EnergyWatch

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More on Peak Oil

In our July edition we drew attention to a looming resource problem, under the heading *Peak Oil: government action please.* We suggested that world oil production might peak 'before 2020,' but we might have been as much as 20 years too optimistic. In this edition we focus on the August power failure in North America. The two are closely connected and the first article on this — despite its flaws — is one of the most important that EnergyWatch has run. In our view the key point is that someone with the best possible insider knowledge is saying that the business-as-usual approach is so close to hitting the wall that it can no longer be taken seriously.

In summary, author Matthew Simmons says:

- Peak Oil is very close, but is inherently difficult to see:
  Peaking of oil and gas will occur, if it has not already happened, and we will never know when the event has happened until we see it 'in our rear view mirrors.'
- The power failure was caused mainly by deregulation, leading to inadequate preparation for weather extremes.
- Gas supply was not an issue this time, but in North America supplies are declining rapidly and will create major power supply problems within a year or two. Since the 1999 supply problems, 220 GW of new gas-fired plants have been built, *...with no supplies. Synthetic contracts were used, Enron-style, to sell gas futures when the gas didn't necessarily exist.*

While Simmons is talking about North America, many of his comments are very relevant elsewhere. A similar situation is developing, more slowly, in the UK (page 28). In New Zealand, some of Simmons comments can be applied directly:

On rebuilding Whirinaki as dry weather reserve:

> *Under deregulation, excess capacity was labelled as 'massive glut' and removed from the system to cut costs and increase profits... The system needs to be designed for a 100 year cyclical event of peak demand. If you don't prepare for this, you are asking for a massive blackout. New plants generally aren't built unless they are mandated, and free markets don't make investments that give 1% returns.*

A 100 year peak seems too much, but might be justified under US conditions.

On security of supply:

> *It's a sharper issue with gas, which doesn't follow a bell curve but tends to fall off a cliff.*

And generally:

> *This blackout ought to be an incredible jolt telling us about a host of energy problems that are ultimately going to prevent any future economic growth.*
>
> *...Saudi Arabia has very likely gone over its peak. If that is true, then it is a certainty that planet earth has passed its peak of production.*

Thankfully, at least one of Simmons' points does not apply in NZ, and suggests the key to our future:

> *Underlying all this is the fact that we have no idea how to store electricity.*

With nearly two thirds of our supply from hydro we do know how to store electricity (even if we can't always store as much as we would like) and we also know how we can eke out what we have: wind turbines; solar panels (thermal now, with photovoltaic likely to follow soon); energy efficiency; wood and wood-waste fires; consumer response to price spikes; and a few others. And with automatic load shedding (power cuts) in reserve .

(Continued on page 2)

EnergyWatch **Issue 30, September 2003**

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More on Peak Oil *Continued from page 1*

Until now the questions have mostly been around:

- Is there a problem?
- Will it pay/hurt business?
- Why should we take action ahead of Australia and the US?

If Simmons is right we now need to think in a whole new way:

- How can we get results most quickly?
- How can we future-proof ourselves?
- Do we need to start thinking about putting the economy onto a war footing?
- Where is business-as-usual taking us?

Which brings us back to comments by Dr Morgan Williams, Parliamentary Commissioner for the Environment, at the conference last year (EW 27, 12/02) :

> *How do we break out of existing paradigms? How do we get out of business-as-usual which we're all worrying about at the moment. If you look back through history... it tends to be shocks. It tends to be catalytic events that jolt us and take us off on another pathway.*
>
> *There's enormous instability sitting there in terms of international security of energy supply and where the Middle East is going, and the relationship to Islam. I don't think we can begin to understand how unravelling that could be.*

Crucial connections needed in the electricity sector

Parliamentary Commissioner for the Environment
23/7/2003

New Zealand's electricity sector has come under the scrutiny of the Parliamentary Commissioner for the Environment, Dr Morgan Williams. Speaking at the launch of *Electricity, Energy and the Environment,* Williams emphasised that, "The time has come to make some crucial connections. We need to examine the options for how electricity is used and provided in NZ and how our choices impact on sustainability. These connections are essential for achieving significant social and economic gains, and for putting us onto an environmentally sustainable pathway."

There has been plenty of debate about electricity over the last few months. This has mostly focused on 'keeping the lights on.' NZ, like other developed countries, has recently experienced some significant challenges in this area. Williams notes that, "Although short-term difficulties need to be addressed, it is vital not to lose sight of a long term vision. To avoid future energy crunches, we need to critically examine how we think about and use electricity, as well as developing environmentally sustainable sources of electricity supply."

Williams was speaking at the launch of a draft 'assessment framework.' The Commissioner is seeking comment on the framework that will be used for making ongoing environmental assessments of New Zealand's electricity sector. Assessments of this type have not been undertaken anywhere else in the world. The framework is therefore very much 'new territory.'

Williams believes the assessments can play an important role. By maintaining a long-term view, there are enormous opportunities available. "It makes sense to get more from our existing resources, as well as capitalising on our significant sources of renewable energy. In essence, it is part of a world-wide movement to 'get more, from less, for longer' in the energy and natural resource sectors."

The Commissioner is seeking feedback on the proposed assessment framework until 30 September 2003. Free copies of the discussion document, and an associated background paper, can be obtained from www.pce.govt.nz or by contacting the Commissioner's office.

Behind the blackout

An interview with Energy Investment Banker Matthew Simmons

Interviewed by From The Wilderness (FTW)
24/8/2003
www.fromthewilderness.com

FTW: What's the most important thing about Black Thursday?

Simmons: This blackout ought to be an incredible jolt telling us about a host of energy problems that are ultimately going to prevent any future economic growth. It's like the ghost of Enron calling. The event itself was astonishing. Senior people like Governor Pataki or the head of NERC (North American Electric Reliability Council) were asking how this could happen. But the problem was inevitable. The only thing we didn't know was when.

Deregulation

FTW: What did happen?

Simmons: On a large scale what happened was deregulation. Deregulation destroyed excess capacity. Under deregulation, excess capacity was labelled as 'massive glut' and removed from the system to cut costs and increase profits. Experience has taught us that weather is the chief culprit in events like this. The system needs to be designed for a 100 year cyclical event of peak demand. If you don't prepare for this, you are asking for a massive blackout. New plants generally aren't built unless they are mandated, and free markets don't make investments that give 1% returns. There was also no investment in new transmission lines.

Underlying all this is the fact that we have no idea how to store electricity. And every aspect of carrying capacity; from generators, to the lines to and inside your house, has a rated capacity of x. When you exceed x, the lines melt. That's why we have fuse boxes and why power grids shut down. So we have now created a vicious cyclicality that progresses over time. Another problem was that with deregulation, people thought that they could borrow from their neighbour. New York thought it could borrow from Vermont, etc. That works, but only up to the point where everyone needs to borrow at once and there's no place to go.

A second major reason is that decisions were made in the 1990s that all new generating plants be gas fired. I have been talking about the natural gas cliff we are experiencing. Many thought that this winter would be deadly, and it's just a miracle that we

have replenished our gas stocks going into the cold months. This winter could have been a major disaster. We've seen a price collapse in natural gas to the [US$ 5–8 /MJ range ($NZ 8.50–13.50 /MJ][1] and the only reason that happened was throughout the entire there were only a handful of days when the temperature rose above [27°C] anywhere. That allowed us to prepare for the winter but we shouldn't be optimistic. One hurricane that disrupts production, one heat wave, one freezing winter and we're out of solutions.

Gas supplies

FTW: And natural gas too?

Simmons: People need to understand the concept of peaking and irreversible decline. It's a sharper issue with gas, which doesn't follow a bell curve but tends to fall off a cliff. There will always be oil and gas in the ground. The question is, will you spend hundreds of thousands to drill a gas well that will run dry in a few months? All the big deposits have been found and exploited. There aren't going to be any dramatic new discoveries and the discovery trends have made this abundantly clear.

We are now in a box we should never have gotten into and it has very serious implications. We also see the inevitable issues that follow a major blackout: no water, no sewage, no gasoline. With the blackout, more than [100 Ml/day] of refinery capacity were shut down. People were told to boil water, but their electric stove wasn't working. What then?

FTW: Makes you wonder about France and the heat wave that has killed 5000.

Simmons: The only reason Europe was spared a far worse blackout was that Europe barely uses air conditioning. America uses a lot but it is a relatively new experience in Ontario, Canada. Until recently Ontario had been a net energy exporter. With air conditioning in the last five years, Ontario became a net importer of electricity.
Texas, with a population of 25 million, set an all time record of 60 000 GW just a week before the blackout. The difference is that Texas is virtually self-contained for electricity.

Weather effects

FTW: So how big a factor was the weather?

Simmons: It was **the** factor in my opinion. To show how much weather determines power use, in the week of 3 August, the US set an all-time national record for electricity use of 90 000 GW[2]. The Mid-Atlantic States' use of power had jumped 29.5% over last year and 20% over just the previous four weeks. Why? The temperature had been as hot as we experienced on Black Thursday. Everything that happened on August 14 started in the 17th hour. *[5 pm, depending on time zone, 16.00 in the next article — EW]*. That's when everything is running at once: industrial, residential, and commercial. This is when demand peaks regardless of the weather. And we know that in hour 17 on that day the US experienced all-time peak energy use. That's when the system tripped out.

How we got here

FTW: So we have two basic camps saying that the problems are generating capacity and transmission lines, without addressing feedstock issues. What about the advocates for deregulation who argued that there would be more generating capacity as a result?

Simmons: History answers that one. Following the 1965 blackout when NERC was created there was a mandate that publicly owned and regulated power providers had to build new plants. Every five years, 10% was added to the generating base. As deregulation was implemented in the 1990s, it was argued that it would open up vast quantities of energy in neighbouring states. In the first five years of the decade, only 4% capacity was added, in the second five years, only 2%.

In the summer of 1999, we had thirty consecutive power events which unleashed the single biggest construction boom in history which built 220 GW of new plants, 98% gas fired, at a capitalisation cost of [€ 530–610/kW, $NZ 1000–1200/kW].

It was decided to use solely natural gas plants for several reasons. Coal fired plants took five to seven years to build. They are very dirty environmentally and the permit process is difficult. We have built on all the available hydroelectric sites we can build on. Nuclear is unpopular and expensive. Oil fired plants are remnants of the days of cheap oil, which are not coming back. That left natural gas and the economists mistakenly presumed there would be large supplies. But natural gas plants were built with no supplies. Synthetic contracts were used, Enron-style, to sell gas futures when the gas didn't necessarily exist.

FTW: Assuming that there was enough feed stock to run the new plants how much building are we talking about?

[1] That is about 4–7 times the cost of Maui gas, for the bottom of a 'price collapse.' Presumably it is the floor price for Shell's LNG proposal (see page 20). See also the top of page 10 for a narrower range —EW

[2] This seems inconsistent with 60 000 GW in Texas alone (at left). Similarly, some unimportant but dubious-looking numbers have been edited out. It looks as if the phone interview was not checked —EW

Simmons: Each state would need to build 40–50% excess capacity. A 40% cushion merely provides the chance to withstand a day of high summer heat and the chance to grow by about 3%/yr for three years.

Shut downs coming

FTW: Yet even if we re-regulate there are still going to be problems with feed stock to power the plants. How serious is that?

Simmons: Someone's going to be left holding the bag big time. If natural gas consumption surges in ten days of excessive heat then it would require almost a complete shutdown of industrial consumption to protect the grid. As I have been reporting for years now, there isn't going to be enough gas to run those plants, let alone new ones.

FTW: You mean shut down the economy for ten days to keep people from cooking?

Simmons: Yes.

FTW: Everyone keeps saying that ANWR (The Arctic Natural Wildlife Reserve) is the answer if we drill there. Is it?

Simmons: ANWR is not 'The Answer.' However, it makes great sense to develop. Drilling there should not have a negative impact on the coastal plains of the Arctic. With great luck, it could create [4800–24 000 m^3/day of oil] and lots of natural gas that could last a decade or two. But this does not become the sole answer. On the other hand, if ANWR is kept off limits, it becomes no answer.

FTW: What about imports of natural gas? Russia and Indonesia have huge reserves; Canada, as the Canadians are painfully aware, is almost depleted when it comes to natural gas.

Simmons: Indonesia's gas fields are very old. Its Natuna gas fields, a source of stranded gas that gets discussed all the time has 95% CO_2 and apparently costs about [€bn 35 to develop 28 x 10^6 m^3/day] of gas. Russia has four old fields that make up over 80% of their gas supply, all are decline.

Other options?

FTW: Windmills? Solar?

Simmons: There's no way they can replace even a portion of hydrocarbon energy.

FTW: Reducing consumption?

Simmons: Reducing consumption has to happen, but many of the favourite conservation concepts make little difference. The big conservation changes end up being steps, like a ban on using electricity to either heat water or melt metals and instead, always using the "burner tip of natural gas." The latter is vastly more efficient, the energy savings are enormous and we need lower ceilings and smaller rooms. We need mass transit, and to eliminate traffic congestion. Finally, we need a way to keep people from using air-conditioning when the weather gets really muggy and hot at the same time. The strain this puts on our grid is too overwhelming.

We also must begin to use our current discretionary power during the night-time. All of theses steps are hard to implement but they make a difference.

FTW: What is the solution?

Simmons: I don't think there is one… Pray for mild weather and a mild winter. Pray for no hurricanes and to stop the erosion of natural gas supplies. If all prayers are answered there will be no crisis for maybe two years. After that it's a certainty.

