EnergyWatch

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Countries Realise Their Energy Vulnerability

At the beginning of January, a dispute over natural gas prices between Russia and the Ukraine had the unintended consequence of giving the European Union a rude New Year's warning about energy dependency and opened up worrying questions about the EU's relationship with Moscow.

Forty percent of the EU's gas needs are met by imports, with 25 percent coming from Russian alone via pipelines that cross Eastern Europe, including Ukraine. On present trends, imports will account for 70 percent of EU gas supplies by 2020 and Russia through its state monopoly, Gazprom, which controls a third of global reserves, is likely to be a key provider.

Eventually Russia and Ukraine agreed to a five-year deal on 4 January but only after the dispute had temporarily disrupted gas supplies to an anxious Europe. Under the complex deal, Ukraine will pay more for its imports of Russian gas but not the immediate quadrupling that Russia had demanded.

Russia produces about 8 million barrels of crude oil per day (nearly 10 percent of total world production), of which it exports 6.1 million barrels of crude, plus 171 billion cubic metres of gas and 20.7 megawatt-hours of electricity.

Despite its economic power, the EU has scant reserves of fossil fuels. Britain became a net importer of natural gas in 2004 and will become

so in oil as well in a few years' time, resulting from the running down of the North Sea oil and gas field. Germany is 36 percent dependent on Russia for its natural gas requirements.

Later in January, the pro-Western former Soviet state of Georgia suffered a temporary disruption in its natural gas supplies from Russia during bitterly cold weather. The Georgians claimed that this was because Russia was trying to apply political pressure on Georgia to be less pro-Western, but Russia replied that it was because of terrorists damaging the natural gas pipelines.

In his 1 February State of the Union address, President George W. Bush stated that the USA needs to end its dependency on Middle East oil.

President Bush said "America is addicted to oil, which is often imported from unstable parts of the world. The best way to break this addiction is through technology". His speech called for improving technologies in order to reduce oil imports from the Middle East by 75 percent by 2025.

President Bush's concern is well founded. The world presently uses around 83 million barrels of oil per day and of that, the USA consumes 20 million barrels or about 24 percent of global usage in a country which has less than 5 percent of the world's population.

Approximately half of the US oil consumption is imported (10 million barrels per day). This means that out of total daily world oil production, 12 percent is imported into the USA from other countries.

At the current price of around US$63 per barrel, this means that the daily US bill for imported oil is now about US$630 million. If during the course of 2006 this price increases to US$85 per barrel (which might well happen) the daily US oil import bill will rise by a further US$220 million.

The technology which President Bush specifically mentioned in his speech was a six-year goal for making ethanol a practical fuel and he promised to fund research into ways to make ethanol from various sources.

Yet the quickest way to achieve widespread uptake of ethanol as a transport fuel is as a fuel extender in blends of around 10 percent with petrol, and the required quantities of ethanol to achieve even this modest goal would not be easily available.

Obtaining ethanol as an industrial by-product (including from the dairy industry) is a well-established and efficient process, but growing crops to obtain ethanol is likely to be less energy efficient (especially if the ethanol comes from crops grown primarily for food production, rather than from crops grown specifically to produce ethanol).

In previous speeches President Bush has mentioned the future promise of hydrogen as a transport fuel, but hydrogen is actually an energy carrier rather than an energy source and at present, the most economic way of obtaining hydrogen is from fossil fuels such as natural gas or coal.

In any event, motor vehicles powered by the hydrogen fuel cell are unlikely to be available at an economic price for widespread application until 2020 at the earliest. Also there will be major infrastructure issues to be addressed before hydrogen can come into widespread use.

In summary, no combination of alternative fuels will in the near future prevent the USA from running low on fossil fuels.

The most obvious step which President Bush could immediately take would be to impose severe cost penalties on owners of gas guzzling SUV's and pickup trucks used as private transport in the USA, but this is a move which he seems to be most reluctant to even consider.

The New Zealand Situation

Here in New Zealand we have our own energy vulnerability problems. The Maui gas field which has provided us with relatively cheap natural gas for the past 25 years is now

running down and is expected to run dry by 2010. Replacement fields discovered so far are nowhere near large enough to keep us going for long and so gas consumption is likely to outstrip supply (especially for electricity generation) at some point between 2010 and 2013.

For several years investigations have been made into importing liquefied natural gas (LNG) into New Zealand by tanker ship and very recently, alternative proposals to import compressed natural gas by tanker from Papua New Guinea have been considered by Todd Energy.

New Zealand already has significant dependence on gas for electricity generation with the Otahuhu B station, the Taranaki combined-cycle plant at Stratford and the Southdown combined-cycle plant all gas-dependent as they cannot operate on any other fuel.

In December 2006 these will be joined by a new combined-cycle gas-fired plant at Huntly. The Government had to financially underwrite the gas supply for this power station before construction could proceed.

In recent times the debate about importing natural gas into New Zealand has shifted from importing the gas to power new generating stations yet to be built, to the need to import gas to keep the existing plants running. However if New Zealand puts its electricity system at risk to imported natural gas, we place our economy at risk from activities and events which are far beyond our shores and over which we have no control.

Clearly the coming century is shaping up to be a "rough ride" for many countries, including New Zealand, as far as having sufficient energy availability is concerned.

John Blakeley

Errata Issue 39

Your editor regrets that two typographical errors were made in Issue 39 as follows:

- On page 7, column 1, final paragraph, line 2 should read "million barrels per day…" (not billion).
- On page 8, column 2, paragraph 8, line 3 should read "…..it exports 6.11 million barrels…" (not billion).

Letter to SEF from the Minister

A brief mention was made in EnergyWatch Issue 39 (page 2) of a letter which had then recently received by SEF from the Minister of Energy. The full text of the letter is as follows.

22 December 2005

Dear Tim Jones,

Thank you for your letter dated 25 October 2005 regarding peak oil and the attached report.

The long term availability of oil reserves is a matter this Government takes very seriously and many of our policies are aimed at ensuring a reduced reliance on non-renewable fuels.

Just last month the Government announced it will explore a wider range of potential energy scenarios in order to develop a National Energy Strategy. The Strategy will enable the Government to identify what, if any, additional initiatives are required to achieve economic and sustainable energy objectives and surmount key challenges including those posed by oil security and depletion.

The Strategy, which is still in its 'conception' phase, will likely be developed by a working group led by the Ministry of Economic Development and comprising other relevant departments. Stakeholders, such as the Sustainable Energy Forum, will be consulted and have formal opportunity to provide feedback in the course of its development. I welcome your interest in being involved in this process.

Yours sincerely,

David Parker, Minister of Energy

Of particular interest is the development of a National Energy Stategy (NES). It is understood that the terms of reference of the NES are due to be submitted to Cabinet soon. The resignation on 21 March of Mr Parker as Minister of Energy is likely to cause delays but hopefully for not more than a few weeks. How

much enthusiasm a new Minister will show for proceeding with the NES is another question. Details of a stakeholder consultation process may be released in April and SEF will certainly proceed with making a submission when invited to do so.

John Blakeley

EECS to be Replaced

In a recent statement, Energy Minister, Trevor Mallard and the Government's spokeswoman on energy efficiency, Jeanette Fitzsimons said that the four year old Energy Efficiency and Conservation Strategy (EECS) is to be revamped. It was stated that EECS is failing to meet targets and will be replaced by next year.

EECS was meant to achieve 20 percent improvement in energy efficiency and increase renewable energy by 20 petajoules (PJ) by 2012.

In order to meet the 20% improvement target, a 2.5% improvement in energy efficiency was required each year. The Energy Efficiency and Conservation Authority (EECA) reported the actual rate achieved by EECS was only between 0.5 and 1.0% each year, a "very modest" improvement in efficiency.

Enough new renewable energy was coming on stream each year to likely meet the 20 PJ target in 2012, but as electricity demand increased, the percentage generated from renewable sources has actually been diminishing.

Mr Mallard and Ms Fitzsimons said that EECS has provided a solid base. "It has delivered some energy efficiency gains but not at a sufficient rate to meet NZ's current and future needs". Ms Fitzsimons is not part of the Government, but became energy efficiency spokeswoman after Government formation negotiations in October 2005.

"The new strategy will pursue energy efficiency and renewable energy more aggressively and will aim to put NZ on a faster course to a sustainable energy system" Ms Fitzsimons said.EECA which is largely responsible for running the present EECS would "lead development" of its replacement.

The Government is also drafting terms of reference for a review of the wider national energy strategy.

Source: NZ Herald, Friday 31 March 2006, pg A6.

Global Warming/Climate Change

Tony Blair's Climate Change Reality

Speaking at the end of the first day of a summit in London of environment and energy ministers, Tony Blair said that legally binding targets to reduce pollution made people "very nervous and very worried".

He said that when the Kyoto Protocol expires in 2012, the world would need a more sensitive framework for tackling global warming. "People fear some external force is going to impose some internal target on you……to restrict your economic growth", he said. "I think in the world after 2012 we need to find a better, more sensitive set of mechanisms to deal with this problem".

His words come in the build-up to the UN talks in Montreal this month on how to combat global warming after Kyoto: "The blunt truth about the politics of climate change is that no country will want to sacrifice its economy in order to meet this challenge" he said.

Source: The Guardian, U.K. 2 November 2005.

Montreal Outcomes

Nations Still Split on Climate Change

From the jaws of defeat, negotiations at the Montreal climate change summit have snatched not a victory but at least a ceasefire.

