



# EnergyWatch

The Journal of the Sustainable Energy Forum Inc

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

Issue 56, June 2010

Published by:- The Sustainable Energy Forum Incorporated, PO Box 11-152, Wellington 6142

Email:- [info@sef.org.nz](mailto:info@sef.org.nz) Web"- [www.sef.org.nz](http://www.sef.org.nz); and [www.energywatch.org.nz](http://www.energywatch.org.nz)

The Sustainable Energy Forum Inc. was registered as a charitable entity under the Charities Act 2005 on 30<sup>th</sup> June 2008. Its registration number is CC36438.

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ISSN 1173-5449 (print) ISSN 1179-4054 (online)

## EDITORIAL

### Uncertain Future of Electric Vehicles

In this my final issue as Editor of EnergyWatch, I have written feature articles on battery-electric vehicles, "plug-in" hybrids and petrol-electric hybrids.

By the end of 2010, General Motors will have the Chevrolet Volt "plug in" hybrid car in full production in the USA. Also, Nissan will have their Leaf electric vehicle being produced in Japan, with production to begin in several other countries within the next two years. A factory in Tennessee is being re-tooled to produce up to 150,000 Leaf all-electric cars per year for the US market, starting in 2012.

These two companies are investing billions of dollars in those projects and are taking a massive gamble that their product will sell in large numbers.

Nissan has been predicting that all-electric cars will represent 10% of global car sales by 2020, but other automobile manufacturers and consultants foresee a much smaller global market share for electric vehicles.

Their reservations are based on concerns about battery cost and longevity, inconvenience of limited range and relatively lengthy charging times, meaning that electric vehicles are likely to remain a niche product for the foreseeable future.

In particular, Honda as Japan's number two car maker remains sceptical about the demand for all-electric cars and questions whether consumers will accept the inconveniences of limited driving range and having to spend time charging the batteries of these cars.

Nissan's five-seater Leaf hatchback will make its European debut in Portugal and the Netherlands in December 2010 followed by the UK and Ireland two months later. It has a range of 160 km on a fully charged battery. Running the air conditioner or accelerating for long periods of time will reduce the range.

In the US, one of the "drivers" for production of electric cars is a requirement by the Air Resources Board in the State of California that for model years 2012 to 2014, the largest car makers by volume in California must sell when combined, about 60,000 plug-in hybrid vehicles and all-electric cars.



But Nissan and other manufacturers are also relying on recently-introduced government incentives to price their cars in the US and Japan to compete in these markets with existing petrol-electric hybrid cars from Toyota and Honda.

Nissan says that it expects that governments will not provide sales subsidies indefinitely and may begin a phase-out when current commitments to incentives expire in about three year's time.

Some analysts say that the introduction and then phasing out over the past 18 months of "cash for clunkers" payments (encouraging purchasers of new cars to scrap their old car for a cash payment) has shown how unpredictable incentives can be.

In the case of the Leaf, Nissan is relying on cash sales incentives to price their mid-sized electric car below NZ\$54K in most European markets and compete with the petrol-electric hybrids from Toyota and Honda.

Portugal, the Netherlands, UK and Ireland have been chosen as launch venues for the Leaf, in part because of government incentives (typically worth NZ\$9K per car). These countries were also picked because of plans to offer a re-charging infrastructure for electric cars.

And while all-electric cars are now close to being produced in large numbers, hydrogen fuel cell-powered vehicles remain very much in the experimental stage, and government funding for hydrogen research in many countries has dropped dramatically, as such research funding has been switched to battery-electric vehicles.

However the price of producing hydrogen fuel cells is now reported to have dropped dramatically during the last 18 months. So it is too early to say whether or not hydrogen-powered vehicles will yet make a comeback as being "the car of the future," rather than battery-electric vehicles.

*Reference: NZ Herald, 22/5/10*

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## **Impetus for Climate Agreement Foundering?**

In the lead up to the Copenhagen climate change conference in December 2009, considerable pressure was exerted on heads of government to attend, at least for the last few days of the conference when an agreement was expected to be reached.

The theory seemed to be that if the conference became “too big to fail”, then in order to save face, all those world leaders would have to reach an agreement by the end of the conference.

In the event, this was not the case. Many world leaders were persuaded to attend Copenhagen, but by the end of the first week it was clearly evident that the negotiating officials had reached an impasse, meaning that by the time the heads of government arrived, there was nothing to agree about.

Instead, five countries managed to reach a “side agreement” – the USA, China, India, Brazil and South Africa – which got the eventual backing of the European Union and, reluctantly, eventually the majority of the developed and developing countries present. This is now known as the Copenhagen Accord.

This is a political agreement with no legally binding obligations. It is likely to remain so unless it can be turned into a binding agreement within about the next year. Without this happening, when the Kyoto Protocol expires in December 2012, there will be nothing similar to replace it.

Then in January and February 2010 several statements in the 2007 IPCC Fourth Assessment Report came under question. In particular, the linking of global warming to a rise in the cost of natural disasters now appears to be a claim which cannot be justified by the evidence presented. (At Copenhagen, this was a central part of a compensation claim by African countries).

It has been noticeable since January 2010 that when severe climatic events around the world are being reported on by journalists, they no longer automatically make a link between that particular disaster and climate change/global warming.

In an interview on TV1’s Q + A programme in April 2010, the Minister for Climate Change Negotiations, Tim Groser, was asked if the momentum towards a new binding international climate change agreement had now been lost. He replied that much work was still going on behind the scenes by officials on technical issues that were not resolved at Copenhagen, with the object of reaching agreement on these issues at the next international climate change conference to be held in Mexico in December 2010.