FTW: What is the solution?

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Oil supplies

FTW: On that cheery note let's take a look at oil supplies.

Simmons: Currently, oil supply issues are as serious as the electrical grid. Last month the International Energy Agency updated their database. They had for years been talking about a coming huge surge in non-OPEC supply, excluding the Former Soviet Union. It hasn't happened. We have the highest oil prices in 20 years and even great technological advances have not had a measurable impact on discovery or production.

Has Saudi Arabia peaked?

FTW: What about Iraq and Saudi Arabia ? All the sabotage, infrastructure damage and the pipeline bombings are actually reducing Iraqi capacity. That leaves Saudi Arabia with 25% of known reserves.

Simmons: I have for years described two camps:

the economists who told us that technology would always produce new supply and the pessimists who told us that peak was coming in maybe 15–20 years. We may be finding out that we went over the peak in 2000. That makes both camps wrong.

Over the last year, I have obtained and closely examined more than 100 very technical production reports from Saudi Arabia. What I glean is that Saudi Arabia has very likely gone over its peak. If that is true, then it is a certainty that planet earth has passed its peak of production.

What that means, in the starkest possible terms, is that we are no longer going to be able to grow. It's like with a human being who passes a certain age in life. Getting older does not mean the same thing as death. It means progressively diminishing capacity, a rapid decline, followed by a long tail.

Saudi Arabia has very likely gone over its peak. If that is true, then it is a certainty that planet earth has passed its peak of production.

Peak Oil

FTW: What about people like Alan Greenspan who tell us that there is no basic problem with energy supplies? Others offer us hydrogen, which is laughed out of hand by people who have looked at its feasibility and efficiency.

Simmons: Basically they just don't get it. Some of them have gotten lazy. They were so carried away by the arguments of the economists that they stopped doing their homework. Month by month, and year by year, events are proving them systematically and thoroughly incorrect. They just don't get it. Right now, there is a deluge of stories on the wonders of hydrogen, but it is not a primary source of energy. For a hydrogen era you need an abundance of natural gas, or a great deal of new power plants using coal and nuclear power.

FTW: But peak oil is peak oil, is it not? Aren't we just talking about something that would have delayed the inevitable for a few years?

Simmons: Peaking of oil and gas will occur, if it has not already happened, and we will never know when the event has happened until we see it 'in our rear view mirrors.'

FTW: Is it time for Peak Oil and Gas to become part of the public policy debate?

Simmons: It is past time. As I have said, the experts and politicians have no Plan B to fall back on. If energy peaks, particularly while 5 of the world's 6.5 billion people have little or no use of modern energy, it will be a tremendous jolt to our economic well-being and to our heath -- greater than anyone could ever imagine.

Matthew Simmons is the CEO of the world's largest Energy Investment Bank, Simmons & Company International. (web site www.simmonsco- intl.com).

Disclaimer

The Sustainable Energy Forum does not fully support this article. Some of Simmons' facts have been questioned. Others look inconsistent, although they may be consistent with a hurried phone interview. From what we can find on the web, Simmons appears reputable. He has said similar things in the past, but in this interview he seems to take a stronger line.

SEF does not agree with Simmons on the role of renewables; distributed generation; and energy efficiency, amongst other subjects. However, we have retained much of this material to show where he is coming from.

In the US a sustainability approach will be most effective if started as soon as possible, but we accept that it will not help significantly if major changes are needed in the next two or three years.

In NZ the problems are much the same, but the timescale and solutions might not be. Renewables are already an important part of our answer and could become a complete answer.

In our view the key point is that someone with the best possible insider knowledge is saying that the business-as-usual approach is so close to hitting the wall that it can no longer be taken seriously.

John Blakeley, for the SEF Committee

US gas production, 1997–2001

"There were simply not enough [gas wells] to offset the rapid decline of the existing gas production base. The latest natural gas supply estimates show that all we produced in the US during the third quarter of 2001 was almost exactly what was produced in the first quarter of 1997, despite drilling and completing an additional 54 000 natural gas wells."

Matthew Simmons, address to American Chamber of Commerce meeting, Albuquerque, 19/10/2001

How it happened

(On 14 August there was a major power outage in a wide area of North America, including the northern and north eastern states of the US, and into Canada. New York came to a standstill, with homes, businesses, lifts, airports and subways all without power. These notes were supplied to SEF News from a US contact. —EW)

What began as a handful of commonplace, summertime 'trips' — brief transmission line shutdowns, usually due to ebbing voltage caused by anything from a bird hitting the lines to a power overload — set off the biggest outage in US history. Fifty million people lost power in eight states and parts of Canada.

14.00 A FirstEnergy 680 MW coal-fired plant in Eastlake, Ohio, trips off. A spokesman said that on a hot summer afternoon that wasn't a unique event in and of itself. "We had some transmission lines out of service and the Eastlake system tripped out of service, but we didn't have any outages related to those events."

15.06 A FirstEnergy 345 kV power line trips in north-eastern Ohio. No cause has been reported.

15.32 The 15.06 incident creates extra load on another FirstEnergy 345 kV line, which heats the wires, causing them to sag into a tree and trip.

15.41 Another FirstEnergy 345 kV line overload trips a breaker at a switching station, also in north-eastern Ohio, and affects the AEP system.

15.46 An AEP 345 kV transmission line trips where it interconnects with FirstEnergy's grid, at Canton, Ohio.

16.06 Another FirstEnergy 345 KV line trips, then reconnects.

16.08 Utilities in Canada and the eastern US see wild power swings. The CEO of a monitoring company says, "It was a hopscotch event, not a big cascading domino effect."

16.09 Power to customers in Cleveland, Ohio, fades as reduced voltage goes to no voltage, with 300 MW turned off.

16.10 A coal-fired power plant near Grand Haven, Michigan trips off.

A 345 kV line trips in Michigan's thumb region.

A 345 kV line trips in southeast Michigan.

16.11 A coal-fired plant in Avon Lake, Ohio, trips.

A transmission line running along the Lake Erie shore to the nuclear plant at Toledo, Ohio, trips.

A transmission line connecting three substations in northwest Ohio trips.

A nuclear reactor in Perry, Ohio, shuts down automatically after losing power.

A nuclear reactor in Oswego, New York, shuts down automatically after losing power.

16.12 A nuclear reactor in Ontario, Canada, shuts down automatically after losing power.

A nuclear reactor near Rochester, New York, shuts down automatically after losing power.

A nuclear reactor near Oswego, New York, shuts down automatically after losing power.

16.15 A FirstEnergy 345 kV line, in northeast Ohio, trips and reconnects a second time.

16.16 A nuclear plant in Forked River, New Jersey, shuts down automatically because of power fluctuations on the grid.

A nuclear plant near Detroit shuts down automatically after losing power.

16.17–16.21 Numerous power transmission lines in Michigan trip.

16.25 Two nuclear reactors in Buchanan, New York, shut down automatically after losing power.

(Rob Bishop and Murray Ellis report that FirstEnergy seem to have been very slack. They failed to:

- *Keep the Slammer worm out of their Davis-Besse nuclear plant safety monitoring system, where it lived happily for five hours.*
- *Carry out basic line maintenance.*
- *Keep alarm systems operating.*
- *Warn neighbouring power companies when they were having critical stability problems.*

And so seem to have set off the big blackout —EW)

Ethanol approved for car use

On 26 August the Environmental Risk Management Authority (ERMA) approved the use of ethanol in petrol. It is the 'active ingredient' in alcoholic drinks and and should not be smelt or touched. Regulations will limit its use to 10% in petrol, for use in cars not specifically designed for it. At this concentration it should be suitable for most cars built in the last 15 years.

Crony contractors pull America's plug

Julian Borger, Guardian Weekly, 20/8/2003

The electrical forensics are still under way, but the big picture of last week's unprecedented blackout in north-eastern America and southern Canada is clear enough — it was a warning against Washington's worship at the high altar of privatisation. Privatisation and deregulation are at the roots of both last Thursday's power meltdown and the 2001 California crisis, and both events have been lessons in the dangers of taking an exclusively private route into far-from perfect markets. California was taken to the cleaners by private energy suppliers such as Enron, which found that it was easy for big sellers to manipulate prices. Last week the problem arose from the fact that not all parts of the power grid offer profitable opportunities for private investment.

In the north east there was plenty of supply from private companies but not enough transmission capacity to take it where it was needed. When a line touched a tree in Ohio, the power it was carrying was diverted to other lines, which overheated, sagged, hit trees and failed too. As the 'cascade' gathered momentum, there was not enough spare capacity in the regional transmission system to take the strain. Power stations did what they are programmed to do when the grid cannot absorb the electricity they produce: they shut down.

No one has found a way of making investment in transmission lines pay. That is true politically as well as financially. Before the blackout at least, it was much easier to get elected on a programme of high defence spending than to go to the voters on a record of generous expenditure on transmission. Pylons and relay stations are not that sexy. That is why there is a gargantuan defence budget, and why investment in the transmission system has lagged so far behind power supply and demand.

Wake up call

President George Bush described last week's power cuts, affecting up to 100 million people, as a "wake up" call, although arguably the alarm first went off in California in 2001, when the president hit the snooze button. At the time, several members of Congress suggested a repair package of US$M 350 (€M 300) to improve the transmission system, but the White House opposed it. After last week's blackout, the administration blamed Congress for failing to agree to the vice president's energy plan , but that was more about oil (and where it might be found in Alaska) than about power lines.

A long-standing problem

Of course, the grid's problems predate the Bush administration, and the problem is highly complex. Part of it is that the transmission lines have fallen in the cracks between state and federal power. Individual states cannot resolve who should pay for lines that run between them, yet they are often too jealous of their own powers to allow the federal government to take over. The issue is so touchy that, even though the National Governors Association's annual meeting in Indianapolis was interrupted by the blackout, the subject was still not put on the agenda.

However, the Bush administration has hardly provided a useful environment to deal with the problem. Public investment does not fit in the Bush-Cheney narrative of their mission, with the patriotic exception of defence. But even there the cult of privatisation has had a powerful and damaging influence. The administration had to be coerced into nationalising airport security screening services, long after it was apparent that private companies were failing at the task. Lip-service security is profitable. Real security is not. The privatisation of defence contracting has left soldiers in Iraq without proper supplies. The problems are so severe that the Army Times — not a paper where you would look first for dissent — has turned against the administration, running a series of bitter editorials.

The same goes for the civil reconstruction of Afghanistan and Iraq, where many tasks that would have been performed adequately by local government bodies or aid agencies had been contracted out before the war to US firms with close ties to the administration, who are not getting the job done.

That is as potentially devastating for America's security as the dilapidated power grid, perhaps more so, but there is no sign of a radical change in thinking. It is impossible to say whether the cult of privatisation owes its grip more to an ideological commitment of the White House, or the close personal ties between its inhabitants and the businesses they used to work in. As in most regimes built on crony capitalism, the two have become indistinguishable.

(The original article contained several more references to military contracting —EW)

Towering design flaws

Amory Lovins
CEO of the Rocky Mountains Institute
The Globe and Mail (Toronto), 21/8/2003

The usual suspects — politicians, regulators, deregulators, utilities, and environmentalists — were rounded up when the 14 August blackout lost 61 GW of capacity in 9 s. Yet the real culprit was the overcentralised power grid. Its giant machines spin in exact synchrony across half a continent, co-ordinated by frail aerial arteries and continuous, precise technical controls. Usually, it works well. But every few years by mishap, or anytime by malice, it can fail catastrophically.

A fixed-wing aircraft can glide without engines, but without instantaneous active control and a tail rotor, a helicopter drops like a stone. The grid is more like a helicopter. Seeing this demonstrated may inspire terrorists to make it happen more often.

After previous major blackouts, more giant power plants were linked by more, longer, and heftier transmission lines. Some of these changes relieved local power shortages, but most were unhelpful. The latest power woes were prolonged because nuclear plants dislike sudden shutdowns and don't restart gracefully: they're the opposite of a peak-hour plant — guaranteed unavailable when most needed.

New power lines, plus wholesale competition, have also spawned huge new long-distance power sales. That much power, travelling that far, can slosh around uncontrollably if a squirrel disturbs the flow and circuit breakers don't instantly open. The well-meaning operators are always surprised — but if they keep building the same architecture, it will keep failing for the same basic reason.

Rewarding reliability

Modernising with fast, solid-state switches and advanced controls will help. Market structures that require and reward reliability are essential (and missing in much of the US). As one utility executive notes, the emerging consensus — that we need to build more and bigger power lines because usage has outpaced capacity — is as wrong as prescribing bloodletting for a patient with a high fever. It reflects a fundamental misunderstanding of what is amiss.

In fact, more wires may make cascading failures more likely and widespread. And they're almost always slower and costlier than three functionally equivalent alternatives:

- Using electricity efficiently;
- Letting customers choose to tailor their usage to price, and;
- Decentralised generation.

Energy efficiency

The cheapest, fastest way to save dollars and pollution is to use energy efficiently. My household electric bill is Ca$ 7/month for a 372 m^2 living space, before counting my larger solar production, which I sell back to the local electricity power co-operative at the same price.

Ottawa just earmarked Ca$bn 1.0 for conservation (and to meet Kyoto obligations). Each saved unit saves three units of coal at the power station. In the 1970s, Canada had world-class energy efficiency programmes but now they're unimpressive, with rules that reward distributors for selling more electricity and penalise them for cutting customers' bills. This perverse incentive is effectively an 'inefficiency tax' on every home and business.