Had the meeting ended in acrimonious failure (as seemed likely until the eleventh hour) it would have sent a chilling signal that the issue of global warming is just too hard for multilateral agreement.

Insomuch as it averted that failure, the meeting was a success. But the meeting itself, and the agreement reached, display the chasm which divides nations on this issue.

The countries that have undertaken obligations under the Kyoto Protocol (which is every developed country except the USA and Australia) have agreed to begin a process of

considering further commitments beyond the end of 2012, when Kyoto's first commitment period ends.

So the risk that Kyoto will fizzle out without a successor agreement may have receded, somewhat, but there is no deadline for completing that process – only that the agreement should be reached as soon as possible and in time to ensure that there is no gap between the first and second commitment periods.

So NZ businesses and policymakers will have to wait some indeterminate time before knowing what the rules will be in 2013 and beyond.

And the developed countries with a commitment under Kyoto represent only about one third of global emissions of greenhouse gases.

The largest country-emitter, the USA, remains adamantly opposed to accepting any binding target for emission reductions. **Yet that is the key to putting a financial value on the right to emit greenhouse gases, which Kyoto countries believe is the key to creating an environment in which dearer technologies make commercial sense**.

Those technologies inevitably involve some cost and it is hard to compete with free emissions.

Also Kyoto does not at present impose any obligations on developing countries, including China which is already the world's second-largest emitter.

What has been agreed with the USA at Montreal is to engage in a dialogue, "an open and non-binding exchange of views on co-operative action to address climate change".

The Bush Administration in the US has attempted to define the disagreement as being between Kyoto's approach (which emphasises emission reduction targets) and their approach (which emphasises technology).

It is a bogus distinction. Neither is any use without the other.

Source: Source: Article by Bryan Fallow in NZ Herald, Thursday 13/12/05, pg A6.,

US Still Out in the Cold on Climate

Only a combination of inexperience and over-exuberance can explain the proclamation by the Minister of Climate Change that the United States is "effectively back in the tent".

David Parker, fresh from the UN climate summit in Montreal was clearly keen to portray the Bush Administration's agreement to join an exploratory global "dialogue" on future steps to control global warming as a breakthrough. Sober analysis however, suggests a far different conclusion.

Mr Parker was in a position to cast a more unemotional eye. Had he done so, he would surely have judged that the US had conceded nothing of significance, and had sidestepped any discussion which might lead to mandatory targets and timetables.

The US position remains essentially as it was before Montreal, as does the divide between it and Australia on one side, and Europe, Japan and other supporters of Kyoto on the other side.

The commitment by the US is to talks that will be "open and non-binding". Specifically ruled out is "negotiation leading to new commitments". This ensures that the US will not find itself in discussions that could lead to the type of emissions cap enshrined in the Kyoto Protocol.

It also signifies that questions raised by the extreme weather events in 2005 have failed to resonate in the While House.

If the Montreal summit could be termed a success, it is only because the US failed to persuade any other nation to join its hard-line stance. This averted any prospect of the talks collapsing, or of the Kyoto schedule being undermined.

Parallel negotiations at the conference produced agreement by the 157 countries signed up to the Kyoto Protocol to begin talks on mandatory post-2012 reductions in greenhouse gas emissions.

This means that all developed (industrialised) countries, except the US and Australia, have agreed in principle to make deeper cuts in

greenhouse gas emissions when their present commitments end in seven years (December 2012). Talks between then and now will seek, but are not guaranteed, to provide a seamless transition.

In the meantime, the US will pursue the voluntary adoption of new energy-efficient technologies by business. The weakness of the approach is its lack of Kyoto-style targets and timetables.

And while the nations signed up to the Kyoto Protocol have signalled their willingness to move forward, they know that their efforts will be constrained by the indifference of the USA, the country with the worlds biggest source of industrial carbon dioxide emissions.

The Montreal summit was an embarrassment for the Bush Administration such was the condemnation of its approach. Its response was a single-minded refusal to enter meaningful negotiations.

The US is far from being inside the tent. Indeed it seems destined to remain outside until a President more amenable to UN-led action sits in the White House.

Source: Editorial, NZ Herald, Wednesday 14/12/05, pg A 18.

Clinton's Montreal Speech

Following are some excerpts from the speech given by President Bill Clinton on 8 December 2005 during the UN Climate Change Conference. This was a side event hosted by the City of Montreal.

There is no longer any serious doubt that climate change is real, accelerating and caused by human activities. We are uncertain about how deep the time of arrival of the consequences. But, we are quite clear that they will not be good. So, what should we do about it? Well, when I was President, I did what I could do in an atmosphere that was, to put it mildly, hostile. We took a lot of executive actions to green the White House and the executive branch of government. We applied higher efficiency standards to appliances in the United States. I sought and lost a carbon tax, and then sought and lost a 25-percent tax credit for the production or purchase of clean energy products.

But, we were active in a partnership for a new generation of vehicles with our auto manufacturers, and in the development of the Kyoto climate change accord. It was not a perfect agreement, and there were criticisms of it at the time. The two most important of which were, first, that Kyoto would hurt the economies of the developed nations by chaining them to greenhouse gas reductions that were not achievable, and certain to lead to top down bureaucratic solutions that would wreck economic growth. The second was that Kyoto did not include developing nations which were already large greenhouse gas emitters in which given present rates of growth would become larger than even the United States, the worst offender, in the next few decades.

The second criticism was fair; the first one was just flat wrong. It was factually wrong. And we know from every passing year, we get more and more objective data **that if we had a serious disciplined effort to apply on a large scale existing clean energy and energy-conservation technologies, we would meet and surpass the Kyoto targets easily in a way that would strengthen, not weaken our economies**. That's the main point I came here to make.

You've just got to decide if you believe this or not, and if you can think you can convince anybody else of it. But, there are lots of hopeful signs here that if we decided to maximize clean energy development, maximize energy conservation technologies, maximize appropriate research, and have the best and most efficient use of old energy sources of oil and coal. If we did all of that, could we find common ground to do something before climate change makes it too late to have meetings like this?

I take it no one in Denmark is embarrassed that they generate 20 per cent of their electricity from wind. That no one in The Philippines is ashamed that they generate 27 per cent of their electricity from geothermal. That Germany is proud to generate over 16,000 megawatts

of electricity from wind. That Japan is glad that they have overtaken the United States, as has Germany, in the generation of electricity from solar cells. I think that the people in the developing world – largely in Latin America, but other places as well – who have solar cells unconnected to central power stations on their homes, that generate enough electricity to turn on the lights and cook the food, for a monthly payment that is more or less equal to a month's supply of candles, are proud that they have that.

If you look at the geothermal capacity of Japan alone, they could produce over half their electricity with geothermal. If you look at wind - the difference between wind and solar, and traditional energy sources is, wind and solar are more like blackberries, cell phones and flat-screen televisions- the more you use the cheaper it gets. Wind is going up 30 per cent a year in utilisation – that means it doubles every two-and-a-half years. Every time it doubles, the price drops 20 per cent. If you want the price to drop faster, increase the capacity faster.

Solar cell usage had been going up 30 per cent per year. Last year, it increased 57 per cent in one year. Every time the capacity doubles, the price drops 20 per cent. America spends roughly $180 billion (US) a year on gasoline – varies depending on the price. If we spent half of that for seven years building windmills, then we generate more electricity from wind that any other source. It's just not true you can't take any of this to scale. It's just that we are sort of rooted in old patterns of organisation and financing.

But, to make the main point, we know the capacity is there. In our country, 20 per cent of all electricity is consumed by lighting. If every home replaced every incandescent light bulb with a compact fluorescent one, which costs three times as much, last 10 times as long, emits one third as much greenhouse gases, every purchaser of a light bulb would save 25 to 40 per cent, no matter how many bulbs they purchased, just a long as they were being used. And we would cut the greenhouse gas emissions attributable to lighting in America by 50 per cent.

So, I just don't believe all of this stuff about how: "well, all these things are nice to talk about, but we can't really get there. Most electric power plants waste 60 per cent of the base heat of the fuel going into them, whatever it is. I saw Amory Lovins the other day at my Global Initiative – and a lot of you know him – but he's been out there saying this stuff for 30 years, and people have laughed at him for 90 per cent of his adult life. And no one's laughing anymore because we now know that conservation is good economics. **Conservation creates energy just as much as alternative sources do.**

I think it's important that we find – if we can get it – a multilateral way of going forward. If we all work together, it's hard to see how we can fail. And if we don't, it's hard to see how we can succeed. My country has four per cent of the world's population. 20 per cent of the world's GDP, and we did have, when I left office, 25 per cent of the greenhouse gases. It may be down to 23 or 24 per cent now, just because of the rapid growth in China and India.

But, the point is we've all got to find a way to do this together. And I think that if you ask yourself: why did 190 mayors agree to do this…commit to meeting the Kyoto accords… who weren't all left-of-centre. Some of them were conservatives. One of the mayors in America that signed on to this Kyoto thing came from a small farming community in Nebraska, and he bragged about the fact that he was a conservative Republican who had voted for the President twice and strongly supported him. But he said: "You know, I'm a farmer, and they told me that we had to go fight terrorists on the principle of precaution." **There is no place in the world where it's more important to apply the principle of precaution than in the area of climate change**.

There are two big obstacles to agreement, it seems to me. One is the general observation made – more eloquently than I can make it – hundreds of years ago by Machiavelli:

There is nothing so difficult in human affairs than to change the established order of things because those who will be hurt by the change are quite certain of their loss, while those who will benefit are uncertain of their gain.

