upgrade. If we had built the e3p plant where it should have been at Otahuhu (instead of at Huntly), we wouldn't be needing the 400kV upgrade now. So there are lots of things that we have done wrong and we're still doing the wrong thing because we are

not recognising that you cannot plan or operate efficiently a power system like ours without central co-ordination. We're pretending that it is not needed. If we talk about wind power, during the peak power demands in June, at one stage when we were running a peak power demand, the total output from wind farms was 3 megawatts. At times they produce all their energy but we still have to meet that peak demand and if we have got to put in more thermal generation capacity to meet that peak demand when the wind turbines are not running, it is looking sick economically and carbon-wise.

Wallace: Well I think we have to see that the battery for wind is essentially the hydro lakes. If you can save on using hydro by the contribution of wind, then you're getting water saved in the lakes during that time and that is then available later.

Distributed Generation

Wallace: The other point is Mark's one about distributed generation and efficiency. We can do a huge amount at a relatively low cost by efficiency. We have to do much more of it than we are doing, but we can also use other mechanisms for dampening down peak demand and we have to remember too that in 2013 the arrangement stops by which the lines companies have to maintain the lines out to all these remote parts of NZ.

Laidlaw: How far down the track are we towards enabling those distributed energy producers to sell their electricity?

Wallace: Well this is a major issue. The electricity markets are a major issue and I am personally very concerned by the way the Government did not reappoint Roy Hemmingway as Electricity Commissioner because he was standing up to the big generators who have been doing a huge amount of gaming and driving up prices and returns to themselves at the expense of the rest of us.

We had for once a fairly strong minded regulator who I don't think did everything he could have done, but was at least ready to stand up to them and we've now seen the Government step in and because the people he was trying to regulate

didn't like him, they'd basically told him to go at very short notice even though it was the end of his contract. It was extraordinarily close to the point where he contract would have just rolled over that they told him to go. And I think we need to be worried by that.

The question of distributed energy generators being able to sell back into the grid is a crucial one. There is some big vested interests that don't want to see that, but I think from the point of view of efficiency of the economy, and from the point of view of energy consumers, it is really important that small distributed generators can sell back into the grid.

Laidlaw: Well that was Cath Wallace ending the panel discussion with John Blakeley, research fellow in the Sustainable Energy Research Group at Unitec; the chair of Greymouth Petroleum, Mark Dunphy; and power industry consultant and climate change sceptic, Brian Leyland; and that discussion was part of the annual Resource Management Law Association conference in Auckland a few weeks ago. (Actually on Saturday 7 October 2006).

Edited Version - John Blakeley

Electricity Matters

Review of Electricity Market

The Electricity Commission (EC) hopes to have a review of the NZ Electricity Market completed by the end of 2007, looking at both the wholesale and retail sectors.

Acting Chairman of EC, Peter Harris, told Parliament's Commerce Select Committee that a review of the market set up in the 1990's was timely because of an "unrelenting" increase of prices for residential consumers, with power prices increasing well above the rate of inflation in recent years. There were also recurring concerns about security of supply.

Mr Harris noted that rising electricity prices don't necessarily mean that the market is failing as there are other factors, such as the depletion of the Maui gas field causing rising fuel costs, the increasing capital cost of new generation capacity,

and volatility of hydro lake levels. The response to climate change is also emerging as a key issue.

But the review will help to pinpoint any structural failings in the current market design. Mr Harris is also keen to see greater consensus among stakeholders about how the system should be designed.

Power companies have generally welcomed the review although they are nervous that it could jeopardise investment in the industry if it drags on for too long. Mr Harris has assured them that this will not be the case, with the EC aiming to have the review completed before Christmas.

The review will not concern itself with whether there is “gaming” or an abuse of power in the market as the EC is already looking into that question. The EC will be putting out an issues paper by the end of April.

References: NZ Herald, 16/3/07
NZ Energy and Environment Business Week, 21/3/07

Electricity Generation up by 1.6%

Latest figures from Statistics New Zealand (SNZ) show that NZ’s total generation during the 2006 calendar year was 40,034 GWh, up 1.6% on the 2005 year. Domestic electricity prices rose an average of 7% during 2006 while prices for commercial users fell 6.5%.

Figures for the October/December 2006 quarter showed that 74% of NZ’s electricity was generated from renewable sources (hydro, wind, geothermal and biomass), up from 66% for the same period in 2005. Hydro and wind generation was 6,368 GWh for that quarter, which is 66% of the total (and up from 58% in the same quarter of 2005). This presumably means that the other 8% for that quarter came from geothermal and biomass.

Reference: NZ Energy & Environment Business Week 14/3/07

Editor’s Notes:

1. There is a difference of about 1800GWh between the above annual figures and those published in Energy Data File (EDF) by the Ministry of Economic Development. This is

because EDF includes electricity generated from industrial cogeneration projects whereas SNZ only includes grid-connected electricity generation (Refer EnergyWatch 42, pg 8).

2. For the year ended June 2006, hydro and wind generation accounted for just 55% of total electricity generation, the lowest ever for a June year. If the electricity generated from geothermal is added, that figure would rise to 62%, and it would probably be 10% more than this in a “wet year” (Refer EnergyWatch 42, pp 8-9). So it would appear that 2006 was a “wet year”, at least in the latter part of the year.

Minister Supports Geothermal Power

On Thursday 29 March, the Minister of Energy, Hon David Parker, attended the commissioning of the new 45 MW gas-fired turbine generator at the Southdown power station (see EnergyWatch 41, pp28-29). In his speech, the Minister strongly supported more geothermal power in NZ, noting that geothermal energy is an environmentally responsible alternative to energy derived from fossil fuels, because it is a low carbon-emitting source relative to fossil fuels, and it also operates at high load factors, providing reliable base load.

The Minister noted that 6% of total electricity generation in NZ is derived from geothermal energy, and he understood that Mighty River Power (MRP) have future plans to develop around 400 MW of electricity generation capacity from geothermal energy over the next 5 - 10 years.

Referring to the Southdown power station, the Minister said that NZ’s known gas reserves had increased significantly in the last two years, which is also very good news for those interested in our electricity security of supply and prices. He said that confidence of access to affordable gas supplies for this new facility would have been central to MRP’s investment decision.

Reference: Minister’s speech notes posted on SEF News, 30/3/07

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 200 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 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 early in March, June, September and December, 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 School of the Built Environment, Unitec New Zealand, Private Bag 92-025, Auckland.

SEF membership

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

Unwaged/student	\$27
Individual	\$45
Library	\$65
Corporate	\$225

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

Name:

Organisation:

Address:

.....

HomePhone:

Work Phone:

E-mail:

Membership type

Amount enclosed: \$.....