Demand response

Demand response signals participating customers (electronically or by price) to avoid un-needed use when power is scarce. This needn't inconvenience anyone: If your electric water heater or air conditioner were off for 15 minutes, you'd never know.

Ontario lets this resource compete conveniently against supply only for big customers (and in pilot-project communities). Yet new 'smart meters' now make load management profitable for homes as well as businesses and, like efficient use of electricity, the strategy frees up transmission capacity. A few hundred MW of load management, and properly opening breakers, might have averted the blackout.

Demand response also stabilises electricity prices and markets. If California in 2000 could have dispatched load management equalling just 1% of power demand, then when nutty rules led suppliers to withhold supply and boost prices, entrepreneurs could simply have shorted the power market, dispatched their load management, and taken a billion dollars of the suppliers' money — enough to deter such antisocial behaviour.

In the US, where inefficient gas-fired turbines make nearly all peak power, demand response saving just 5% of peak electric load would save about 9.5% of all US natural gas. That could quickly return natural gas prices from around US$ 6–7 /GJ

(NZ$ 10.20–11.90/GJ) to for years to come — and quickly. Between 1983 and 1985, the 10 million people served by Southern California Edison Company used efficiency and load management to cut the decade-ahead forecast of peak demand by 7% of actual load per year, at only 1% of the cost of new supply. Today's technologies and delivery methods are far better.

Distributed generation

Distributed generation is unaffected by transmission failures. Last week, some energy utilities isolated their engine generators from the collapsing grid; they kept running, as did some customers. These islands of light in a sea of darkness were powered by local generators or solar cells that had been installed mainly to save money, but delivered reliability, too. A megawatt generated where its needed is far more reliable than a megawatt generated far away — yet they are priced the same, with no credit for reliability.

Throughout electricity's first century, power plants were costlier but less reliable than the grid, so ever-bigger power plants backed each other up through the grid. But new power plants are now cheaper and more reliable than the grid, so delivering reliable and affordable power now means generating it near the customers. (http://www.smallisprofitable.org).

Thermal power stations stopped getting more efficient in the 1960s, stopped getting cheaper in the 1980s, and stopped getting bought in the 1990s. Yet public policy continues to favour central plants and big transmission lines. Transmission is still centrally planned, and needn't compete fairly with its cheaper alternatives.

Our problem isn't too few power lines; it's obsolete rules, rewarding perpetuation of an inherently vulnerable grid. Letting all options compete fairly — whether they save or produce energy, no matter how big they are, what kind they are, or who owns them — would gradually and profitably build a power system as resilient as the Internet. Then major failures, instead of being inevitable by design, would become impossible by design.

Another power crisis?

In the second week of August, power prices rose about 10%, apparently due to declining lake levels. Lakes were at about 84% of average levels for the time of year, and inflow for the week was just 62%.

Dominion Post, 19/8/2003

New Zealand reactions

There have been several published reactions to the N American incident in the NZ media; these quotes give the flavour of them:

Ralph Craven, CEO of Transpower

The power blackouts in N America this month were a timely reminder to New Zealand of the need for investment in the national grid to provide secure power system operations into the future.

So could the same thing happen in NZ?
The answer is no.

Transpower runs the grid so that a single event is unlikely to lead to cascade failure and tripping of other lines or generators...

(NZ has automatic cut-out of the interisland link, and automatic load-shedding —EW)

New Zealand has the advantage of having a lot of hydro generation that can be restarted quickly after a blackout and used to start other stations...

Making new transmission investment a reality is a key focus for Transpower. New investment of more than $Bn 1.0 is needed in the next 10–15 years.

[This] does not mean overriding the basic principles of the RMA, but we need to find ways to streamline the process.

Steven Boulton, CEO of Powerco

New Zealand could face the power blackouts that rocked America if the Government does not stop regulating the prices of electricity lines companies...

In the US, price, profit and revenue control have starved electricity lines companies of the funds they need to invest in upgrading and maintaining their networks.

Wellington trolley buses to stay

Wellington Regional Council has decided to keep the city's trolley buses, which will be upgraded over the next five years. The council had to decide whether to do away with the trolley buses in favour of diesel buses, which would cost less to run each year. The council's transport manager, Dr Dave Watson, says it costs about $M 1.0 /yr to maintain the overhead wires.

NewsRoom, 17/7/2003

Whirinaki reinstatement

(We give the NZ Government press statement announcing the Whirinaki power station, virtually as received, with a selection of the questions and answers that came with it. Not mentioned in either is that this is effectively a reconstruction of a station that was dismantled and sold overseas only two years ago. This is not entirely the government's fault because it was Contact who decided to sell, but a key factor is the resource consent mentioned in the last answer, which was given for the old station —EW)

A new 155 MW power plant will be built before next winter to help provide increased certainty of electricity supply for New Zealand, says Energy Minister Pete Hodgson. The new oil-fired plant, likely to be situated at Whirinaki, Hawkes Bay, will provide reserve generation for use during very dry periods when hydro lake inflows are abnormally low. It will also provide reserve generation should there be a major breakdown in another generating plant.

"Today's announcement reflects the Government's commitment to providing a secure electricity supply for the benefit of all New Zealanders," Hodgson said. "If required, this plant could supply up to 3% of New Zealand's average power needs."

The plant is expected to cost $M 150 to build and the cost will be recovered through a levy on the industry, consistent with the Government's electricity supply security policy announced in May. The cost equates to less than $ 5.00/yr for the average household.

The Government is entering arrangements with Contact Energy to install and operate the plant at its Whirinaki site. The Government will own the plant and has the option to locate it elsewhere if a preferable site is identified in time to allow the plant to be commissioned by winter 2004. Discussions are under way with the owners of other possible sites with suitable resource consents and a final decision on the location will be made shortly.

"Normally the Government would prefer not to own reserve plant itself," Hodgson said. "However in this case we are taking advantage of an opportunity to secure an early and valuable increase in electricity supply security. Contact has an appropriate site available, but Crown ownership of the plant gives the Government useful flexibility in choosing the location. Acting now also ensures we will also be able to commission the plant by winter 2004, which the Electricity Commission would not have enough time to achieve."

The Commission, which will govern the electricity industry and have responsibility for supply security, is due to be established in the next two months. Over the next two to three years it will develop a portfolio of reserve generation to insure against the risk of power shortages in very dry years.

"In most dry years the electricity system will cope without having to draw on reserve generation," Hodgson said. The Electricity Commission will be working to ensure that electricity market arrangements for managing dry year risk function more effectively in future. These include careful forecasting of supply and demand, management of thermal fuels and hydro storage, increased opportunities for demand-side responses to wholesale price movements, and improvements to hedging arrangements. Reserve generation is the backstop to such measures."

Hodgson said having the new plant run on distillate, a light fuel oil, meant it could be relied upon to be available when needed. Because it would run infrequently — only in very dry years — it would not have a significant impact on air quality or on New Zealand's total greenhouse gas emissions. New base-load generation, to meet everyday electricity demand, was still expected to be predominantly from renewable resources over the next twenty years.

"New Zealand will need other reserve generation, and electricity generators are invited to consider offering plant for reserve duty. The Government urges potential suppliers to advance their plans and take steps to obtain resource consents for projects. The Ministry of Economic Development is actively seeking options for reserve generation in the run-up to the establishment of the Electricity Commission, which will take over this work."

Questions and answers

When and how will a levy be imposed to recover the cost of the plant?

The Electricity Commission is expected to be operational by spring 2003. The Commission will be able to apply a levy to recover the costs of reserve plant after new legislation has been passed early next year.

Over what period will the cost be recovered?

The actual cost of the plant will be recovered by

the levy, probably over a period of around 10 years. Details of the levy arrangements will depend on the final form of the new legislation.

When will a final decision be made on the site?

The plant comprises 3 units and it is possible that they could be deployed in different locations. Decisions on location are likely by October 2003.

What will the power cost per unit to produce?

The electricity cost when the plant is operating will depend heavily on the cost of fuel at the time. The anticipated cost is in the range $ 150–200/MWh.

Will this plant deliver 1-in-60 dry year security for 2004 and for later years?

No. The 1-in-60 dry year security standard is a new benchmark for the New Zealand electricity system and meeting it will require the acquisition of a portfolio of reserve generation over several years. The commissioning of this plant will be the first step in building up the necessary reserve capacity.

How much more reserve generation do we expect New Zealand will need in the next two to three years?

This has not yet been determined, as the new Electricity Commission will be responsible for assessing the level of reserve generation capacity needed to meet the 1-in-60 dry year security standard.

What will be the role of the Electricity Commission?

The Commission will be responsible for contracting for the availability and output of the plant and for recovering the costs through the reserve generation levy.

How will the extra carbon dioxide emissions from this plant affect New Zealand's ability to meet its Kyoto target?

As the plant will generate only on a reserve basis, the addition to New Zealand's greenhouse gas emissions will be minimal.

How will the carbon dioxide emissions compare with those from a gas or coal fired power station?

Carbon dioxide emissions from a distillate-fired plant are greater than from a plant burning natural gas, but less than coal. However, this plant is modern and includes the latest emission reduction combustion technology. All emissions have been modelled as being well within the relevant Ministry for the Environment Ambient Air Quality guideline levels.

Why is the agreement to use the Whirinaki site only for 11 years?

The 11 year term relates to the duration of Contact's resource consents. The Government and Contact will consider prior to the end of the 11 year term any on-going arrangements.

Commentary

Comments from the SEF discussion group (thanks everybody) include:

- The site is that of the standby plant that Contact earlier demolished. They are using the resource consent from that plant.
- One wonders what premium the Government is paying for an RMA-free project?.
- Contact are abandoning the 100 MW combined cycle plant at the site that they recently gained a resource consent for.
- The variable cost are $150–200/MWh. This is also the fuel cost of running diesel generators — not surprising as they both use diesel at similar thermal efficiencies. $M 150 could have paid many times over for the technical interconnection requirements for the ~150 MW of existing diesel generator sets that could be paralleled with the grid that could also run for months on end in dry year firming mode.
- The Government should not expose consumers to significant costs without looking at alternative mechanisms to mitigate the impacts of 1-in-60 year dry conditions.
- It is unlikely that a cost/benefit analysis of the Government's proposal to procure 1-in-60 dry year capacity stacks up against alternative risk minimisation strategies such as the recent 'Target 10%' campaign.

(The last two points are from Federated Farmers —EW)

EnergyWatch

Arms getting tired?

Yes, this is EnergyWatch's first 32 page edition. But hang in there: we hope to bring the next edition back to the standard 24 page length. It is due in early December.

Fortunately (in this context) we have no more to say on Maui. We passed both our Maui articles (EW 28 & 29, March and July 2003) to Dr Lloyd Taylor at Shell, with an offer to publish his response in this edition, but no reply has been received.

SEF submission to the Commerce Committee's inquiry into the New Zealand electricity industry

John Blakeley, Steve Goldthorpe and Molly Melhuish

(A slightly edited version of submission made at the end of July —EW)

The Sustainable Energy Forum is an informal group of individuals with an interest in a sustainable energy future for NZ. Membership ranges from staff in major energy companies to students and retired people. Many members are in active businesses in small-scale energy supply and energy efficiency.

The Forum conducts an e-mail discussion group, open to any interested persons, on sustainable energy issues. This has provided much valuable information and considered opinion, which underpins much of what is written below.

Introduction: sustainable energy options

Because of the high percentage of hydro-electricity (65%), installed capacity (MW) has never been the limiting factor in meeting electricity demand, but always energy availability (GWh). The most important economic problem in NZ's electricity sector is security of supply — not only in dry years, but in meeting peak demands to avoid local or even system-wide collapse, and to meet the growth in GWh demand. Such problems are recognised world-wide as being made worse in restructured systems.

Demand-side management is now recognised by the International Energy Agency (IEA) as a key to improving the reliability of restructured electricity systems. The IEA has just launched a new task group to research and promote the use of demand side management and energy efficiency.

The most important environmental imperative of NZ's electricity sector is its emissions of CO_2. These can be reduced through policies to reduce fossil fuel generation and reduce growth in electricity demand. In contrast, transport and especially agricultural emissions are far less tractable. Present projections of emissions from the electricity sector indicate a likely doubling of CO_2 emissions by the end of the first commitment period (2012), rather than reducing them back to 1990 levels in line with NZ's Kyoto Protocol obligations.

The Parliamentary Commissioner for the Environment (PCE) recognises that reducing growth in electricity 'demand' (GWh) is of the highest priority in improving the environmental sustainability and reliability of NZ's electricity system. Its second priority is the facilitation of small-scale renewable electricity generation and direct primary energy use to substitute for electricity use. The very significant funding by Parliament of the PCE's electricity sector assessment over its first four years (up to $ 400 000/yr) suggests that its assessments will not simply sit on the shelf.

Both economic and environmental problems in NZ's electricity sector can be addressed through use of 'sustainable energy options' (SEOs). These are small-scale investments in energy efficiency and renewable energy, which can be installed in the locations where needs are greatest, and which do not lead to electricity surpluses as happens with large scale generation projects.