The second problem is that the old energy economy is well-organised, well-financed and well-connected politically. The new economy is, by and large, entrepreneurial, creative, still-undercapitalised, and the markets are not all that well organised.

But, we have got to get people to think about how to jump start this. So, when British Petroleum adopts their new slogan, Beyond Petroleum – insofar as it is reflected in real actions – that's good. When Royal Dutch Shell finances windmills, that's good. I think every oil country in the world ought to take some of the benefits of that US$65 a barrel oil, and become energy countries – not just oil countries. Why shouldn't the oil countries of the world finance the development of solar and wind power? You could do it all over the Middle East. You could start at the Equator and work out. It would be a way of generating jobs, reducing poverty, increasing development and avoiding future impacts of climate change.

So, when we did discuss at my Global Initiative, the biggest dollar commitment we had – this is very interesting – was from a large European insurance company, Swiss Re, who committed $300 million to clean energy projects in Europe over the next few years. Why did they do that? Because they're going to go broke if global warming keeps running up the number of intense weather events. You can't figure out how to insure or reinsure against an unpredictable and ever-expanding number of risks. And the leader is a wise and thoughtful man, so that's how they made their commitment.

So, my plea is that we get more corporations, cities, other local governments and NGOs involved in this; that we try to go forward multi-laterally; that we not give up on market mechanisms. This carbon market is going to take off, as long as we don't walk away from it. It's going to be an enormously successful thing and incredibly important in trying to help us deal with this, and moving big dollars around and getting big projects done.

Again, my plea is for us all to get together, let's try to go forward together. And if you can't agree on a target, agree on a set of projects so everybody has something to do when they get up in the morning. It is a terrible thing to paralyze ourselves, and give people an excuse, and let anybody off the hook from doing something. Let's find a way to walk away from here and walk into the future together, so that we all have something that will give our grandchildren this planet in a more prosperous and more humane way.

Carbon Dioxide Study Increases Climate Change Fears

Results of a study by the European Project for Ice Coring in Antarctica are to be published in the journal *Science*. These show that there is more carbon dioxide in the atmosphere today than at any time in the last 650,000 years.

By analysing tiny air bubbles preserved in Antarctic ice, a team of European researchers have highlighted how the world's human population is dramatically influencing the build up of greenhouse gases.

Levels of carbon dioxide have built up from 270 parts per million two centuries ago to 380 parts per million today.

Sceptics sometimes dismiss the rise in greenhouse gases as a part of a naturally fluctuating cycle. However this new study provides definite evidence countering that view.

Today's still-rising level of carbon dioxide is already 27 percent higher than peaks during the last 650,000 years. Moreover, the rise is occurring at a speed that is over a factor of 100 faster than anything seen in natural cycles.

Source:NZ Herald, Saturday 26/11/05, pg B11.

Roles of the Electricity Commission

Your editor attended a presentation on Tuesday 13 December 2005 made by the Electricity Commission (EC) to business and industry representatives in Auckland.

It is clear that the EC is presently faced with some difficult and challenging tasks, three of which are discussed below.

Consideration of Transmission Alternatives

The EC has to weigh up alternatives which may be available instead of major upgrades to various parts of the national grid before giving approval for such upgrades to proceed. (In this regard, a final decision from the EC on whether or not the proposed 400kV transmission line is to proceed from Whakamaru to Auckland is now expected by the end of July 2006).

One difficulty is that the grid investment test (GIT) which is to be used by the EC is based on a very narrow criteria. It seems to your editor to be geared towards finding the solution of most benefit to present electricity market participants, rather than to the electricity industry and consumers as a whole, let alone the national benefit.

This issue of EnergyWatch (page 23) reports on an article by Brian Fallow in the NZ Herald (3 November 2005) noting that the regulatory environment in which Transpower operates is still in a state of flux and quoting a report by Alex Sundakov (of economic consultants Castalia) saying that the EC is heading in the direction of becoming more of a central planner than a regulator.

"Its approach to approving (transmission) investments focuses on the Commission's view of what an optimal generation and transmission system might look like, rather than Transpower's assessment of real-world market needs and risks. The risk is that the Electricity Commission's theoretical model will take precedence over Transpower's commercial judgement".

The EC appears to want to specify the assumptions for system planning. Since in many areas the EC is not an independent decision-maker but an adviser to the Minister (of energy), this may introduce a risk of planning assumptions being set to reflect political objectives or beliefs, rather than market realities.

Sundakov sees a danger that we will end up with a "worst of both worlds" outcome with the EC trying to impose a central planner model on top of an industry structure that is decentralised and market-based.

Handling the "Dry Year" Situation

Soon after his appointment, Roy Hemmingway the full-time Chairman of the EC included this topic when he addressed a meeting on 26 March 2004 in Wellington organised by the Energy Federation of NZ on the subject "solving NZ's electricity problems".

He noted that most electricity systems around the world are "machine constrained", meaning that it is the generation plant that dictate the system capacity. NZ in contrast is "fuel constrained" (a term which includes hydro inflows) and furthermore the fuel supply is highly variable. Average annual total electricity generation is around 40,000 GWh, 60 to 65 percent of which comes from hydro. Compared with a "normal year", available hydro generation is plus 7,000 GWh in a "wet year" and minus 5,000 GWh in a "dry year". Moreover, this annual variation is without any predictability.

So this means that available annual hydro generation can fluctuate between plus 17.5 percent and minus 12.5 percent of total annual electricity generation requirements.

Since the rest of the generation will be primarily from thermal power stations, this means that such plant will have to work very hard during a "dry year" but will be partially idle during a "wet year".

During discussion at the 13 December 2005 meeting in Auckland, mention was made that the old central planning system in NZ used to produce surpluses of electricity generation

capacity which was wasteful, whereas the market model should provide increases in generation capacity "just in time" for when it is needed.

Also mention was made that generation providers into electricity markets (who by and large will provide the additional capacity when it is needed) hate surplus capacity as it tends to lower prices and therefore revenue received.

Yet within the annual variations described above, how can you provide electricity "just in time" for the requirements each year without having surplus capacity in most years? There must be sufficient available capacity to cover the "dry year" situation.

The Government's "knee-jerk" reaction on this issue following the 2003 winter electricity "shortage" coming so soon after the 2001 event, was to build the Whirinaki back-up power station in Hawkes Bay to be managed by the EC, but whether or not we are going to see more "Whirinakis" remains unclear.

There is considerable concern at present about a possible looming dry year shortage situation developing in the winter of 2006, but at the 13 December meeting Roy Hemmingway remained confident that the analysis carried out by the EC indicated that the risk of this happening was still quite low.

The next major increment of generation capacity is the new 385MW combined-cycle gas-fired power station at Huntly, but this will not be completed until about December 2006.

An important factor to consider here is the cost of non supply, be it a "blackout" caused by a major generator failure or transmission failure or a "brownout" caused by a lack of transmission capacity or a lack of fuel availability (including hydro). This can be many times the normal cost of power supply. In his March 2004 speech, Roy Hemmingway noted a prior (9-12 January 2004) Benmore/Haywards transmission outage when three pylons blew over, which enabled North Island spot prices to reach $1000 per MWh. This translated to $2.20 per kWh in domestic terms, relative to $0.15 per kWh as normal.

Development of an Environmental Sustainability Framework

In its June 2005 report entitled *"Energy, Electricity and the Environment"*, the office of the Parliamentary Commissioner for the Environment (PCE) includes an environmental performance assessment of the EC in its initial start-up period from 1 March-30 June 2004 (under the Electricity Act 1992, the PCE is required to make assessments on progress towards a more sustainable electricity sector).

The PCE report notes that at the end of this assessment period, the EC was developing an environmental sustainability framework to guide its activities and drawing on the advice of environmental and sustainability experts to help it prepare its environmental sustainability framework to guide its activities. However, the PCE report notes that unlike in other work streams, the EC has chosen not to publish on its website, minutes of meetings or the advice provided by experts.

The PCE notes that this has made it difficult to define the extent to which the EC is considering environmental sustainability in its activities.

The report recommends that without further delay, the environmental sustainability framework should be completed and integrated into the EC's day-to-day activities.

However at the 13 December 2005 meeting, Roy Hemmingway stated that the EC had no view of whether or not the Marsden B power station should be converted to being coal-fired as the EC must leave it to the market to determine when and where future electricity generation capacity will be developed.

During discussion time, I asked him a specific question on the EC's views on its responsibilities in regard to climate change and NZ's commitments under the Kyoto Protocol, especially in relation to increasing greenhouse gas emissions from new thermal power stations being developed or proposed in NZ.

In response, Roy Hemmingway said that the EC is "struggling to find its role" in this area

and that the carbon tax was an "easy way out" for the EC but that tax is not yet in place (and of course since abandoned).

Hemmingway noted that the PCE has said that the EC is not doing enough in this area but that the EC was struggling to see how it can fulfil an environmental role under its existing mandate "without becoming a system planner".

It will be interesting to see what the next report by the PCE (for the year ending 30 June 2005) says on this particular topic!

John Blakeley

Son of Project Aqua

Two years after dumping the controversial $1.2 billion Project Aqua, Meridian Energy is reviving the plan for a smaller power scheme on the lower Waitaki River.

The scheme involves a 34km tunnel with one power station downstream of the present Waitaki Dam. It is projected to cost between $700M and $900M.

The new scheme would generate a maximum of 200 to 285 megawatts (MW) – compared with 530MW for the cancelled Project Aqua. It would have an annual average output of 1100 to 1400 GWh – equivalent to the electricity needs of all the houses in Christchurch.