In order of likely ability to supply energy within the next few years, NZ's most relevant SEOs are:

- New renewable energy: wind generation, landfill gas, wood wastes, solar water heating, domestic firewood from pine or coppiced eucalypt, and photovoltaic electricity. The potential resource from wood wastes alone will rise to up to 80 PJ/yr of wood wastes, though less if some trees are not harvestable.
- Energy efficiency in existing houses, commerce and industry, and Minimum Efficiency Performance Standards (MEPS) standards for new or renewed buildings and equipment.

Scope of this submission

This submission will be centred around the second, fourth and eighth terms of reference:

- ToR 2: the asset utilisation by electricity generation companies and their planning for capacity development.
- ToR 4: if and where the retail sector is acting competitively and to ensure that such competition is genuine and that barriers to switching suppliers are extinguished.
- ToR 8: what, if any, further reforms to the regulatory regime are required to ensure lines companies in the future receive a fair rate of return on invested capital and that consumers are charged fair prices.

Others of the terms of reference will be referred to as they become relevant in the discussion.

Planning for capacity development

Since the 1960s NZ has had sufficient generating capacity in place to avoid power shortages except in years drier than about 1-in-20. The only exception when a serious shortage did develop was in the autumn/winter of 1992. Even in the autumn of 2003 when spot prices rose dramatically, inflows were approximately those of a 1-in-20 dry year.

Discussion at the 17 June 2003 Energy Federation Conference, on the Government's dry-year security measures, indicated wide agreement: high spot prices were caused by a failure to utilise capacity rather than by shortage of capacity. (This is relevant also to Term of Reference #1). We agree with this.

We consider that a modest surplus capacity is appropriate for NZ, but that it is inappropriate to build sufficient generating (and transmission) capacity to cover a 1-in-60 dry year. Such a stringent security standard does indeed reflect the importance of electricity to the NZ economy — but it does not need to be met entirely through additional installed fossil fuel power station and transmission capacity.

A more secure electricity supply can be achieved through investment at or near the end of the supply chain, in combination with diversification of NZ's bulk renewable electricity supply system via appropriate wind farm developments and other renewable energy projects, both existing and new.

Standby generators

Standby generation — on the premises of consumers sensitive to power outages; owned by lines companies; and embedded in lines company networks — adds local security of supply where it is most needed. To the extent that standby diesel generators are used more than originally intended, they would potentially conflict with the objectives of the Sustainable Energy Forum to promote sustainable energy solutions.

(In fact the fuel for these generators could be made entirely renewable, by using biodiesel. Biodiesel potentially emits less contaminants than diesel from imported oil. However, biodiesel is in its infancy. The environmental and economic implications of its large scale use still need to be much more firmly established, and if so, as a fuel for urban standby diesel generators, biodiesel could be considered as a requirement under city bylaws.)

Renewable energy generation and distributed generation

Renewable energy generation, distributed throughout local lines networks (distributed generation, or DG), improves reliability in the event of network breakdowns. At the same time they augment NZ's primary energy supply, adding diversity that is sorely needed given our dependence on South Island hydro (which may become increasingly unreliable as climate changes), and on gas (increasingly expensive with the demise of Maui). The most common examples are:

- Wind generation from wind farms and individual properties
- Small hydro and micro-hydro schemes
- Photovoltaic generation (currently economic only in remote areas).

All these generation types can and should be interconnected to the local lines network. Generation at individual properties should be connected with 'net metering,' so the meter will run backwards if the generation is in excess. The interconnection equipment to do so safely is fully developed and not expensive compared to its value in augmenting primary energy supply and easing transmission constraints. Objections to net metering are due largely to commercial rather than security concerns, or come from people unfamiliar with modern interconnection safety systems.

The recently released report of the Centre for Advanced Engineering (CAE), 'DG — A Study of Capital Opportunities,' assesses a potential of 750 MW of DG that could be realised within about 12 years. This however would require an electricity market specifically 'engineered' to overcome today's strong barriers to DG. It is noted that the CAE report identifies that most of this capacity is based on fossil fuel generation. This is not compliant with SEF objectives.

To the extent that DG reduces demand from the grid, and thereby eases transmission constraints and GWh demand, it has a useful function. However, SEF would much prefer that net generation into the local lines network (or the grid) from DG systems comes from renewable energy sources.

Fuels that substitute for electricity generation

Security of electricity supply is also improved by direct use of energy other than electricity. For example, solar heaters are being installed by Eastland Networks to reduce energy demand on their rural networks, where ripple control is not being used. Wood-fired domestic heating, water heating (and even cooking) reduce winter peak

demands that cause the greatest stress on supply through the national grid and often even more stress on local networks.

Portable LPG heaters are widely used and provide a convenient quick heat source, and also reduce the demand on networks. However the exhaust gases and moisture go into the living area, causing dampness and potential health problems in all but excessively ventilated houses.

Electricity retailers almost without exception fail to promote sustainable energy options (especially energy efficiency retrofits) that would be cost-effective for their customers. This is understandable because their profits are largely determined by the amount of energy they can sell.

It would be desirable to offer new retailing options that reward customers for being responsive to the actual costs of electricity supply. Since generator-retailers have no incentive to do this, we favour the facilitating of specialist energy traders, who could offer to customers, energy services to reduce the cost of electricity supply.

Energy traders could provide advanced meters (which are becoming cost-effective for an increasingly large number of customer types), and provide the appliances or building envelope retrofits, which improve the efficiency of the customer's electricity use. The traders would be most active in areas where networks are constrained, where they could work with lines companies to defer network investment. The very substantial savings in cost of supply would be shared between the specialist retailer and the customer.

Issues connected with Electricity Commission

A major concern is that the Commission, following the concept in the Electricity Amendment Act 2001, is required to give effect to Government Policy. The Commission will have functions both in regulating market participants (through its evolution of electricity market rules) and in intervening in the market (through the dry-year reserve capacity decision):

- The confidence of investors in the electricity system — both supply-side and demand-side — will be reduced if the market rules can be changed as a matter of government policy. This function of the Commission needs to be ring-fenced and surrounded by a guaranteed fair process.
- Investment in dry-year reserve capacity by the Commission has the potential to limit the uptake of demand-side options and renewable generation options. These include promoting energy efficiency that reduces winter peak loads, — in particular, ceiling insulation in poorly insulated houses and energy-efficient light bulbs; and new renewable electricity generators which do not suffer dry-year shortages — wind generation in particular.
- Government's decision to contract for 8 years of large-scale coal supply for Huntly, (*Dominion*, 22 July 2003) would appear to contravene the 'environmental sustainability' objective of the Electricity Amendment Act. That quantity of coal will help prevent NZ from meeting its Kyoto obligations.

General comments

A return to a substantial surplus of generating capacity would drive wholesale prices down, to the benefit of major electricity users who buy much of their electricity from the spot market. But the cost of building that capacity and storing the fuel would raise average electricity prices for all consumers. This may offset the advantage of more stable spot prices, so that "the net impact on economic growth prospects is uncertain."

Government's proposed investment in reserve capacity would make new peaking stations much less risky investments for generators, and thereby could increase risks to investors in small-scale 'sustainable energy options.'

Conclusions

Planning for generating capacity development needs to be done with caution, to avoid surplus generating capacity which would crowd out renewable distributed generation, solar, wind and biomass energy and energy efficiency investments.

As noted by the PCE, sustainable energy options provide the most economic way to improve environmental sustainability and reliability in New Zealand's electricity sector. SEF is concerned that through its actions to give effect to Government Policy, the Electricity Commission's decisions may have a very negative impact on sustainable energy options. This applies particularly to the implementation of the Government's May 2003 dry-year reserve capacity decision.

Depletion and US energy policy

Matthew Simmons
President, Simmons & Company International

(An abridged version of a paper presented at the international workshop on oil depletion, Uppsala, Sweden in May 2002. The full paper is available at: http://www.oilcrisis.com/aspo/iwood/simmons_depletion.pdf —EW)

I am honoured to participate in this unique programme and I commend the organisers for taking oil depletion seriously. I applaud Professor Aleklett and Dr Colin Campbell for assembling some of the world's experts to address this topic.

I am an investment banker who ended up spending the past 30 years in energy-related investment banking. In the aftermath of the 1973 Arab Embargo, I founded Simmons & Company, an investment bank for 20 years focussed exclusively on the petroleum service and equipment industry, then more recently the entire energy field.

Initially I relied on the conventional wisdom, but came to realise that very few understood the total energy picture. There was an expectation of falling rig numbers and increasing discoveries: more oil and gas from fewer wells. I made a detailed analysis of the relationship between rigs and reserves added, looking at oil and gas together. This led me to question why people thought production would rise. The more people I asked, the fewer sound answers I received. I soon began speaking out on the genuine risk that US oil production would soon fall.

In 1995, I pulled together the excellent production data for the North Sea. I was stunned at how far the daily production of giant fields like Brent and Forties had fallen, and how long it had been since any really large fields were discovered. I realised that the North Sea would soon peak, and finally grasped that the supply experts were forgetting about depletion!

I began to realise that a wide group of supposed energy experts were assuming the new generation of oil service technology had facilitated enormously our ability to add supplies, and "reversed the age- old decline curve." Since our investment banking client base created most of this oilfield technology, I knew this was not true. All this technology did was create the ability to drain fields faster and create far higher decline rates once new fields peaked. Then I read Colin Campbell's excellent book on the pending end of cheap oil. His discussion of blowout depletion and what the industry does to stem this phenomenon taught me even more about this important and largely ignored topic.

A new concern: depletion

Soon, I began talking about depletion, its growing fury, how little the world knows about actual decline rates in specific fields, and how hard it is to track historical decline rates, let alone project future rates. I began reminding supply forecasters that it was becoming impossible to do any serious forecast unless you had a clear sense of how fast the existing base in each forecasted area was declining. I found how little even key players knew about the whole depletion topic. Time after time, I found myself explaining the basics of depletion to people who should have been instructing me.

A slide I have used many times illustrates the projected growth in oil demand and the added amount of oil that needs to be on stream by 2010 to meet a decline in the existing base. The first few times I used this graph, I plugged in an annual decline rate of 3%, which I simply concocted for lack of any real knowledge of the blended global rate. I now use 10%, but I suspect this will be too low.

I have also watched the constant whining and complaining of too many world-class energy experts who loudly dispute the excellent work being done by people like Colin Campbell and Jean Laherrere, without a scrap of factual data. I have studied the depletion issue for too long to have any remaining doubts, but I am still amazed at the limited knowledge about this topic and its dire consequences.

In 1956 M King Hubbert published his highly controversial report predicting that the US would peak as the world's largest oil producer in the early 1970s. By 1970, this theory was hardly remembered. Production peaked in 1970, at about [1.5×10^6 m^3/day]. A decade later, this had fallen to [1.1×10^6 m^3/day], despite a drilling boom that produced 4 times more oil wells each year. Today it is [0.5×10^6 m^3/day]. This was a serious study. Yet, almost everyone failed to take notice until it was too late to do any alternative energy planning.

US energy policy

The Bush Energy Plan was the most comprehensive outline for how America must address its future energy needs ever tabled by any US administration. It addressed the issue of depletion for the first time, by turning away from the heavy dependence on

natural gas created during the 1990s. It focussed on alternative energy sources as well as oil and gas, and called for a return to more nuclear energy and clean coal; a genuine recognition that America had 'bet the ranch' on an ever-growing supply of natural gas to fuel electricity needs. The concern stemmed from the simple fact that President Bush and Vice President Cheney were both staggered to watch a drilling boom for natural gas occur as gas prices tripled, and to then see that this unprecedented drilling boom merely kept the daily supply of natural gas flat.

The supply concerns embedded in the Bush Energy Plan are not only real, they are probably also understated, particularly for natural gas. Despite many plans to accelerate the adoption of better energy-efficiency and R&D funds to push forward hydrogen, wind and other new forms of energy, none of these new energy sources can grow fast enough to be a real alternative to oil or natural gas even by 2020.

What now?

Based on detailed analysis of data from Texas, I fear that US natural gas supplies could fall as much as 10% in as little as six months from now. The drop could be close to double this amount by the time it bottoms. If this happens, it will jolt the US economy far worse than the 1973 Oil Embargo. And unfortunately, there is no quick fix: America's electricity grid is dependent on a supply of natural gas that must grow by 35% over the next 8 years.

I fear that 5 to 10 years from now, historians might look back and discover that natural gas in 2002 finally experienced the same fate as US oil did 32 years earlier. The unforeseen consequences will be a watershed event in US history. If the US cannot grow its electricity demand through a lack of ample natural gas, it is hard to see how our economy can grow. If the US economy is curtailed, this puts some severe pressure on many other economies of the world too.

The key energy issue is depletion. The decline curve of existing supply is creating a vicious treadmill that needs an increasing number of wells to be drilled, to simply keep the base flat. There is a vast gulf about this whole depletion issue. But, some progress is finally being made on connecting the dots.

I again commend all the sponsors of this program for implementing a serious discussion about this serious issue. We are late in the game but it is better to start late than not at all.

ASPO sees conventional oil production peaking by 2010

Doris Leblond

(Another view of Peak Oil this time from the industry magazine Oil & Gas Journal, *30/6/2003 —EW)*

The Association for the Study of Peak Oil (ASPO) — a network of scientists, universities, and government departments — met near Paris at the Institut Français du Pétrole (IFP) late last month to push their strong warning that conventional oil production will peak before 2010.

Backing ASPO is the Oil Depletion Analysis Centre (ODAC), which is self-described as "an independent, UK-registered educational charity working to raise public awareness and promote better understanding of the world's oil depletion problem."