Most of the 13 affected lower Waitaki River landowners are said to be in favour of the concept.

In a departure from Project Aqua, Meridian is taking a two-stage approach and will first apply later this year to Environment Canterbury for "water only" resource consents for the scheme, probably in the third quarter of the year.

Construction would later require land use consents from the Waimate District Council.

This two-stage approach would ensure that Meridian had the guarantee of the fuel – water – for the hydro scheme before proceeding to the next step.

It would also enable Meridian to carry out extensive consultation during the water rights process, along with detailed investigations and design of the scheme.

Source: NZ Herald, Friday 31 March 2006, pg C1

Are Winter Electricity Shortages Likely?

Winter Electricity Shortages Loom?

Although electricity generating companies had been concerned for a number of weeks prior to this, two newspaper articles in mid-November alerted readers to the developing low hydro storage situation, especially in the key South Island lakes – Pukaki and Tekapo.

Hydro lakes provide about 65 percent of NZ's electricity but a lack of rainfall and snow melt meant that Pukaki and Tekapo were respectively 4m and 3m above their minimum operating level in mid-November, which is unusually low for this time of year.

All the main thermal power stations in NZ, except one, were operating at near full capacity in an endeavour to allow those lake levels to rise.

Christchurch-based electricity analyst, John Noble, warned that the margin between installed generating capacity and demand will be at its lowest in the next year, creating difficulties if a machine at a major power station is out of action combined with a drought, and a cold winter on top of that will compound the problem.

The country's next major power station, the 385MW combined-cycle gas-fired station at Huntly is not due to be commissioned until December 2006.

A spokesperson for Genesis Energy stated that coal is being stockpiled at the existing Huntly power station. There was already a two-month supply of coal but the reserve was being increased to last for three months in preparation for next winter.

Despite the concerns, the Electricity Commission is sticking with its earlier predictions that NZ will not face a power crisis in six month's time. The Chairman, Roy Hemmingway, said that he is not expecting a one-in-sixty year dry spell next winter although he was aware of the low

southern lakes. "We still don't see a problem for next winter, but we are keeping an eye on things. If we don't think we can meet the one-in-sixty dry year standard, we will take the appropriate action with calls for conservation".

Independent power consultant, Brian Leyland said "Unless it rains a lot we are at reasonable risk of an electricity shortage and we should be preparing for that. Nobody should go into panic mode, but we should all go into precautionary mode. The high electricity spot price was a sign of (potential) problems in supply. The current spot price in mid-November was 13 or 14 cents, compared with 3 or 4 cents at the same time last year".

"At this time in a normal year, a combination of spring rains and snow run-off means that the hydro lakes are filling quite rapidly and quite often there is backing off from thermal generation to avoid spilling of the hydro lakes. This year we are in the reverse situation" Mr Leyland said "We are relying entirely on all those big (thermal) generation units, some of which are 30 years old, operating reliably for the next eight or nine months. If one of them fails, we would need to have unusually heavy rain to compensate for it".

Meridian Energy spokesman, Alan Seay, said the situation was a concern but could be turned around within a couple of weeks if decent rainfall came along. If the situation did not improve in the next couple of months, it would be a problem.

"The concerns do centre around next winter, when we would want those lakes, Tekapo and Pukaki at the maximum operating levels" Mr Seay said.

NIWA was expecting dry and warm weather conditions in the South Island lakes area until the end of January.

NZ has faced several power crises since 1992 when blackouts and forced power savings cost the country an estimated $600 million. In 2001 and 2003, the country again faced power shortages caused largely by low lake levels and rising demand for energy.

Sources: The Press, Tuesday 15 November 2005, pg A1, and, NZ Herald, Wednesday 16 November 2005, pg A5.

Some Statistical Information

- The total hydro lake storage is 57% of average for this time of year.
- At this point in time during the 2001 'dry' year, the total hydro storage was 3,000 GWh – it is currently 1,480 GWh.
- All of the country's available thermal stations are operating (using fossil fuels).
- For the 6th successive week, NZ's electricity demand has exceeded that for same time during previous years.
- The Spot Market rate for electricity is now 4.3 times greater compared with the same time last year.

Source: Email to University of Auckland staff (urging them to conserve electricity), Wednesday 14 December 2005.

Note: On 7 April 2006, total hydro storage had actually increased to 2066 GWh, about 66% of average storage for this time of year, and demand had levelled off to about the same as in 2004 as a result of various industrial production cut-backs.

A Winter Electricity Crisis?

Susan Wood: Next winter there could be an electricity crisis because we have been relying too heavily on hydro electricity. Since the last winter crisis in 1992, electricity use has boomed yet we still obtain 70 percent of our electricity from hydro. NZ has been very well served by hydro over the last century but we are very reliant on the weather and on water storage in two key South Island lakes – Pukaki and Tekapo. We rely on the snow to melt and the rain to fall to replenish these two lakes over the spring and summer.

At the present time, storage in Pukaki and Tekapo is very similar to the same time in 1991, but this could alter with a sustained period of rain. However heavy rain is not expected in the near future.

Businesses are feeling the squeeze right now with the higher spot price for electricity, and Comalco has cut back production of aluminium by 5%. Comalco says that it is concerned about both the short-term and long-term security of electricity supply. The present spot price of electricity is too high for them to want to pay it, and they would rather cut back on aluminium production.

Roy Hemmingway: Combined with the steady growth in electricity demand, the very dry spring we have experienced has caused the electricity market to respond with a high spot price.

Jeanette Fitzsimons: Clarified that when Comalco last renegotiated their electricity supply agreement, they took the right to opt for an additional 10 percent of supply, in exchange for which they agreed to cut back on their demand in times of electricity shortage, and that is what is happening at the moment.

Bryan Leyland: **What we've done is neglected to look ahead at our electricity requirements and plan ahead to meet them**. We will probably need to change the way in which the electricity market works and have some form of central planning.

If we had planned ahead for the end of the Maui gas field, which we had known was coming, then perhaps we would not be in this present situation. We have large amounts of coal which could be used for electricity generation, but this is mainly in the South Island and a long way from the centres of electricity demand.

Jeanette Fitzsimons: Technology cannot do anything about the climate change disadvantages of using coal-fired electricity generation.

Actually we have been adding to our generating capacity each year, especially with more wind power in recent years. We need to use more renewable energy for electricity generation from a variety of sources and there is great potential to increase our efficiency of electricity use. The answer is a whole lot of small things which we can do and which will all add up.

Bryan Leyland: Demand has actually been growing steadily at about 800 GWh per year for many years now and this figure is unlikely to change very much in the next few years. We have been using electricity more efficiently in recent years and this is good and is likely to continue.

In addition to adding to our thermal electricity generating capacity over the next 20 years, we will have to replace ageing, existing thermal stations. This will mean about 6000 MW of new thermal electricity generating capacity being required over the next 20 years or so.

Susan Wood then asked each of the panel for their views as to whether nuclear power should be considered for use in New Zealand.

Bryan Leyland: Nuclear power should be considered along with all other potential future sources of electricity generation.

Jeanette Fitzsimons: Agreed that the nuclear option could be considered but she herself had considered and rejected this option because it simply does not fit with the NZ electricity generation system. It comes in large lumps of generating capacity which are too large for NZ. A great deal of technology and expertise is required which NZ does not currently have, and we have no means of nuclear waste disposal in NZ – unless we could arrange to bury it in outback Australia!

Roy Hemmingway: Agreed that nuclear power stations are too big and too expensive for NZ at present. This is likely to be the case for the next 20 years, so for the time being, the nuclear power option is not available in NZ.

Source: "Close Up" programme on Television One. Tuesday 6 December 2005.

Hydro Lake Levels Below Average

Meridian Energy says that its hydro-lake levels in the Waitaki system are less than half the normal average for this time of year.

The power supplier says the Waitaki system, which makes up about two-thirds of the country's hydro storage, is at 46 percent of its average capacity at this time of year.

It says that there have been small inflows in the last two weeks, but it hasn't been enough to make up for the dry spring.

Source: TVNZ, TV1 News, Friday 30 December 2005.

Be Prepared for Cold Showers?

Storage in Lakes Tekapo and Pukaki, the main hydro lakes in the Waitaki catchment was only 55 percent of average for this time of year the

CEO of Meridian Energy, Dr Keith Turner, recently told the commerce select committee of Parliament.

Water levels in those lakes are slightly below where they were at the same stage in 1992 and they have been below 1991/92 levels for most of the past five months. And the levels of those two lakes are significantly lower than in the more recent shortage years of 2001 and 2003.

Nationally the picture is a bit better with storage sitting at about 70 percent of normal for this time of year. But the trend over the last two months has been downward when it should be upward.

Electricity Commission chairman, Roy Hemmingway, agreed that the trend line is worrying. "We had only three or four weeks of good rain around Christmas time and we need another period like that to put things in good shape. But I think there is a way to go before we could say we have a real problem on our hands".

While lake levels are below average they are still in the Commission's comfort zone, based on its modelling of demand and its analysis of inflows during the past 72 years.

Dr Turner said that historically, the inflows to the Waitaki catchment come from the spring to the end of March. "We are not at the end of March yet. The forecasts are not particularly encouraging that we will get a lot of rain. But I don't believe that we should put the country through a major electricity savings campaign just yet", he told the MPs.

The Electricity Commission's "minzone" is derived by asking a model based on hydrological records of the past 72 years the question "If all the gas and coal-fired generation is running, what is the minimum level of hydro storage we need to ensure we don't run out of water if the inflows are no better than the lowest on record?"

But how can we be sure that none of the big thermal generators "fall over" at the critical time? And can we be sure that the future will be like the past, when considering climate change possibilities?

The CEO of Genesis Power, Murray Jackson told the MPs that "waiting until we hit the minzone was akin to waiting until you hit an iceberg before taking action.

Source: NZ Herald, Thursday 9 March 2006, pg C2

Power Shortage looks Unlikely

The CEO of Mighty River Power, Dr Doug Heffernan, has told Parliament's commerce select committee that the country is still likely to escape electricity shortages this winter. He said that while the hydro storage situation is quite tight, it is not likely at this stage that we will have a shortage.

His "glass half full" view contrasts with what his peers at Genesis Power and Meridian Energy told the MPs two weeks earlier.

Although the lakes are well below normal for this time of year, they remain above the Electricity Commission's "minzone" line.

Dr Heffernan defined the minzone as follows "If the national storage gets as low as this, then we will need to be operating all thermal plants flat out, including Whirinaki, in order to ensure that we don't run out of water".

Dr Heffernan noted that Mighty River Power's hydro stations are on the Waikato River and fed from Lake Taupo which is in good shape, unlike the Waitaki hydro lakes which are at similar levels to the crisis year of 1992.

Source: NZ Herald, Friday 17 March 2006, pg C1

New Transmission Line into Auckland

On Transpower's controversial plans to build a new 400kV transmission line across the Waikato into Auckland, Dr Heffernan said "All the generators say there needs to be more transmission capacity into the Auckland region. How it should be done is for the Electricity Commission to determine".

But without a national grid performing properly, competition among generators and the development of renewable energy sources would be constrained".

Transpower CEO, Dr Ralph Craven, expressed his Company's concern about a "just-in-time" approach to upgrading the national grid.

Echoing what Dr Heffernan had told the MPs, Dr Craven said "The risk of investing too late is many times greater than the perceived cost in investing too early.

"It's an asymmetric risk. That means that while there is a low probability of something happening, if it does the consequences are huge".

The Electricity Commission has delayed for a month its interim decision on whether to approve Transpower's plans for a new line from Whakamaru to Otahuhu. A final decision is not expected until July.

Source: NZ Herald, Friday 17 March 2006, pg C1.

When is a Frog a Bird?

Electricity industry consultant, Bryan Leyland, suspects that there is a 20 percent chance that we will have an electricity shortage situation in the winter of 2006 similar to 2001 or 2003, and something like a 5 percent chance that it will be similar to 1992.

"The hydro storage is now the same as it was this time in 1992, the year of the big shortage. The main difference between now and 1992 is that we no longer have large reserves of Maui gas to burn – and even if we did, we do not have much spare capacity in the power stations to burn it".

"It is hard to avoid the conclusion that when we reformed the electricity industry, we threw out the baby with the bathwater. While there is no doubt it was right, to end the Electricity Department's and Ministry of Works' monopoly on building and operating power stations and transmission lines, **it was not necessary to choose an electricity market structure that does not co-ordinate generation and transmission, or provide enough reserve capacity, and induces generators to maximise profits by keeping us on the edge of a shortage".**

"Better options were available, but the decision-makers seemed to believe that if they called their proposed system a 'market' it would behave like a real market. It is like calling a frog a bird and expecting it to fly".

Source: NZ Herald, Thursday 9 March 2006, pg A17.

Wholesale Electricity Spot Price Falls then Rises Again

The daily average wholesale electricity spot price rose steadily from 6 cents per kWh in mid-October 2005 to around 17 cents per kWh in mid-December, reflecting increasing concern about levels in the hydro storage lakes and increasing thermal generation.

However the spot price then fell substantially over the next two weeks to around 8 cents per KWh on Saturday 31 December as a result of low demand over the holiday period.

Source: NZ Herald, Monday 2 January 2006, pg C15.

Note: In January and February there have been large fluctuations in the daily average spot price between 4 and 18 cents per kWh, but with an overall upwards trend from around 8 cents on average in early January to around 11 cents on average in early March.

Why are Spot Electricity Prices at Crisis Levels?

"Three wise men have stated publicly that we are unlikely to face any electricity shortages this winter so why are spot prices at crisis levels?" said the Chair of the Major Electricity Users' Group (MEUG) Terrence Currie.

The Chairman of the Electricity Commission Roy Hemmingway and the Minister of Energy Hon David Parker have repeatedly advised that blackouts are unlikely. Recently the Chief Executive Officer of Mighty River Power Dr Doug Heffernan advised a Select Committee of Parliament that "electricity shortages this winter" were not likely.

Mr Currie said, "Everyone is being assured that although hydro storage is well below average for this time of year there is sufficient generation, even if inflows were the worst ever, to ensure

there are no blackouts this year. The Electricity Commission Riskmeter has been steady on "medium" notwithstanding that spot prices started rising in the 4th quarter of last year.

If the risks of shortages are minimal, the Electricity Commission and the Government need to explain to consumers exposed to electricity spot prices why they have to pay unjustifiably high prices. Why should prices be so high if the risk of a shortage is remote?"

"Energy intensive users have faced high prices in 2001, 2003 and now in 2006. These high prices are destroying the credibility of New Zealand for investment. It is doubly ironic when the electricity generating companies continue to make record profits.

The inescapable conclusion one must reach is that there is little competition in the New Zealand generation sector and that must be addressed as a matter of urgency. The high prices and the record profits will also have flow through impacts on households".

"Households are not immune to the current extreme spot prices because retail tariffs when reset by retailers should reflect the large increase in wholesale costs. The difference is households will see this as a lagged increase over the next few months to a year whereas large industrial and commercial consumers see the price impact immediately. Households are likely to see the impact as higher retail tariffs later this year."

"This loss of economic viability and production from large industrial and commercial power users and the flow through later to household tariffs does not appear to be warranted when the risk of blackouts is very low. Manufacturers are not impressed that New Zealand is losing production and in some cases significant export sales simply because SOE generators can set prices in a poorly performing market to make super profits. That does nothing for the balance of payments problems the country faces".

Mr Currie said that late last year MEUG suggested that in the interest of the economy as a whole, all electricity customers including households use electricity wisely and if possible make any quick and easy conservation savings.

Those companies and households who followed that advice must feel disappointed that the spot prices have continued to climb and that generators have been making higher profits. The conundrum for consumers is…..if the risk of blackouts is very low…..why are prices getting higher day by day? One of the three wise men needs to answer that question.

Source: Media Release by the Major Electricity Users' Group (MEUG), Friday 17 March 2006.

Heavy Industries Cut Back Production

Anger is building in the heavy manufacturing and processing sector as high electricity prices once again make production uneconomic.

In the 2001 and 2003 electricity supply crisis, many companies simply stopped producing goods because the high cost of power meant that these goods would be made at a loss. This year there are early echoes of the same problem, even though winter is still some months away.

Now manufacturers face the bitter choice of disappointing their customers by denying them products, or keeping them served but making a loss. They are angry that it has come to this.

Comalco was the first company to reveal production cuts, saying that the electricity price on the spot market is too dear to make aluminium production economic.

Then Winstones Pulp International which has a plant near Ohakune revealed the same thing. Now the Hawkes Bay forestry firm Pan Pac is also cutting back from making over 600 tonnes per day to averaging 500 tonnes per day and potentially if electricity prices stay where they are, they might attempt to cut back to about 400 tonnes per day average. There have been cuts at three of its five pulp production lines and cuts at a fourth are likely. They said that present power prices are totally unjustifiable, given that NZ has enough electricity to keep the country supplied.

"We have been assured by both the Minister and the Electricity Commission and even by some of the major generators that there will be adequate supplies of electricity and that there should be no blackouts this year. In that circumstance, we just cannot see why at the moment power prices are running at about $250 per megawatt hour, close to 4 to 5 times what the actual cost of producing that power would be even for the most expensive generators".

That price was common on the electricity spot market today. Electricity seven day average price was $175 per megawatt hour but it soared to $330 at one point, way past the profitability mark for production in some manufacturing companies.

Winstones said "Every time there is an energy shortage the electricity market proves again that it doesn't work. They put a great deal of faith in this market but when you look back, every time it has come under stress at all, it has failed. The Government has really got to sort this matter out, once and for all, and with incredible urgency".

Another huge electricity user is the country's biggest company, Fonterra, which says it simply can't stop processing milk which arrives at its factories, but that there is a price to pay.

"We're concerned about the implications it has on our margins in an internationally competitive market. We're doing what we can to increase our energy efficiency. However we would all be relieved to see energy prices kept to a minimum".

Winstones said "At these sorts of price levels, we either have a crisis or we don't have a crisis. If there is a crisis, then the Government has to find a way of getting a message through to the 70 percent of consumers (those in the domestic sector) who aren't affected by the price signals on the electricity spot market. If there isn't a crisis, then the electricity companies must be held to account for some fairly gross profiteering".

An electricity industry spokesperson denied that high power prices are profiteering, saying that they reflect present real shortages of capacity in the electricity industry.

The Minister of Electricity, David Parker, could not be reached for comment.

Meanwhile the main electricity companies have appointed a special representative to oversee winter supplies.

Source: RNZ"Checkpoint" programme. 21/3/06

News Item

Older Imports to Flood In as Dollar Weakens?

The Motor Industry Association (MIA) states that a weakening NZ dollar is bad news for the age, safety and environmental effects of the country's vehicle fleet in the short term, and that older and shoddier vehicles are going to be pouring across the NZ wharves.