Both ASPO and ODAC openly denounce the "politically correct" view held by most policymakers and institutions — not to mention oil companies — that "near-term oil supply is mainly an economic and geopolitical concern."

Urgency, alternate fuels stressed

There is urgency, the agencies believe, to "make the world aware that the party is over," in the words of Kjell Aleklett, professor of physics in the Department of Radiation Sciences at Uppsala University. Aleklett started the Uppsala Hydrocarbon Depletion Group in January 2002. "The depletion of oil, which furnishes 40% of traded energy and 90% of transport fuel, should by all means be a sensitive subject for all governments as well as for you as an individual. It heralds for mankind a discontinuity of historic proportions," he warned.

Kenneth Deffeyes, a colleague of M King Hubbert at the Shell Oil research laboratory in Houston, explained the implications of 'discontinuity:' "After the peak, the world's production of crude oil will fall, never to rise again. The world will not run out of energy, but developing alternative energy sources on a large scale will take at least 10 years. In the meantime, there will be chaos in the oil industry, in governments, and national economies." Hubbert is known for his prediction in 1956 — later proven correct — that US oil production would peak in 1970.

Deffeyes believes, as does Pierre-René Bauquis, a retired petroleum engineer and now an associate professor at the IFP School, that replacement energies will need to take nuclear into account. For transportation, Bauquis sees synthetic fuels playing a major role — not only those known today but also new synthetics such as carbonated hydrogen produced by the nuclear industry.

Natural science approach

The speakers claimed, in the words of Aleklett, that they are presenting the evidence for a "natural-science approach to oil depletion, addressing the geological constraints, the technical basis of reserve estimation, the distribution of field sizes, and the obvious correlation between discovery and production after a time lag."

They also claim that the reason why there has been so far little response to the threat that conventional oil will soon peak, is that most published data on energy, population, and the economy are unreliable. Jean Laherrère, a former exploration and production executive with Total SA and now an associate consultant with the Zürich-based Petroconsultants, noted that, "in many cases, authors have political motives, selectively choosing data from a wide range of uncertainty to give a desired image."

"In addition to the uncertainty of the measurements themselves, as in the case of population or the confidentiality of oil reserves, they often indulge in manipulation," Laherrère said, adding that, "our present culture of eternal growth makes the word 'decline' politically incorrect."

Colin Campbell, ODAC director, and a former Amoco PLC exploration manager and executive vice-president of Fina Norway, was one of the first to warn of the modelling of depletion produced estimates that were 'incorrect.' Campbell brought forth the fact that, "since 1980, the world has consumed some 500 billion barrels (80 km^3) but has only found 300 billion as it eats into its inheritance from earlier discoveries."

Pessimists and optimists

IFP President Olivier Appert, while admitting that the debate is "an open-ended one," sets himself firmly among the optimists, because, he says, "the playing field is growing, technology is offering new opportunities, and demand is lower than anticipated."

But for ASPO, technology will not be able to prevent the forthcoming decline. Indeed, it says, breakthroughs have hastened, and not pushed back, oil depletion. Concerning the "growing playing field," Ali Samsam Bakhtiari, of National Iranian Oil, warned that there are limits even to Middle East output. "For those believing that for Middle East oil, 'the sky's the limit,' some shattering surprises might result over the next 2 decades," he said.

Gas reserves

Conventional natural gas reserves also are heading for peak production, as endowment is probably about the same as oil. Less gas has been used so far, but the global peak in conventional gas production is already in sight, in perhaps 20 years, forecast Robert W Bentley of ODAC, "and hence the global peak of all hydrocarbons [oil plus gas] is likely to be in about 10 or so years."

So, will the US, which will become more dependent on imported petroleum in the years ahead, be forced to resort to 'resource wars,' asked Michael Klare, the Five College Professor of Peace and World Security Studies. Klare noted that foreign energy policy, "is one of the driving factors behind the Bush administration's military build-up. And while the war in Iraq has several causes, the protection of US oil imports from the Persian Gulf is one of the most important."

(Some of the wording here is interesting. Note particularly the last paragraph under 'Natural science approach,' and how OGJ puts down Campbell without denying what he says. —EW)

Panic attack in NZ

In our last edition we drew attention to panic as a possible response to diminishing petroleum supplies (EW 29, p 19). As if on cue, the Dominion Post published on 8 August a piece headed, 'Call to waive oil and gas royalties,' in the wake of Shell's decision to suspend exploration.

We give below edited versions of Shell's press release; the National Party's and SEF's responses; and extracts from a Daily News (New Plymouth) piece on LNG (predicted in our March 2003 article on the Maui rundown),and another Dominion Post piece on 'clean fuel.'

Note that we too missed the point that Shell's withdrawal is only definite for twelve months: they state that there is to be no fundamental change in business strategy or positioning! —EW

Shell New Zealand, 6/8/2003

As part of the annual global exploration capital allocation process, the Royal Dutch/Shell Group has decided to reduce the level of exploration

funding available to Shell NZ over the next 12 months. Shell NZ Chairman Dr Lloyd Taylor says that despite this decision, there will be no fundamental change to Shell's business strategy or business positioning in NZ. "Rather the decision reflects a more tightly focused business strategy that is a direct consequence of the global competition for risk capital," Taylor said.

"The immediate focus of Shell NZ's Exploration and Production business is upon improving the return from its very significant investments of the last few years. This will be achieved by focussing on the immediate requirement to bring on stream the Pohokura gas field, while at the same time maximising the utilisation of its existing asset base. To put this in perspective, we have exploration and production assets of approximately $bn 3.5 , and face a further investment of approximately $M 500 over the next two years to realise continuity of gas supply in the face of declining Maui production.

"The decision to reduce exploration funding in 2004, follows the expenditure of over $M 17 in the last two years on exploration evaluation studies and drilling. Unfortunately, this effort failed to discover material new hydrocarbon reserves, nor define new opportunities for exploration that are comparable to those available elsewhere.'

"Shell is also continuing to address the issue of long-term security of gas supply for NZ, investigating the potential of Shell's global portfolio of LNG technology, assets, and expertise for use in NZ."

Kyoto claims another victim in oil industry

NZ National Party, 7/8/2003

The Government's ideological agenda is set to cost NZ a major player in the oil exploration industry, according to National Party Energy spokesman Gerry Brownlee.

"The National Party is saddened and disappointed by the decision of Shell Oil to quit exploration in NZ from next year. It will have a decided effect on this country's long term energy security."

"While it's up to Shell to give the exact reasons for its decision, I'm quite certain it's at least in part due to the heavy regulatory costs involved in exploration in NZ. There's real uncertainty about the viability of fossil fuels given the Labour Government's premature commitment to Kyoto and the overall lack of a cohesive co-ordinated energy policy," says Brownlee.

"With much of our power generated through thermal plants, often fired by gas, the cost of electricity is bound to rise if more viable gasfield aren't found," Brownlee says.

Sustainable Energy Forum, 8/8/2003

"Shell's exit from the NZ gas exploration scene will inevitably give a new impetus to the development of renewable energy. The greatest risk to renewable energy businesses is that a new gas find will swamp the New Zealand energy market, making their own myriad of small contributions uneconomic," said Molly Melhuish for the Sustainable Energy Forum.

Explorers will now be calling for even more government subsidy and more generous tax concessions, to fund them into the market niche abandoned by Shell. Government should instead redirect the massive tax concessions for gas exploration, for use by small-scale energy businesses who can deliver results. All that is needed is a tax policy that gives equal treatment to large-scale and small-scale enterprises.

NZ can do without new giant gas fields. The Maui field will produce an average of 130 PJ/yr over its contract lifetime. Wood wastes alone will make available up to 50 PJ/yr within four years, and up to 80 PJ/yr thereafter. Wind farms and solar water heat will readily make up any primary energy shortage in the medium term. Sensible use of existing resources will provide a bridge to fully renewable energy.

The present gas exploration subsidies emphasise offshore concessions, in the hunt for new giant oil/gas fields. These would be so costly to develop that any commercial exploitation would be based on new Think Big energy export schemes. Government does not seem to have learned from the past Think Big disasters.

There **are** alternatives. Government needs to implement policies that give small-scale energy options an equal place in energy markets, and in the 'market' for tax concessions. These options are invariably cheaper than the failed gas exploration programme. They give added benefits in reducing CO_2 emissions from the energy sector, and providing jobs throughout New Zealand.

Major demand-side savings are possible; most homes and businesses can profitably save 20-30% of their energy use. Solar hot water, wood stoves and home insulation are major options for domestic use. "More work is needed to make sure these savings can be made," said SEF Convenor Dr John Blakeley. "Historically, NZ's cheap energy has led to over-use, and we now need to kick the habit."

Port Taranaki tipped for LNG trade

The Daily News, 22/8/2003

Taranaki may become the centre of a new multi-million dollar energy industry — liquefied natural gas (LNG). The Maui field is expected to run dry in

the middle of this decade, and major gas users are now looking to imported LNG as one way of helping keep power stations and big industry going. Taranaki is seen as the obvious import point for tanker loads of LNG. New facilities would need to be built at Port Taranaki and nearby.

Contact Energy CEO Stephen Barrett confirmed that investigations had already begun into the potential use of LNG. Barrett said Contact believed that LNG would play a vital role, and expected that imports would need to begin before the end of the decade.

(The Daily News seems to be unaware of the safety risks of unloading LNG tankers close to urban areas. See also footnote 1 on page 4, about the likely price —EW)

'Clean fuel' for NZ?

Dominion Post, 28/8/2003

Wellington investment bank McDougall Stuart is advising Australian GTL Energy that their 'clean fuel' project has potential to be used in New Zealand.

GTL Energy has, with an American company, developed and patented techniques to take the moisture from low-grade coal and compress it into high-energy briquettes that can be used for electricity generation.

A coal-to-gas technology, established world-wide, was also being used to turn the coal into gas that could be used for electricity generation. Gas emits less CO_2 than coal during electricity generation.

GTL has gained a licence to use technology from the USA to convert the gas into 'clean' diesel, without any sulphur content).

Seventy percent of NZ's coal reserves are tied up in low-grade lignite in Southland. We have got a fuel there that has got no application — it doesn't burn effectively. A lot of heat was generated in the coal-to-gas and and gas-to-liquids processes that could be used to reduce the coal's moisture.

(Free heat for drying = waste heat = CO_2 emissions = carbon charges, and that is just to make the fuel —EW)

;;;;;;;;

Opinion

Farmers Against Realistic Trade-offs

The farmers are upset about the Kyoto Protocol. Again. This time it is levies for research into minimising methane emissions from livestock, of 9 c/yr each for sheep and 72 c/yr for cattle.

At the time of the ratification debate, farmers opposed — quite reasonably — a carbon charge on these emissions. The purpose of a charge is to influence behaviour, and the only possible response at an individual farm level would have been to reduce stock levels, putting many farmers out of business. Clearly it was a political non-starter, but you would have thought from all the fuss that it was a real possibility.

One thing that farmers can do is collectively fund research into methods of reducing emissions, and this is what the Government proposed. Early research has already showed promising results. The initial proposal was that farmers should fund their own research. The estimated annual cost was about 2% of the equivalent carbon charge, for a realistic prospect of major benefits: more efficient use of animal feeds (generating methane needs energy, so an animal emitting less methane either uses less feed or gains weight more quickly); profits from technology transfer to farmers in other countries; and indirect gains through a more stable climate and general economic well-being.

But Federated Farmers chose to be unreasonable, and now we are seeing a campaign of deliberate misinformation built around crude humour, with the media and every struggling opposition party climbing on the bandwagon: it is a fart tax (a belch charge actually, but they needed an 'f' in the acronym, and 'tax' is more emotive); we are the only country in the southern hemisphere to sign the protocol (several southern hemisphere countries have signed but after John Howard tossed a coin we are the only one with Kyoto obligations before 2012); and farmers are already providing the bulk of NZ's carbon sink credits (*what???*).

The bulk of NZ credits come from forestry plantings, but during consultations the larger forestry companies declined to accept the credits, because they did not want to be saddled with the liabilities when they cut the forests down. So we are being expected to believe:

- Our beef, dairy and sheep farmers are one and the same with the forestry owners. Farm foresters (shade trees, shelter belts and steep country) are

suddenly the keystone of our economy. We have some sympathy with genuine farm foresters committed to sustainability, but not for the much larger group trying for a free ride.

- Carbon credits from tree planting should be a private property right. Climate Change convenor Pete Hodgson has made it clear that landowners are welcome to claim this right if they sign a covenant against future harvesting, registered against the land title.
- The farmers feel that they have been cheated because they cannot claim the credits as trees grow and then pay the tax on harvesting. Here Federated Farmers have fallen into the trap of believing their own propaganda: this is a fair point for a tax, but much less clear for a charge. Applying a charge on an annual net basis would have huge administration costs and possibly very little to show for it: the rate is set by the carbon market (but capped at $ 25/t) and is likely to change. Why should the farmers be given a windfall if the price drops?

The real tragedy is all the negativity, when our farmers are more exposed to climate risks than most. At least some farmers recognise this and are embarrassed by their representatives' antics. Working on 'ruminant physiology' is one of many partial answers to a very complex problem. It might have a greater effect on NZ's national emissions than any other measure; we are the only developed country in this position.

A levy to fund such research is in both the short-term and long-term interests of NZ farmers and is a much better deal than the carbon charge faced by fossil fuel users. If it is rejected, just who will the joke be on?

Peat potential

Britain's uneven attempts to reduce greenhouse gas emissions by 12% to levels agreed at the Kyoto summit could get a helping hand from an unexpected source — ancient bogs. Blocking modern drainage ditches would top up bogland, which is a carbon reservoir almost as effective as tropical rainforests, according to scientists at Leeds and Durham universities. Bogland in Britain already retains more carbon than all the forests in the UK and France, according to their study. "A growing peat bog actually takes out carbon from the atmosphere and stores it on the land," said Mark Reed, of Leeds University's school of the environment. Guardian Weekly, 20/8/2003

Bio-ethanol not a waste of energy

Dr Carl Henderson

(In the July edition of we gave [p 25] a claim that using bio-ethnol gives out less energy than is used to produce it. The author of this response worked in the area in the early 1980s, at Lincoln University, and is well placed to give a local viewpoint. His current estimate of the ex-factory cost of ethanol from sugar beet is $ 0.90–1.00/litre, but this could be reduced if sugar beet ethanol was integrated with an existing ethanol factory, for example a whey ethanol factory.

Thanks to both Carl and his brother Geoff, who arranged the contact. —EW)

The Berkeley claim that biomass ethanol has an energy ratio of less than one (that is, the [man-made energy out]/[man-made energy in] is less than one) is not correct. They can only be referring to the smallest and least efficient farm-scale gasohol from grain plants, and are misrepresenting the issue by claiming all gasohol (alcohol used as a transport fuel) from grain plants are this inefficient.

A large gasohol-from-corn plant with continuous distillation will have an energy ratio of greater than one. More importantly, ethanol from sugar beet plants is more energy efficient than gasohol from corn plants, with an energy ratio of 2 to 6, depending on whether methane is made from the wastes or not.

I did a study in 1986 on a large sugar beet ethanol factory, based on six years of laboratory scale and pilot scale work by myself and colleagues. With continuous distillation, and energy recovery in various parts of the factory using heat exchangers, the energy ratio was calculated at 2.5 when producing anhydrous ethanol, and 5 to 6 if methane was made from the wastes. A group of operational beet ethanol factories overseas average out an energy ratio of 2, without methane production, so our lab- and pilot-scale based calculations are close to reality, especially since the overseas beet ethanol factories include a mixture of old and new factories.

This energy ratio is (ethanol energy plus the feed value of the beet pulp), divided by (all the man-made energy inputs to the farm and the factory). The latter include energy to make the fertiliser for the farm, and 'sequestered' energy used to make the steel for the tractors, farm implements, trucks, and the factory structure. Of course not all of these energy inputs are oil-based. The beet ethanol factory boilers can be fuelled with coal or natural

gas, or methane made from the beet pulp and stillage. And if you used coal or methane as a boiler fuel the 'auto fuel energy ratio' (ethanol energy out /oil energy in), would be 5 or 6 for anhydrous ethanol from sugar beet. This is the most relevant energy ratio, and it is very good.

Biomass ethanol is it is not just a 'greeny, environmentalist option,' as it was styled 20 years ago. It is now a necessity for today's cars in the US — as an octane booster — and may be soon for NZ.

Over the last 20 years two key environmental issues have removed lead from petrol in the US. One issue is that lead has been shown to retard intelligence, based on children living beside motorways having high lead levels and lower IQs. The second issue is that the USEPA (environmental protection agency) has established NAAQS (national ambient air quality standards), included in which are 6 criteria pollutants, which must be monitored and met by states and local bodies. These 6 criteria pollutants are CO, NO_2, O_3 (ozone), SO_2, particulates, and lead. All of these are produced by cars and trucks, and the first three are part of photochemical smog (along with volatile organic compounds), and have forced the adoption of exhaust catalysts for cars. These catalysts are poisoned by lead, the second reason lead has been removed from petrol.

To get high octane levels today there are three options:

- Refine the petrol more, which is expensive, energy inefficient, and creates more benzene (bad).
- MTBE, which was hailed as the octane booster of choice by the oil companies 20 years ago, is water soluble, not easily biodegradable, and has a low odour threshold and is tainting water supplies. It is banned in California, and the USEPA is phasing out MTBE over the entire US.
- Ethanol.

Geoff Henderson adds:

The moral I would draw from all of this is:

- Don't believe most of the rubbish put out by those who want to torpedo the renewables
- Policy-makers especially should not try to get into the ins and outs of technical questions like energy ratios because they tend to listen to those who make the most noise — those above — instead of those who really know their stuff
- Instead policy makers should concentrate on creating a level playing field for the renewables.

Wind turbine performance exceeds expectations

Compiled from information supplied by Windflow Technology

Windflow Technology's WF500 wind turbine is performing above expectations, according to the company's Chief Executive, Geoff Henderson. "The WF500 is operating more efficiently than expected in all wind speeds, and its cut-in wind speed is closer to 5 m/s than the expected 6 m/s," said Henderson. "The machine's actual construction costs and technical performance strengthen our confidence that the machine is commercially competitive."

The Christchurch-based chief executive officer of Windflow Technology Ltd and his team have been monitoring the performance of their pre-production unit at Gebbies Pass since its installation two months ago. "The onset of more seasonal higher winds during the spring will allow testing at optimum levels," said Henderson, "but so far, the unexpectedly high energy output indicates that the windmill design is working far better than we had predicted."

The Company has predicted a price of 6.0–6.5 c/kWh for its wind power. According to figures released recently by the Ministry of Economic Development, of all New Zealand's generation options, only geothermal is likely to maintain price parity with wind power over the next 20 years. Coal for example, is predicted to cost 7.5–10.9 c/kWh (including the proposed carbon charge), while hydro will remain at 8.5 c/kWh.

According to Henderson, wind generation can be developed quickly and incrementally, whereas most other sources require longer lead times and major capital investments. "Windflow's forward planning is based on its commercially competitive machine gaining just 12% of the predicted market for wind power in New Zealand," Henderson said, "The effect of this is that in about 20 years time Windflow machines will have an installed capacity of 500 MW, the approximate equivalent of the Clyde Dam or 5% of present generation. The wind-turbines will be sited in several wind-farms throughout New Zealand with a total area similar to Lake Dunstan (26 km^2), but unlike hydro-power, 97% of that area will remain available for its original use."

The report of the Energy Efficiency and Conservation Authority (EECA) on NZ's Wind Energy Potential states, "the total long-term

potential has been assessed to be in the order of 100 000 GWh/yr, three times our total present generation. This assumes that 1% of the land area in NZ would be suitable for wind farming."

Noise problem

Unfortunately there is a noise problem with the pre-production unit in the Gebbies Pass; it has exceeded the noise limit of its Resource Consent. "Our monitoring has identified sound levels in McQueens Valley of about 35 dBA; this is above our 30 dBA allowance," said Henderson. "We have met with our neighbours to discuss the problem and our solution for it. We share their concerns and appreciate their understanding."

In applying for its Resource Consent, the company agreed to a reduced sound level in recognition of the concerns of some local residents. Consultations with the local community identified a particular noise issue; McQueens Valley is very sheltered from the wind and therefore has very low background sound levels even when the windmill will be running in 12–20 knot winds (22–37 km/h). So the company agreed to a sound level lower than the District Council's normal night-time requirement of 40 dBA.

The problem has been identified. The steel tubular tower acts like a bell to magnify any mechanical noise from the windmill. The company expects to implement a solution within weeks.

Additional capital needed

Windflow Technology is seeking additional capital of $M 5.5 to begin series production of the Windflow 500 turbine, and has made its existing shareholders a 1-for-1 renounceable rights issue, at $ 2.00 a share. This means that existing shareholders can either buy one new share for each share they already own, or sell their right to buy new shares. The offer closed on 27 August. In early August rights were trading at around $ 0.45. Since May 2003, Windflow shares have been traded through the Unlisted Securities Market of the NZ Exchange.

Recent retail price rises highlight an advantage of wind power: it will reduce price hikes over the long term, and especially during dry years. Windflow's business plan includes an assumption of 4-5 c/kWh as the prevailing wholesale electricity price a few years from now. By contrast year-ahead contract prices reached that level last year, and spot market prices have exceeded it for most of this year.

In the event the rights issue raised some $M 5.0.

Beyond Kyoto: advancing the international effort against climate change

The Pew Centre on Global Climate Change have issued a set of six discussion papers under this general title. Comments are invited, before the final papers are presented at CoP-9 in December. To access or comment on the papers see:

http://ealert.pewclimate.org/ctt.asp?u=441061&l=3858

Below is a summary of the introductory paper.

With more than 100 countries, including most of the industrialised world, now committed to the Kyoto Protocol, this landmark agreement may soon enter into force. If so, Kyoto's launch will be a strong signal to markets that emissions of greenhouse gases come with costs; and a declaration of multilateral will to confront a quintessentially global challenge. But with the US not joining, the Protocol will cover just 40% of global emissions, and only through the coming decade. The reality is that whether or not Kyoto comes into force, the challenge ahead remains the same: to protect the global climate. This series of 'think piece' papers each addresses one of six core challenges — interrelated issues central to the design or negotiation of an effective long-term strategy. The aim, above all, is to be pragmatic.

A long-term target: framing the climate effort, by Jonathan Pershing and Fernando Tudela

> Examines the benefits and difficulties of establishing a more concrete long-term goal, and argues that alternatives – such as an "activity-based" target or a non-binding hedging strategy – may be more practical.

Climate commitments: assessing the options, by Daniel Bodansky

> Identifies the key variables in designing mitigation commitments, offers criteria for evaluating different approaches, and discusses the merits of several leading alternatives.

Equity and climate: in principle and practice, by John Ashton and Xueman Wang

> Explores the fundamental equity concerns, and

argues that no single equity perspective or formula can be a basis for agreement: the goal instead must be a political package that roughly balances competing equity claims. The authors suggest a set of outcomes.

Addressing cost: the political economy of climate change, by Joseph E Aldy, Richard Baron, and Laurence Tubiana

Identifies three critical cost dimensions that present themselves in negotiations — aggregate cost, relative cost, and cost certainty – and assesses how alternative approaches address each.

Development and climate: engaging developing countries, by Thomas C Heller and PR Shukla

Argues for a fundamental reorientation of climate policy to focus less on emission outputs and more on the underlying activities or inputs that drive them.

Trade and climate: potential conflicts and synergies, by Steve Charnovitz

Identifies potential conflicts between the goals of climate protection and trade liberalisation, possible measures to avert such conflicts, and ways the trade and climate regimes can be mutually supportive.

The six think pieces have evolved over the past year with input from a team of expert reviewers. The Pew Center is releasing them now as working drafts to invite comment from the broader climate community and from others with a stake in the climate debate. In addition, with support from the United Nations Foundation, governments, stakeholders and experts are providing direct input in three workshops on the papers in China, Germany, and Mexico. The papers will continue to be refined and will be published in final form for release at CoP-9 this December in Milan. The final volume will include an additional chapter synthesising and expanding on common themes.

Mind the gap

A note on the SEF discussion group says that BRANZ (Harry Trethowen) did research several years ago and found that — as a rule of thumb — a 2% gap area in roof insulation leads to about 20% loss in insulation performance.

Another sort of gap is heat flow through the joists, when insulation is laid between them — again about a 20% performance reduction.

Shadow of extinction

George Monbiot, The Guardian 1/7/2003

It is old news: two hundred and fifty-one million years (My) to be precise. But the story, now told for the first time, demands urgent attention. Its implications are more profound than anything taking place in Iraq or Washington. Unless we understand what happened, and act upon that intelligence, prehistory may very soon repeat itself.

The events that ended the Permian period, from 286 My to 251 My ago, could not be clearly determined until the mapping of the key geological sequences had been completed. Until recently, palaeontologists had assumed that the changes that took place then were gradual and piecemeal. But three years ago a precise date for the end of the period was established, which enabled geologists to draw direct comparisons between the rocks laid down at that time in different parts of the world.

Having done so, they made a shattering discovery. In many places, the rocks record an almost identical sequence of events, taking place relatively instantaneously. A natural cataclysm nearly ended all life.

They also suggest that human activities threaten to replicate those processes, within the lifetimes of some of those who are on earth today. As professor of palaeontology Michael Benton records in his new book, *When Life Nearly Died,* the marine sediments deposited at the end of the Permian period record two sudden changes:

- The red or green or grey rock laid down in the presence of oxygen is suddenly replaced by black muds of the kind deposited when oxygen is absent.
- An instant shift in the ratio of the isotopes (alternative forms) of carbon within the rocks suggests a spectacular change in the concentration of atmospheric gases.

On land, there was another dramatic transition at the same time. In Russia and South Africa, gently deposited mudstones and limestones suddenly give way to massive dumps of pebbles and boulders.

The Permian was one of the most biologically diverse periods in the earth's history. Herbivorous reptiles the size of rhinos were hunted by sabre-toothed predators. Massive coral reefs accumulated, home to fish of all kinds and hundreds of species of shell creatures. Then suddenly the fossil record very nearly stops dead.

The reefs die instantly, and do not reappear for 10 My. Among many classes of marine animals, the only survivors were those adapted to the near-absence of oxygen.

On land, plant life was almost eliminated. Only two fossil reptile species have been found that survived the end of the Permian. One of these became ubiquitous because nothing else was left to compete with or to prey upon it. Some 90% of the earth's species appear to have been wiped out. It was 150 My before the world once again became as bio-diverse as in the Permian.