"Importers are losing purchasing power in Japan and this is compounded by the boom in demand for used vehicle imports from Russia".

"Even the Independent Motor Vehicle Dealers Association is admitting that its members will be seeking older and shoddier vehicles for the same money and foisting them on to the hapless consumer in NZ".

Last year used imported motor vehicles reached a record average of more than 8 years old. Of the used four-wheel-drives entering the country in 2005, 21767 vehicles (78 percent) were 9 years of age or older.

Source: NZ Herald, Wednesday 29 March 2006, pg F7.

The New Zealand Electricity System

Have the Electricity Reforms Delivered?

John Campbell: Where do power profits go? Six years ago, we were promised a "brave new world" of electricity. There would be a number of electricity companies competing to sell us power.

Well what happened? Prices have gone up and the ageing generation and transmission infrastructure is not being sufficiently upgraded to cope with increasing demand.

By creating a competitive electricity market, the Government-of-the-day repeatedly told NZ consumers that electricity prices would fall. Even in October 1999 when doubts were first expressed about whether this was going to happen, the government was still saying "it is early days yet to assess the benefits of the electricity reforms to consumers, but there are many more benefits still to come".

Tonight we assess the electricity market. Do you get competitive prices and is our ageing electricity generation and transmission infrastructure network being sufficiently maintained.

Richard Langstone: The reason that we have our present electricity system is that fifty years ago, the people in charge decided that it would be an excellent idea, the taxpayer liked it and the government approved the expenditure and funded it and built the projects, and charged for the expenditure based on the cost of production, and then sold the electricity to the consumers.

Then twenty years ago, those in charge decided that we needed to pay for our electricity differently. They created a market model that they said would give us cheaper power. They said that this would be good for electricity companies and good for the NZ consumer.

Clearly this has been excellent for the electricity companies. The four companies owned by the government in the last financial year to 30 June 2005 collectively made financial surpluses of $550 million made up as follows:

Meridian	Surplus	$218 million
	CEO paid	$1.17 million
Transpower	Surplus	$141 million
	CEO paid	$750,000
Mighty River	Surplus	$121 million
	CEO paid	$820,000
Genesis	Surplus	$70 million
	CEO paid	$730,000

When the weakest financially performing power company makes an annual surplus of $70 million, then it looks like a company would have to do extraordinarily badly not to make a lot of money, and when you are in a tight and captive market, when there might be an electricity shortage, then you just put your price up!

In response, Keith Turner, CEO of Meridian, said that this is a very simplistic analysis, because an electricity company can lose money in a big way. If you look back to 2001, during the winter electricity shortage Meridian was selling power to consumers at $50 per megawatt hour and buying electricity on the spot market (to on-sell) at $500 per megawatt hour, ten times as much as it was getting.

Richard Langstone: But it is an industry where good days tend to heavily outnumber bad days for the electricity companies. I had to take the opportunity to ask Keith Turner about his salary.

In response, Keith Turner said that in NZ, we are now exposed to global markets for labour and everybody can see the "brain drain" to Australia and the skill loss to NZ. In his job he is exposed to global pressures, the same as everybody else in the industry at this level is exposed to.

Richard Langstone: It is funny to think that in the "old days" one government organisation

(ECNZ) was responsible for running the whole system and its CEO, Dave Frow, was paid $300,000 a year but now we have four CEOs of government-owned electricity companies whose combined salaries total $3.3 million a year.

In response, Keith Turner said that the creation of the market model has made a huge difference to the efficiency with which the whole electricity industry is run.

Richard Langstone: But consumers don't think that this has been good for them because they are being asked to pay more.

Keith Turner: If commercialisation of the electricity market had not occurred, prices to consumers would be very much higher than they are today, or else the cost of electricity would have to be subsidised by government from taxation.

Richard Langstone: This is a frightening thought because the consumer is already having to pay 31 to 38 percent more for their electricity now than before it was "commercialised" six years ago (1999).

The average householder uses 8000 kWh of electricity a year. In 1999, the price to consumers was around 14 cents/kWh. In 2005, the price to consumers is around 18.5 cents/kWh which means a higher annual electricity bill to the average consumer of around $358 per year.

Peter Vernon (former General Manager of Wellington's electricity supply company): Quite frankly the electricity companies are doing very well at what they were put there to do, and that is to make profits for their owner and in fact they are really doing that too well!

However, NZ is at risk – high risk – of failure of electricity plant and infrastructure resulting in electricity shortages, even power outages, and high prices as a result.

Richard Langstone: The government-owned electricity generating companies are making huge profits and not really putting money back into the system to upgrade the electricity infrastructure.

Keith Turner responded that his own company, Meridian Energy, has made $650 million in profit and at the same time invested $500 million in more capacity over the last five years; including refurbishing of existing generation plants; the Manapouri tailrace tunnel; and wind power projects, including Te Apiti.

But he commented that the system is still in trouble. A few weeks ago the system in Christchurch was only a few MW away from capacity and relied on local diesel generation capacity. This was because Transpower have not kept up with increasing demand on the transmission grid resources and the investment programme required to do this.

John Campbell: The Commerce Commission has recently stated that Transpower has earned $100 million more than it should have in the last two years.

Keith Turner responded that it is imperative that we spend more money to upgrade the transmission grid but Transpower has been stymied by public opposition to its projects. We have to build more transmission capacity, and quite quickly, not just in Auckland but in the South Island as well. Christchurch in particular is "too close to the wind" at present.

John Campbell: The government told us that competition would drive electricity prices down and force electricity companies to fight for your business. But what has actually happened?

Take an average house in Christchurch with 3-4 people and with no gas supply. There is a $20 difference in annual electricity cost between the cheapest and most expensive provider. Similarly there is only a $24 difference in Wellington and $41 in Auckland.

On the face of it, there is no competition between providers.

John Campbell then introduced the new Minister of Energy, David Parker, and asked him whether we have real competition in the wholesale electricity market.

David Parker replied that he is only three weeks into the job and he didn't yet have a complete answer to this very complex question. **If we don't have true competition in the electricity market place, then the foundation stone on which the market model is based is not there**.

John Campbell: But looking at the very small price difference between the various electricity retail companies in Christchurch, isn't the competition model just a farce?

David Parker said that it is not quite that simple. The most important competition which takes place is the price of which the generators agree to sell power to retailers and he is not sure that you necessarily see that reflected in prices at the retail level.

John Campbell: Can we talk about Transpower for example. In the last financial year they had a net surplus of $141.5 million. The comparable figure in the previous year was $64.7 million, so in one year they doubled their net surplus, and prices are still going up. Can you explain why they have doubled their net surplus?

David Parker said that he couldn't explain this, but he does have to concede that huge amounts of money do need to be spent in the electricity sector in strengthening the generation and transmission infrastructure after six years of strong economic growth. We need to spend about $1 billion each year for the next five years to upgrade the electricity infrastructure.

John Campbell: Is this playing "catch up" for lack of investment in previous years?

David Parker said that certainly in the case of transmission lines, this is part of the answer. Investment required in transmission is "lumpy" with major expenditure being required every 20 to 40 years and not enough has been spent over the last five years in upgrading the system.

John Campbell: But Keith Turner has said that the transmission grid is now so overloaded that some lines cannot be taken out for servicing. Surely this is more than the maintenance you would expect in a decade. There are real ongoing problems here aren't there?

In response David Parker said that Transpower has been spending $80 million per year on transmission maintenance, but it is now looking at costs at the order of $400 to $500 million for projects such as the proposed new 400kV transmission line from South Waikato to Auckland.

John Campbell then introduced Graham Stairmand, the National President of Grey Power, who said that his organisation is very concerned about continual escalation of electricity prices imposed on them for a number of reasons, sometimes justified and at other times, in his view just "make believe".

He said that the elderly have very little disposable income, so when the electricity prices go up, they have to choose between keeping warm and spending less on food and clothes; or wrapping themselves up in blankets and getting cold and then becoming a burden on the health system.

Grey Power believes that as a social conscience, electricity price rises should be approved by the Minister so that government is fully aware of what they are imposing on the elderly of this nation.

John Campbell: Put this in the context of the annual profit of Meridian of $218 million and Transpower's annual profit of $141 million, and suddenly how do you explain why old people have to sit there with blankets on their knees because they can't afford electricity?

In response, David Parker said that he agrees that it is not good that in NZ, the average interior temperature of houses is decreasing, in part because of rising electricity prices, and he absolutely agrees that electricity price rises hurt those on low incomes the most, but the prices should also be seen in the context that NZ electricity prices even after the recent increases, are still below the mid-range of prices by international standards, but having said that **he did recognise that as Minister of Energy, he has a responsibility to consumers both for ensuring security of supply (i.e. "keeping the lights on") and that power is provided at affordable prices without causing too much environmental damage.**

Finally, John Campbell asked the Minister if he thought that the benefits of the electricity market model had been oversold and whether the promises made at that time have been honoured.

In response, David Parker said that clearly the benefits of the electricity reforms were oversold and clearly mistakes have been made in implementing the electricity reforms. He listed four things which the present government has done which would not have been necessary if we had a truly competitive market.

1 The government recognised that lines companies are an absolute monopoly and that there is a need for more price regulation there.

2 The government recognises that the market wasn't putting on additional generating capacity early enough, especially in a "dry year" situation.The government had to step in there with initiating the Whirinaki back-up generating plant which was built.

3 The government had to financially underwrite the gas supply for the large new gas-fired power station now being built at Huntly.