So what happened? Some scientists have argued for a meteorite, but there is a more persuasive case for a series of gigantic volcanic eruptions in Siberia, now dated to 251 My ago. The volcanoes produced SO_2 and CO_2. The CO_2 appears to have warmed the world sufficiently to have destabilised methane hydrate, locked in sediments around the polar seas. The release of methane into the atmosphere explains the sudden shift in carbon isotopes. Methane is an even more powerful greenhouse gas than CO_2. The result of its release was runaway global warming. The warming appears, alongside acid rain, to have killed the plants. Starvation then killed the animals.

Global warming also seems to explain the geological changes. If the temperature of the surface waters near the poles increases, the circulation of marine currents slows down, which means that the ocean floor is deprived of oxygen. As the plants on land died, their roots would cease to hold together the soil and loose rock, with the result that erosion rates would have greatly increased. So how much warming took place? A sharp change in the ratio of the isotopes of oxygen permits us to reply with some precision: 6˚C. This is the upper estimate produced by the IPCC, for global warming by 2100. A conference of some of the world's leading atmospheric scientists in Berlin last month concluded that the IPCC's model may have underestimated the problem: the upper limit, they now suggest, should 7–10˚C. Neither model takes into account the possibility of a partial melting of the methane hydrate still present in vast quantities around the fringes of the polar seas.

Suddenly, the events of a quarter of a billion years ago begin to look very topical indeed. One of the possible endings of the human story has already been told. Our principal political effort must now be to ensure that it does not become set in stone.

Sustainability to be built in to the Resource Management Act

(On 5 August, Energy Minister Pete Hodgson introduced into Parliament a bill with the unpromising title of Resource Management [Energy and Climate Change] Amendment Bill 2003. We give below extracts from his speech —EW)

The Bill supports the Government's climate change and energy policies through amendments to the Resource Management Act 1991 (RMA). It recognises the Government's preference for national co-ordination of controls on greenhouse gas emissions and it gives greater emphasis to climate change and energy matters in RMA planning and decision-making.

The Bill introduces an explicit requirement for those exercising functions and powers under the RMA to have particular regard to a series of new matters. These include:

- energy efficiency;
- the effects of climate change; and
- the benefits to be derived from the use and development of renewable energy.

Clause 5 of the Bill amends the RMA by inserting the new matters into section 7 of the RMA.

This Bill provides national direction by ensuring that efficient use of energy, the benefits of renewable energy and the effects of climate change are flagged for the attention of those working with the RMA.

For example, it requires local authorities, when considering proposed wind farming projects, to have particular regard to the benefits of lower greenhouse gas emissions offered by such an energy source. This does not confer automatic approval on renewable energy proposals, but it requires anyone exercising functions and powers under the RMA to take these matters into consideration.

Energy efficiency in NZ

Ventilation of the new Brittomart Transport Interchange in Auckland has a power requirement of up to about 3.5 MW.

Electrical Technology, 8–9/2003

Land Transport Management Bill to reappear soon

Kerry Wood

(Some of what is advocated here is politically impossible at present, but in that case how are to manage Peak Oil? —EW)

The Land Transport Management Bill should be resurfacing in September, after disappearing from view last February. In the mean time the visible ripples include the 'Green Light' campaign and calls for Auckland's transport problems to be fixed, often with elaborate schemes for drivers to avoid most of their costs.

How much to pay for road use?

A key issue is how much road users should pay. A weak case for no change is being argued noisily by the business-as-usual advocates, while the case for higher charges goes by default. Drivers are paying too little, and drivers on congested highways or in the main centres are paying far too little.

Using nation-wide figures for 1993 (the latest available: data from MoT), road taxation transferred to the consolidated fund ("stolen from motorists") was about $M 200, but hidden subsidies to road use were an order of magnitude greater, at about $bn 3.3:

- Rates contributed $M 250 in 1993: This is about half the cost of maintaining local roads, and is mostly a hidden subsidy to drivers (although minor amounts are used for things like footpaths and bus shelters). The rates contribution alone is similar to the sum transferred to the consolidated fund. The result is that drivers are sheltered from their real costs — in other words subsidised.
- Uncharged environmental costs contributed roughly $M 1400 in 1993 (best-guess estimates for air quality, noise, greenhouse gases and water quality). Some of these costs are very poorly understood, but they are real costs — however uncertain — and reducing them will benefit the economy. Failing to charge them to road users is another subsidy. The accuracy of the cost allocation will be unknown and almost certainly partially wrong, but that is better than making no charge and knowing that it is wholly wrong.
- Unpaid capital charges were about $M 1650 in 1993: calculated as 6.4% interest on the capital value of the roads, which was some $bn 25.8 in 1993 — yet another subsidy.

To explain the capital charge needs a short diversion. Money put into buying a house is money that can't be spent elsewhere, when a cheaper house might be a better choice. Less money spent on the house might mean a lower mortgage, or any spare money could earn interest. Not bothering to collect the interest is a cost. Most businesses recognise this. That way they can compare like with like, and know what their buildings are really costing them.

For example, if you can just afford to spend $ 300 000 on a house, spending only $ 250 000 at say 6% interest would bring in extra income of $ 3000 a year, which might be a better choice. Spending an extra $ 50 000 on the house is a cost.

It is the same with roads, but with no capital gain. Not paying interest makes the roads look cheaper than they really are, and there is a temptation to spend more than is really justified. And with $bn 25 invested a little overspending makes a big difference.

If it is argued that these charges are unreasonable because "we have already paid for the roads," then the playing field should be levelled, by applying the same rule to bus and train stations; bus lanes and rail tracks; and harbour infrastructure used by coastal traffic. And the same goes for water mains, power stations, airports, everything. Many people and almost all businesses would see these changes as subsidies — quite correctly — so why are roads different?

Drivers see their costs as much lower than they really are, because so many of their costs are charged elsewhere in the community. Often they think only of petrol costs, when the real cost may be many times higher. So they over-use the roads, creating the problems we see so widely.

Since 1993, traffic has grown twice as fast as population; we now realise that road users are killing as many people indirectly through air pollution as they kill directly, and we know more about the very high costs of congestion — up to at least $ 2 /vehicle km in the worst places and times. A closely linked issue is obesity due to lack of exercise.

Other issues

Other issues that should and/or will be debated include:

- *Should new roads be built by the private sector and paid for by tolls?*

  Privately funded roads would be much more costly than roads funded as at present, but that is not necessarily a bad thing. The key issues are who carries what risk; that public ownership is retained; and that public authorities decide what

is needed, instead of allowing contractors to build what they see as most profitable.

- *Should drivers pay to support public transport, or rail services?*

  This would be unreasonable if drivers faced their full costs, but is much more reasonable when they are — in effect — heavily subsidised.

  A special case is on-road priority for public transport (bus lanes or light rail tracks), which is empirically justifiable when it increases capacity and/or reduces pollution. A well established effect is that faster public transport speeds up car trips too — the basis of the present bus priority programme in London.

- *Should drivers pay for special provision for pedestrians and cyclists?*

  Rating is generally more appropriate for the very low costs of providing for walking and cycling. This works well at motor traffic speeds below 30 km/h, but is much more difficult where drivers are allowed to maintain what they see as a reasonable speed. At more than about 30 km/h the risk of injury to unprotected road users is too high, and special provision is often needed.

  If a highway divides a community, provision for crossing it is a road cost, to be paid by drivers. Crossings at kilometre intervals may be adequate for drivers but not for cyclists and definitely not for pedestrians.

- *How are drivers to be charged for their external costs?*

  Methods available at present include tolls at key points; parking charges (including levies on private spaces); a central area access charge (as in London); and petrol taxation.

  The ultimate charging system is a satellite system that charges each vehicle for each section of road used, according to the nature of the road, the vehicle and the level of congestion. Rates being considered in the UK are NZ$ 0.06–2.40 /km. This system will probably be available within a decade.

  A charging method to *avoid* is registration charges, which are a barrier to ownership but not to use.

- *Will increasing the cost of road transport damage the economy?*

  Probably the reverse. Removing a subsidy, whether direct or hidden, increases costs for those subsidised, and charging trucks more for road use will increase the cost of nearly everything. But the increase is usually only small. Most of the increased taxation will go somewhere useful, and will allow lower taxation or improved services elsewhere in the economy.

  More important will be the consumer response to higher costs. If road transport becomes more expensive we will see more freight going by sea or rail; more low-energy warehousing replacing high-energy just-in-time deliveries; more local manufacture and warehousing, with more of it located near rail sidings; and so on.

  The same kind of argument applies to walking, cycling or using public transport. Increasing the costs of driving encourages these modes, and they respond well to greater safety and faster journeys.

- *How can we reduce the $bn 1.0 a year that road congestion is costing Auckland?*

  First, treat the figure very cautiously— nobody knows (or will admit) where it came from. If it is not a guess, it must be based on comparing present conditions with some congestion-free ideal where cars can achieve peak-hour, door-to-door average speeds of — what? 50 km/h? 100 km/h?

  Second, there is no way that we can significantly reduce the figure by spending any conceivable sum on roads (where has it been achieved for any length of time?)

  Third, if the figure is correct and drivers will benefit from road building, why should they not pay for it?

- *What is a fair split between car and truck costs?*

  Despite industry protests, the current rates are about right: 45% trucks, 55% cars. The answer depends on the method you choose (hence the fuss). The fairest is to work out theoretical costs for all-trucks and all-cars, on separate roading systems, and apply the calculated cost ratio to the real world.

- *What is wrong with taxing road use?*

  Very little. Taxing anything tends to discourage its use, so taxing things that have high external costs, such as driving, is much more sensible than taxing things like income.

- *Where does Peak Oil fit in to this?*

  Given NZ's very high transport energy use, that is the most important and least asked question of all.

  We could 'solve' Auckland's problems by letting contracts for a huge road building programme based on public-private partnerships, and then have to pay the private builders full contact prices for little-used roads, years after commuting by car had become unaffordable. And all while seeing house prices crash in areas unwittingly designed to prevent good public transport.

Miniwhats

Britain facing an energy shortfall

Britain will become overwhelmingly dependent upon energy pipelined from politically unstable countries in less than 20 years, a new report has warned. The *State of the Nation 2003* report, published by the Institution of Civil Engineers (ICE), reveals a potential 80% shortfall in meeting the country's energy demands from current supplies by 2020. Such reliance on unsecured, imported fuel supplies could have potentially 'cataclysmic' effects, the report claims. The electricity generation mix in the UK is at present about 32% coal, 23% nuclear, 38% gas, 4% oil and 3% others.

Emission constraints mean the UK's coal-powered generating plants will close shortly after 2016, while just one nuclear power station will remain operational beyond 2020. Under current government planning, the outstanding balance will have to be replaced by gas-fired power stations, importing 90% of their fuel, no later than 2020. The ICE report claims that Britain's energy plans lack both diversity and security of supply, and calls on the government to develop a sustainable solution that incorporates all types of generation, including renewable sources such as wind and wave power, and cleaner coal and gas-fired power stations. Tom Foulkes, the director general of ICE, said, "If future gas supplies were interrupted, this country would have major difficulty in keeping the lights on. Britain is a long way from the major new gas fields being developed in central Asia and Africa. Can the security of the UK's gas supply be guaranteed, given that it will have to travel thousands of miles in a series of pipelines that are vulnerable to mechanical failure, sabotage and terrorist attack?"

The Scotsman, 27/6/2003

UN rejects CDM measures

A United Nations climate change body has held its first review of projects under the Clean Development Mechanism aimed at reducing greenhouse gas emissions around the globe — and failed to approve a single one. "Don't expect miracles," Hans Jurgen Stehr, chairman of the executive board of the, said, "in many ways these are pioneers. Many had valuable ideas." Twelve projects were presented to the UN body.

"We have to answer the question: why would this not have happened anyway," said Christine Zumkeller, co-ordinator of the UN's co-operative mechanisms programme. A country with many fast- flowing rivers could, for example, argue it is helping the planet by building hydro-electric plants instead of burning fossil fuels, but regulators say that may not be a legitimate argument if the fossil fuel plant was not a viable alternative in the first place.

Reuters, 9/7/2003

Call for faster low sulphur fuel phase in

The motor industry wants a review of regulations concerning sulphur levels in fuels accelerated. Otherwise, it says, New Zealand diesel and petrol will continue to be too dirty for the latest cleaner and more economical engines.

From next August, sulphur in diesel will be limited to 500 ppm (parts per million), dropping to 50 ppm in January 2006. Regular petrol will drop from 350 to 150 ppm, while premium will stay at 150 ppm.

But the Motor Industry Association's executive director, Perry Kerr, says that is far too late, and both fuels should be 10 ppm by January 2006, in line with Euro regulations in force from October 2005.

NewsRoom, 11/8/2003

(A major project redefinition like this, with contracts let and materials already on order, is unlikely to be helpful. Project scheduling would be severely disrupted, costs would escalate heavily, and all so that our air could be a little cleaner: At present the maximum sulphur content for diesel is 3000 ppm [usually lower in practice], so the proposed change would reduce the maximum permitted sulphur content by 2990 ppm instead of 2950 ppm. More to the point, it might help to sell a few more cars. —EW)

Eastland Network to get an exemption for generation

The Commerce Commission has exempted Eastland from the application of the cross involvement rules of the Electricity Industry Reform Act 1998 (EIR Act). The Act currently limits the cross-involvement between electricity lines businesses and electricity supply businesses to a maximum of 5 MW of generation.

Eastland had applied to the Commission for an exemption for diesel generator sets with a combined capacity of 6.5 MW, which Eastland will use for security and outage management, and also for the 4.88 MW Waihi Hydro Power Scheme, which Eastland presently has for sale.

The Commission accepted Eastland's argument that the use of the diesel generator sets in a peaking role would enable Eastland to avoid more costly transmission and distribution asset upgrades, thereby satisfying the broad purpose of the EIR Act, which is to better ensure that the benefits of efficient electricity pricing flow through to consumers.

Eastland Network is an electricity lines business

which owns networks in the Wairoa and Gisborne regions. A copy of the decision is available on the Commission's website: http://www.comcom.govt.nz/adjudication/index.cfm

Commerce Commission, 24/7/2003

Project Aqua

Meridian Energy are trumpeting Project Aqua, their proposal to canalise part of the flow in the lower Waitaki River. A press release on 21 July would take whole a page of EnergyWatch if printed in full, but would need to be a paid advertisement. The opening gambit sets the tone:

Huge benefits are in store for the Canterbury and North Otago regions, as well as New Zealand as a whole, if Project Aqua proceeds.

"New Zealand has benefited enormously from hydro development in the past and we are carrying on that tradition but we are doing it with great innovation and great flair," says Meridian Energy Chief Executive Dr Keith Turner.

And so it goes. The project will create 2600 local jobs (3100 nationally); help local business, both during and after the construction period; improve supply reliability, both locally and throughout the South Island; provide irrigation; reduce CO_2 emissions; reduce wholesale electricity prices by 5–10% (some heroic assumptions here); enhance community recreation (there are to be storage ponds/lakes); bring environmental benefits (mitigation of effects); and, "maintain New Zealand's international reputation for having a secure and reliable electricity supply." They even have a dismissive crack at 'Brand X,' the proposed Wairau hydro-irrigation scheme.

And as we reported in our July edition, all the construction plant is to run on biodiesel.

They must be very worried about something...

Projects to reduce emissions

Briefings on the Government's first *Projects to Reduce Emissions* tender round are to be held in the second week of September 2003.

The Government is offering tendered incentives for new projects that will reduce greenhouse gas emissions over the first commitment period of the Kyoto Protocol (2008–2012). The objective is to reduce New Zealand's greenhouse gas emissions by supporting projects that:

- Provide emission reductions in the Kyoto Protocol first commitment period (2008–2012) beyond the reductions that would have occurred without the project
- Are not viable without the tender incentive.

Individual firms, groups of firms, other organisations or individuals can submit proposals for projects.

Projects that provide additional emission reductions will be rewarded with emission units. These 'carbon credit' units are expected to be internationally tradable when the Kyoto Protocol comes into force. A pool of four million units is being made available for the first tender round. The types of projects likely to qualify include:

- Those using renewable energy sources such as wind or bio-energy.
- Emission reductions associated with the waste sector.
- Switching fuels to reduce carbon emissions.

If the available units are oversubscribed, priority will be given in this first tender round to processing larger projects that would contribute to electricity security.

The tender will be overseen by a Projects to Reduce Emissions team set up by the NZ Climate Change Office. Future tender rounds are expected to be held annually.

NZ Climate Change Office, 14/8/2003

Bush loosens controls on emissions

The Bush administration has decided to allow thousands of the nation's dirtiest coal-fired power plants and refineries to upgrade their facilities without having to install costly anti-pollution equipment. The measure will take effect later this fall. The decision marks an important and cost-saving victory for the utility industry, which has vigourously lobbied the administration to relax the existing Clean Air Act enforcement program.

Senator John Kerry, a presidential candidate, charged that President Bush was giving major polluters a "get out of jail free" card, and that the new rule "literally pulled the rug out from under every governor's efforts to curb air pollution."

Washington Post, 28/8/2003

Commerce Commission gives Pohokura go-ahead

The Commerce Commission has authorised OMV New Zealand, Shell Exploration and Todd Petroleum Mining to work together to jointly market and sell gas produced from the Pohokura gasfield. Authorisation is on the grounds that a joint venture approach will make the gas available more quickly, and is subject to the following conditions:

- The parties can market and sell gas jointly after 30 June 2006 only if the Pohokura field is fully operational by that date
- If the Applicants want to sell their interests in the Pohokura field, the sale must be conditional on any purchaser(s) obtaining a clearance or an authorisation from the Commission; and
- The Applicants do not prevent purchasers from onward reselling of gas to third parties.

Commerce Commission, 1/9/2003

Offshore wind farms in the UK

The UK government has announced plans to start a £bn 6.0 (€bn 8.4, NZ$bn 16.4) wind power revolution that could create 20 000 jobs and power one in six households by 2010. The Trade and Industry Secretary, Patricia Hewitt, announced a second round of offshore wind licensing, which she says puts the Government on track to generate 10% of electricity from greenhouse gas-free means by the end of the decade. The new licences will encourage developments in East Anglia, the Thames estuary and the northwest of the country. Crown Estates, which has responsibility for the licensing, hopes to attract 6000 MW of offshore capacity.

The British Wind Energy Association (BWEA) welcomed the government push. "We are sixth in the world behind countries such as Germany, Spain and Denmark, yet we are the windiest country in Europe. We have the best offshore expertise and workforce, and all of this can be used to make Britain the leader in this new industry world-wide," said Alison Hill, a BWEA spokeswoman. But the organisation also warned that the Government needed to resolve difficulties connecting remote wind schemes with the national grid, a financing premium on renewable schemes due to political uncertainty, and opposition from the Ministry of Defence to some turbine plans. The BWEA wants Ms Hewitt to confirm aspirations expressed in the recent White Paper that the UK obtains 20% of electricity from renewables by 2020.

Defence and maritime interests have expressed concern at the proposed developments, and the Maritime and Coastguard Agency has drawn up guidelines to ensure that offshore wind farms do not damage navigational safety. Proposals include:

- A clear consent regime.
- A traffic survey of the area.
- A safety risk assessment, tailored to the area concerned
- Account taken of foreseeable interference with shipboard systems.
- Appropriate design for rescue of maintenance staff.

Guardian Weekly, 30/3/2003
Lloyds List, 17/7/2003

Sustainable transport?

In mid-July a truckload of bikes in Hastings was crushed into a mangled mess. The bikes were unclaimed, lost or stolen property handed to Hawkes Bay police. Some were expensive and most in good condition, but all were destroyed because they did not have maintenance and safety manuals — and the law forbids their sale without them.

Until recently, police auctioned unclaimed bikes, but the Commerce Commission told them to stop. It said the law forbade the selling of bikes without a manual, no matter how new they were, or whatever their condition.

Ministry of Consumers Affairs acting manager of trading standards service John Barker said, "We are working on it as a matter of urgency".

An exemption is now proposed. eCAN 77

Nuclear option fizzles out

Sellafield's Thorp reprocessing operation is to close by 2010. The £bn 1.8 works (€bn 1.4) , which opened only nine years ago, is to be wound down by British Nuclear Fuels Ltd, which hopes to convert it to waste handling. Brian Watson, director of the Sellafield site, said BNFL was changing from production into a nuclear waste disposal company. The days of reprocessing spent fuel to produce plutonium and uranium for potential re-use are numbered. "There is £bn 30 (€bn 21) worth of clean-up work here. We hope that will be seen in a more positive light," he said. Reprocessing was Sellafield's nuclear dream. The plant has 75 t of plutonium and 3336 t of uranium recovered from reprocessing, all stored and closely guarded but with no obvious use.

Watson admitted: "It would greatly help our situation if we had some decisions from the Government about what to do with all this." Watson said BNFL had made some bad mistakes, the most recent the fuel quality falsification scandal of 1999, but there had been changes. BNFL is being changed from the owner of Sellafield into a management company since it became technically bankrupt two years ago with liabilities now estimated at £bn 41 (€bn 29).

Thorp was supposed to reprocess 7000 t of spent fuel in 10 years, but it is years late on its target and is being run at about 50% of capacity. This is because the dangerous liquid waste produced by reprocessing cannot be disposed of fast enough to

satisfy the government's safety regulators. The plant is expected to close in 2010.

Guardian Weekly, 20/8/2003

Cellphone dangers

No, not crashing your car or frying your brains; this time its frying your car, and possibly your children too. There have been incidents where a cellphone caused a fire during car refuelling. In one case the phone was placed on the car's boot lid; it rang and ignited petrol fumes, and the ensuing fire destroyed the car and the pump.

Mobile phones can ignite fuel or fumes. Mobile phones that light up when switched on or when they ring release enough energy to provide a spark for ignition. Mobile phones should not be used in filling stations or when fuelling lawn mowers etc, or around other materials that generate flammable fumes or dust, such as solvents and dust.

Suggested rules for safe refuelling a car are:

- Turn off the engine.
- Don't smoke.
- Don't use a cell phone — leave it inside the vehicle or turn it off.
- Don't re-enter the vehicle during fuelling.

The last point is because of a different problem — static. The trouble comes when touching or removing the nozzle after entering the car during filling. Helio International, 12/4/2003

Who are the hoons (and energy profligates)?

The average speed on motorways has been increasing for years. A study provides at least a partial explanation for this development. It establishes, in a micro-economic model, that higher income can lead to a higher choice of speed. With increasing income, the value of time increases and the costs of driving faster decreases in importance, for both operating costs and potential fines.

Given a choice, car drivers generally want to drive as fast as possible, other things being equal. But they are constrained by accident risk, fuel costs increasing with speed above a certain level and the risk of receiving a fine. As income grows, fuel costs and fines are less constraining.

There is the further relationship that driving faster can induce discomfort through noise and vibrations. The consumer can compensate by buying a high quality car, which is more comfortable at higher speeds. As income grows, consumers can afford better quality cars. The relationship between income and the quality of the car is very clear and documented.

Thus, it is expected that average speed will increase with average income and decrease if the probability or the size of a fine increases. Increasing incomes have increased the perceived value of time and decreased the effect of fines, which in turn has lead to increased speeds. This trend must then be expected to continue, unless enforcement is strengthened.

These are the findings of study by Mogens Fosgerau (mf@dtf.dk) for Danmarks Transport Forskning. The issue of speeds on Danish roads has come into focus with the recent political decision to increase the general speed limit on motorways from 110 km/h to 130 km/h. There has been a prolonged public debate concerning whether speeds will actually increase after such a change and on the likely effect of increased enforcement.

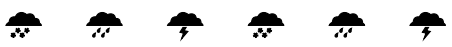
According to the theoretical model, the effect of income on speed occurs because the value of time increases with income whereas the fine does not. It is clearly possible to neutralise the effect of income on speed by letting the size of the fine increase with income as well. OutReachLinks, 5/7/2003

100 MW co-generation plant to be investigated

A co-generation plant with up to 100 MW capacity will be investigated by Genesis Power and Norske Skog for the Kawerau mill.

The plant concept utilises an open cycle gas turbine coupled to a steam turbine, and a multi fuel boiler that will burn biomass and gas to supply steam and electricity to the site. Engineering consultants Sinclair Knight Merz have been selected to carry out the feasibility study, which could take up to four months to complete.

The benefits of the proposed co-generation plant for large industrial customers include a stable electricity price going forward and a source of reliable heat and steam for processing. The plant would alleviate transmission constraints in the central North Island and reduce greenhouse gas emissions. Genesis Power, 17/7/2003



Conference
Conference
Conference

Achieving Targets for Sustainable Energy in New Zealand

Saturday & Sunday 15–16 November at Unitec, Auckland

The programme is still being firmed up but it is not too early to make a diary note. Flyers will be mailed out soon, or see the web site:

www.sef.org.nz

The outline programme is:

Saturday 15 November

9.00–10.00 Registration

10.00–10.30 Opening and introductory address by John Blakeley, SEF Convenor

Setting the scene — What we want to achieve at this conference

10.30-12.30 **Session 1 — Climate Change**

12.30–13.30 Lunch

13.30–17.30 **Session 2 — Renewable Energy**

18.30–21.00 SEF Dinner

Sunday 16 November

9.00 - 12.30 **Session 3 — Energy Efficiency and Conservation**

12.30–13.30 Lunch and **SEF AGM**

13.30–15.30 **Session 4 — Project by the Parliamentary Commissioner for the Environment, and Closure**

The general format of the sessions will be a keynote speaker, followed by discussion and supplementary papers.

The committee are also hoping to hold a function on the Friday evening, as a lead-in from two other conferences in Auckland, both ending on the Friday: RENZ and a Geothermal conference.

International climate change symbol

A new international climate change symbol has been developed for use by NGOs and individuals. It is not available for commercial use. EnergyWatch is registered to use it, but with no decision on regular use taken yet. Its creators say:

Climate change has become an increasingly important problem across the world. Organisations communicate about the issue from different perspectives: impacts, causes and solutions. These fragmented messages can make climate change look like a problem that cannot be tackled. Solutions like energy efficient appliances or green electricity are often not linked to the same underlying problem.

When reproduced in colour the earth is blue and green, the 'wax' is white and the flame yellow.

See
http://www.wnf.nl/klimaat/CC/index.htm

Forum Membership

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

Unwaged/student	$ 22.50
Individual or library	$ 45.00
Corporate	$ 250.00
Overseas	$ 55.00

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