4 The government had to introduce the Electricity Commission which is meant to have a watching brief on this sector.

David Parker said that **the question still remains as to whether we have a sufficiently competitive electricity market in order to justify a market model in this area.**

John Campbell: What is the answer?

In response, David Parker said that he doesn't have the answers yet, but the questions are very proper to be asked.

Source: Television Three "Campbell Live" programme, Monday 14/11/05

Bonus Sparks Anger

Meridian Energy has awarded its staff bonuses of $3 million, spread amongst 370 employees, at a time of increasing electricity prices.

Meridian which lifted its profit by 64 percent to $218 million in 2005 has about 100,000 domestic customers in Christchurch and has increased its prices by about 30 percent in the past two years.

A Meridian spokesman said that the payout, the first of its kind made by the generating and retailing company was not a bonus but a "one-off performance-related payment" rewarding employees for their input into the recent sale of the company's Australian subsidiary, Southern Hydro, for A$1.42 billion (NZ$1.5 billion).

The Meridian board had approved a proposal that every staff member received a sum equal to 10 percent of their base salary.

A cross-section of the company's workforce had been involved in closing the deal, which returned a profit of $600 million, and it was decided that all staff should be rewarded rather than just a few closest to it.

According to salary figures in the company's latest annual report, 122 Meridian staff members have pay packets of $100,000 or more. The CEO, Dr Keith Turner, whose base salary is over $900,000 a year was boosted in the year to June 2005 by a "golden handcuffs" payment of $811,000 for the previous three years. His total package of $1.72 million makes him the highest-paid SOE boss.

Grey Power Federation president, Graham Stairmand called the $3 million disbursement "obscene" and said that Meridian could have used that money to pay a rebate to everyone of its customers in Christchurch.

Christchurch City Missioner, Michael Gorman, said that people who did a good job deserved to be paid appropriately. "Having said that, there is a fundamental question that the resources which Meridian have in a sense belong to NZ".

"It comes down to basic human rights and needs. One of the needs is warmth. Some in the city and country can't afford to adequately heat their homes".

Meridian has missed out on a "wonderful opportunity" to reward its customers with a rebate, Gorman said.

Meridian completed the sale of Southern Hydro to Australian energy company, Australian Gas and Light at the end of November. It bought Southern Hydro, which now has 11 hydro stations and a wind farm from US-based Alliant Energy in April 2003 for $A595 million.

Dr Turner said that when the sale was completed, it would take about six months to calculate how much of the $1.5 billion might be distributed to the NZ government as a dividend.

Source: The Press, Wednesday 7 December 2005, pg A1

Transpower Plans New Inter-Island Link

A $520 million upgrade is being planned for the crucial North Island-South Island power link. Transpower states that this should put a brake on rising power bills and lead to better competition in the wholesale electricity market.

Transpower is seeking approval from the Electricity Commission (EC) to replace the fading 40 year old technology with new equipment and to install two new submarine cables under Cook Strait.

Originally built in the 1960's, the high-voltage direct current (HVDC) line between the two islands forms the backbone of the national power grid, allowing cheap hydroelectricity from the South Island to be used in North Island cities. It was previously upgraded in 1991.

If approved, the upgraded line could be ready by 2010 and increase the capacity of the link from 1040MW to 1400MW.

The original link was now "progressively falling short of the reliability and availability standards" required of a 21st century power system, Transpower has said in its submission to the EC.

Power is usually sent from the South Island to the North Island. It is converted from alternating to direct current at Benmore in the Waitaki Valley, then transmitted over 535km to the shores of Cook Strait, where undersea cables carry the power 40km to the North Island.

Up to 1040MW of electricity can now be sent to the North Island, but only 600MW can be sent the other way. In dry winters, when water is scarce in the South Island storage lakes, power from North Island stations is sent south. This happened most recently in 2001 and 2003.

If the plan is approved, $90 to $130 million will be spent on laying two new submarine cables under Cook Strait and $300 million plus will be used to install two new valve halls, one at Benmore and the other at Haywards, near Wellington. The transmission line cables and pylons themselves will not need to be changed.

The proposal is part of the first grid upgrade plan that Transpower is submitting to the EC. The plan also includes the controversial scheme to build a new 400kV transmission line through the Waikato and to Otahuhu.

Transpower says that new investment is needed across the grid, so it can get more electricity into the high-growth areas of Auckland and north.

It is the job of the EC to settle disputes about how the costs of such upgrades should be shared across the electricity industry.

Source: NZ Herald, Thursday 6 October 2005, pg C1.

Keeping Transpower Honest

For two years in a row Transpower has raked in more revenue than the Commerce Commission says it is allowed. Over the two years, the breaches exceed $100 million. In that period prices for household electricity consumers have risen 18.5 percent and commercial consumers are paying 17.7 percent more.

Even if most of that inflation is due to generation rather than transmission costs, it is tempting to see Transpower, the archetype of a monopoly, as greedy and arrogant, and to wonder what use the regulators are.

But everything about Transpower, including the roles of its two regulators, the Electricity Commission (EC) and the Commerce Commission, is overshadowed by the question of upgrading the national grid.

About $1.5 billion of investment is required and soon, if security of supply is not going to be compromised, Transpower says. That includes the controversial planned new line across the Waikato into Auckland, and upgrading the inter-island link.

Transpower portrays itself as beset on one side by an empire-building and intrusive EC second-guessing every decision it makes, and on the other by a Commerce Commission whose approach to regulation would limit its revenues to those in days when little was being spent on the national grid, and hobble its ability to undertake the investment needed.

Transpower argues that to provide for the investment needed, it should be allowed to increase its prices by CPI plus 7, or even 10 percent.

In confirming its CPI minus 1 percent threshold for another year in June 2005, the Commerce Commission made it clear that, for its part, the appropriate treatment of new investment was still an open question.

In short, the regulatory environment that Transpower operates in is still in a state of flux.

But a report by Alex Sundakov of economic consultants Castalia, commissioned by Transpower, says that the emerging trends are troubling. "The EC is heading in the direction of becoming more of a central planner than a regulator" Sundakov says.

"Its approach to approving investment proposals focuses on the EC's view of what an optimal generation and transmission system should look like, rather than Transpower's assessment of real-world market needs and risks. The risk is that the EC's theoretical model will take precedence over Transpower's commercial judgement".

"Since in many areas the EC is not an independent decision-maker but an advisor to the minister (of energy) this may introduce a risk of planning assumptions being set to reflect political objectives or beliefs, rather than market realities".

Sundakov, like Transpower, is critical of the unwieldy division of labour between the two commissions whereby the EC is responsible for approving grid investments but the Commerce Commission is responsible for regulating how much revenue Transpower can earn.

"Seeking to regulate prices through a price threshold based on historic resources, when historically there has been underinvestment in the grid, means Transpower will have to breach the threshold to fund the necessary investment" Sundakov said.

Clarity about the physical capacity of the grid and transmission pricing is vital information for people planning generation investments. This creates a problem that in order to review whether a particular transmission investment is necessary and efficient, the regulator needs to know about investor's plans with respect to generation.

In turn, investors cannot finalise their plans with regard to generation without knowing what transmission of generation would be available and undertaken.

Sundakov rejects the notion that transmission and generation investment can be seen simply as competing ways of addressing the same problem. "Rather, transmission sets the platform for and defines the geographical scope of competition among generators".

"Blurring the distinction between a regulated monopoly and a competitive market is a bad idea, which gets worse if the regulator ends up subsidising generation investment (from some sort of levy) on the grounds that it is still cheaper than major transmission investment".

Ralph Matthes of the Major Electricity Users Group, sees this as a slippery slope towards the EC taking over investment. "At one

extreme this could be the EC writing out a cheque for someone to build a power station in Auckland".

However Matthes believes that the EC will be risk-averse. "They will canvass the options and if it looks absolutely clear that the generators will get generation into Auckland and the only question is which of the generators will do it first, the EC may decide that it can defer Transpower's proposed upgrade. But if there is any doubt, the upgrade will be approved" Matthews believes.

"In the regulating of bodies like Transpower, a fine line must be walked. Get it wrong in one direction and we will be ripped off through excess monopoly profits. Get it wrong in the other direction and the risk is under-investment and the lights eventually going out".

The "cost of non supply" is very high. A recent EC study found a power failure or series of failures would only have to cause 72 GWh of lost electricity consumption to justify the $1.5 billion transmission upgrade plan which Transpower believes is necessary. This is less than one day's average national consumption.

Sundakov sees a danger that we end up with an outcome that is the worst of both worlds, **with the EC trying to impose a central planner model on top of an industry structure that is decentralised and market-based**.

Matthes says "everyone is watching the EC like a hawk to make sure NZ does not go down that road".

Matthes also said that he believes that **Transpower has yet to make the mental adjustment to a higher level of accountability than before, instead of "we know best and here's the bill".**

Source: Article by Brian Fallow in the NZ Herald, 3/11/205, pg C2.

Commerce Commission Moves to Control Transpower Prices

The Commerce Commission announced on Thursday 22 December that it intended to declare price controls on state-owned monopoly Transpower's transmission services after its investigation of breaches of the company's price threshold during the past three years.

The Commission alleges Transpower has breached the Commerce Act by increasing its charges beyond stated limits, affecting all consumers.

The Commission will set out reasons for taking control of prices in a paper due for release on 27 January. Submissions will then be taken until 15 February and the Commission intends making a final decision on 17 March.

Energy Minister, David Parker, declined to speak, but in a prepared statement said it was "utterly appropriate" that the Commission should investigate the state-owned company if it felt the need.

Transpower spokesman, Chris Roberts, said the company was disappointed that it would have to wait until 27 January before finding out the Commission's reasons for its decision.

Transmission charges make up about 10 percent of the average power bill. Transpower announced in late November that it planned to increase transmission charges by 19 percent from April 2006 and by up to 13 percent a year for the following four years, saying extra money was needed for upgrades to the national grid with total cost around $1.5 billion.

Chris Roberts said that Transpower openly admitted that for the last three periods that they have breached the threshold and had supplied the Commission with their justification for doing so.

Mr Roberts said that Transpower is gearing up for a level of investment that has not been seen for 40 years, which has meant expanding the capability within the company and increasing staff numbers, spending a lot more on regional projects and planning for some large-scale projects in the year ahead.

But Transpower's price rises are limited to the rate of inflation minus 1 percent under the Commerce Act, unless the rises are for

investments approved by the Electricity Commission. A 19 percent rise in the year from April 2006 would yield about $85 million more than those limits allowed.

Following the announcement of Transpower's planned rate increase, the Commerce Commission launched an investigation into allegations of price-fixing in the wholesale and retail electricity markets.

Transpower was already under investigation by the Commerce Commission before it announced the 19 percent increase in transmission changes. The Commission was investigating price rises in April 2004 which resulted in Transpower collecting $111 million more in revenue in the two years to June 2005 than regulations allowed.

The Commerce Commission believed that Transpower had breached pricing thresholds in every year except 2002 since the Commission was granted power to regulate the 28 electricity transmission companies in August 2001.

Transpower owns and operates the national high-voltage electricity transmission – known as the national grid – linking generators to electricity distribution companies and major industrial power users.

Transmission charges are paid by electricity generators and retailers and lines companies and passed on to consumers.

Source: NZ Herald, 23/12/05, pg C3 and Otago Daily Times, 23/12/05 pp 1-2.

Bill Shocks Generators

South Island generators being asked to pay the annual $76 million running costs of the inter-island power link may take the decision to Court.

The Electricity Commission has shocked Contact Energy, Meridian Energy and TrustPower with its determination that they will have to pay these costs.

These three generators and any new South Island generators will also be charged for the cost of any new assets on the high voltage direct current link from Benmore to Haywards via the Cook Strait cables.

Source: NZ Herald, Friday 17 March 2006, pg C3

Hydro's Power Share Shrinks and Electricity Prices Rise

Electricity generation was almost flat in 2005 compared with 2004, but hydro's share of it decreased.

Statistics New Zealand reported on 8 March that total annual generation in 2005 of 39,400 GWh was only 0.1 percent higher than the year before. Although the June quarter was 2 percent higher than a year earlier, the September quarter was 2 percent lower.

Hydro-electricity generation was 13 percent lower for the 2005 year contributing only 59.4 percent of generation compared with 67.1 percent in 2004 and an average of 62.3 percent over the past five years – two of which were marked by electricity shortages.

In the last three months of the 2005 year, thermal generators produced 42 percent of electricity, the highest share on record for a December quarter. This was 29 percent more thermal generation than in the same period in 2004.

This increased thermal generation reflects the fact that storage in hydro lakes declined markedly during the December quarter, a period when storage normally increases.

Statistics New Zealand said electricity prices for household consumers rose 4.1 percent over 2005, following rises of 8.8 and 9.3 percent over the previous two years.

But for commercial consumers, the average price increase was 9.8 percent in 2005, on top of 11.7 percent in 2004 and 6.1 percent in 2003.

Source: NZ Herald, Thursday 9 March 2006, pg C2

Energy from Southland's Lignites?

SEF member, Steve Goldthorpe recently wrote to the former Minister of Energy, David Parker on this topic and has received a response from the present Minister, Trevor Mallard, saying that his letter had been passed on to officials for consideration.

The latest version of Steve's note on diesel to lignite prospects is given below.

The Future for Coal?

The lead articles in two weeks' editions of Energy and Environment Business Week describe prospects for future coal technologies in New Zealand and Australia respectively and give some insight into the approaches to future coal technologies on either side of the Tasman Sea.

The lead article in last week's magazine claims that "Solid Energy could have a Southland Coal to Diesel Plant by 2012". This week's magazine leads with the story "New $300 million research fund in Australia seeks 'zero emission' coal power generation" It is interesting to contrast the approach of the coal industry in New Zealand and Australia to that industrys' biggest vulnerability - climate change.

The following are extracts from the first article about turning Southland coal into diesel:-

Elder claims that the economics of converting coal to fuels such as diesel, petrol, methanol and aviation fuel stack up when oil prices are above US $40/barrel,"With oil now at $60/barrel, the economics are a no-brainer"

The process of "coal liquefaction" involves converting coal initially to syngas, from which not only transport fuels but also other products such as methanol, fertilizers and electricity can be made"

L&M Managing Director Greg Hogan says the company has just started a prefeasibility study, which will take about 12 months. If the plant comes to fruition it would represent a massive $6billion investment and produce about 50,000 barrels of diesel a day.

He (Don Elder) says Solid Energy is looking at using carbon capture technology to stop greenhouse gases going into the atmosphere. But he foresees a coal to liquids plant initially being built without carbon capture, which will be added later when the technology becomes sufficiently sophisticated.

I have the following comments on this scenario.

The coal liquefaction process proposed for New Zealand is indirect liquefaction, which involves conversion of coal to gas and then catalytic synthesis of diesel from that gas. This process route has been in use for decades at the Sasol plants in South Africa. This process route is much less efficient than direct liquefaction, which involves solvent extraction of coal followed by hydrogenation of the resulting liquid.

"Thermal efficiency of 67% is a fair average figure for direct liquefaction. Indirect liquefaction of coal is much less efficient, Sasol 1 being only 37%. However, Sasol 2 and 3 are said to be much better, perhaps in the mid-50s%." (Technology Status Report – Coal Liquefaction. UK DTI 1999). These figures are based on the use of good quality bituminous coal.

The use of low quality lignite, as proposed for New Zealand, would adversely impact the overall thermal efficiency. Therefore it is reasonable to assume that a lignite gasification and liquefaction plant in New Zealand might at best have a lignite-to-diesel thermal efficiency of about 50%.

The scale of operation envisaged for the Southland plant is 50,000 barrels of diesel per day, corresponding to 100 PJ per year of diesel, which is about equal to New Zealand's current demand for diesel. That diesel would emit 6.8 million tonnes per year of CO_2 when used in vehicles. However, over 13 million tonnes of lignite would be required, yielding, in total, 19

million tonnes per year of CO_2. This means that the precombustion emissions associated with making 50,000 barrels per day of lignite-derived diesel would be over 12 million tonnes per annum; i.e. 180% of the combustion emissions.

In contrast the production of conventional liquid fuels from crude oil yields precombustion emissions of typically 15-20% of the fuel combustion emissions. This means making New Zealand's diesel from Southland lignite would add over 10 million tonnes per annum of CO_2 to New Zealand's already growing CO_2 emission inventory.

Solid Energy suggests that "when the technology becomes sufficiently sophisticated" CO_2 sequestration might be added to the lignite to diesel plant. However, in the last 25 years of worldwide research there has been no major technological breakthrough in CO_2 capture and storage technology to overturn the large energy and economic penalties.

In the case of a lignite-to-diesel plant, the best that can realistically be hoped for would likely entail a doubling of the capital investment and the need to capture and store two tonnes of CO_2 for every tonne of CO_2 coming out of diesel engine exhausts. The concept of retrofitting futuristic CO_2 capture technology to an existing lignite-to-diesel plant is simply not credible.

In contrast, the Australian coal industry, is levying 20c/tonne to fund a $300 million research and development programme focusing on refining the known technologies of coal gasification and carbon geo-sequestration to bring them into mainstream use within the next two or three decades. This programme focuses on coal-fired large scale electricity generation, which is the most appropriate platform for CO_2 abatement technologies.

Solid Energy has declined the opportunity to participate in that programme. Whilst critics would claim that the Australian programme is largely a PR exercise, it is founded on an emerging thinking in the coal industry that super-clean coal technology, including CO_2 emission avoidance, will become inevitable if coal is to continue to be a mainstay energy source for future generations.

Steve Goldthorpe, March 2006

Editor's Note

As a comparison, the official estimate as at 16 June 2005 of NZ's shortfall of available carbon dioxide credits over the first five-year Kyoto commitment period is 36 million tonnes. (Refer EnergyWatch Issue 37, pg 5). However estimates have recently been made that the net effect of dropping the carbon tax (as announced on 21 December 2005) will be to increase the shortfall to around 49 million tonnes over the five-year period.

If such a diesel from lignite plant as described above was operating continuously in Southland over the five year period 2008-2012 inclusive, the estimated increase in carbon dioxide emissions, would amount to a further 50 million tonnes, effectively doubling NZ's shortfall.

Electricity Commission Admits Error over Power Risk

The EC has admitted that its risk assessment of a power crisis this winter has been too optimistic. On 5 April it changed the Minzone and Emergency Zone levels by 15 percent, making it far more likely that NZ will face a power shortage this winter.

Ministers' assurances of "no rolling blackouts this winter" have been based on incorrect advice.

The error arose from the EC over-estimating the generation from the Waitaki catchment and the Huntly power station. Meridian and Genesis have been saying for months that the EC have been wrong, and this change shows that their concerns were justified.

Source: Press release dated 6 April 2006 from Hon Nick Smith, National Party Energy Spokesman.

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EnergyWatch

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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).

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