However without more political will being displayed, it seems unlikely that a binding agreement can be reached at the conference in Mexico.

In late April 2010 the Australian Prime Minister, Kevin Rudd confirmed that his government has decided to defer its proposed emissions trading scheme for Australia until at least 2013. This will defer action until after the rest of the world decides what to do after the Kyoto Protocol expires in 2012.

The emissions trading scheme adopted into law in New Zealand last year is due to impose additional charges on motor fuel and electricity as from 1 July 2010 and the Government has had to resist a lot of pressure to delay introducing these additional charges because of the Australian decision to delay the introduction of its ETS by three years.

It really does appear at present that around the world, the momentum to reach a new legally binding international climate change agreement is being lost.

## And That's It From Me

When I took over the editorship of EnergyWatch from Kerry Wood in June 2005, I always envisaged that it would be a relatively short-term arrangement until I became too busy doing other things to continue.

Five years and twenty issues (EW 37 to EW 56) have sped by since then and it is now time for me to “hand over the reins” to the incoming Editor, Steve Goldthorpe, with my best wishes for the continuing success of the publication.

**John Blakeley**

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## SEF FEEDBACK

### From the Convenor



I have been asked by John Blakeley to write something about my interests in sustainable energy, and my reasons for being involved in the Sustainable Energy Forum.

I have always been interested in the environment with my first love New Zealand's natural environment. I first studied zoology and then forestry with a view to be part of the movement to promote more sustainable forestry practices in New Zealand. Unfortunately the dissolution of the NZ Forest Service greatly reduced the opportunities to be involved in this type of forestry, so I went on to undertake a Masters degree in Resource Management at the Centre for Resource Management. At the Centre I was made aware of the central role of that energy plays in society and the concept of sustainability.

Over the next 18 years I worked in the public sector primarily in the area of resource, EnergyWatch 56

energy, and transport policy. Before I returned to study I was lucky enough to work for the former Parliamentary Commissioner for the Environment, Morgan Williams, leading his work on energy and transport.

I am particularly interested in the adaptation of modern society to a future where energy will be costly and possibly, in some cases, physically scarce. My interests focus is on energy efficiency and transitioning to renewable energy. This is one reason why my PhD research is focused on the potential of electric vehicles in New Zealand.

In my role as convenor, I see the Sustainable Energy Forum playing an important role ensuring that the issues around sustainable energy are kept in the public profile, during what I consider will be a difficult political environment.

However, if we can maintain our enthusiasm as an organisation we will be ready to make real progress when it becomes apparent to the public that sustainable energy is not something in the ‘nice to have’ category, but will be essential in maintaining and enhancing New Zealanders’ quality of life.

**Doug Clover**  
**PhD Candidate**  
**Environmental Studies**  
**School of Geography, Environment and**  
**Earth Sciences**  
**Victoria University of Wellington**

## Letter to the Editor

Steve Goldthorpe recently gave a very interesting speech in Warkworth. He mentioned, as an aside, that there is little real competition in the electricity sector.

Perhaps the following may interest our members.

Best regards

K.H. Peter Kammler

### Electricity Reform, Mark IV

Again, our politicians are trying to introduce competition into the electricity system by tinkering at the edges. In doing so, they show a surprising lack of understanding about the market forces involved, epitomised in then Energy Minister John Luxton's statement that "Electricity is no different from baked beans". Oh really? Contrary to a can of baked beans, electricity cannot be stored in a meaningful quantity. It also cannot readily be replaced with other products.

Economics 101 tells us that companies, such as supermarkets and car producers, compete until death – or takeover. This happens because marginal cost is lower than average cost. Said differently, turnover rises faster than cost. For example: Every car that Toyota sells is cheaper to produce than the car before because the fixed cost, such as design, tooling and marketing, are spread over a larger base. Thus, additional cars can be sold with a higher profit margin, or at a cheaper price. This rule applies to about 95% of all economic activity.

Unfortunately, our politicians are unaware of the other 5% of market transactions, which, by their very nature, are non-competitive. The market then turns into a house of mirrors: nothing is what it seems to be.

It has to do with a market law called "diminishing returns from finite resources". Translated into everyday language, it means that the most accessible resource is exploited

first, and then the second best, and so on, down the merit order. As a result, expanding production causes prices to rise – not fall.

Crude oil is a prime example: In the Middle East, oil comes out of the ground at US\$4 a barrel because the conditions are so favourable. In Alaska, and from the Canadian tar sands, the oil costs about US\$40, with offshore platforms somewhere in between. The low-cost producers then apply what is called "shadow-pricing". They hike their price to just under the level of the most expensive producer, reaping gazillions of dollars as windfall profit.

The New Zealand electricity system displays a similar characteristic. The first hydro dam was built where the least amount of concrete could dam the most water, and so down the merit order at rising cost.

Regardless of how much the generation system is atomised, or privatised, it is not a readily competing industry. This is because electricity from new, high-cost, stations makes average costs *rise* - not fall. In other words, as long as a generator can supply the market only at prices *higher* than its previous average, competition will remain elusive.

The setup of the electricity wholesale market reinforces this cosy – and costly - arrangement. It was created in 1994 not by the government of the day but by the industry itself, overnight, to suit its own designs. No prize for guessing that the design is to make lots of money. In this so-called wholesale market, all electricity is sold at the highest prevailing price – no matter how cheaply it was produced. This leads to a perverse incentive to accept – if not create - shortages because they drive up the price of existing hydro power but not the cost of producing it.

Another law of economics says that the cost and the benefit of an action – or inaction – must fall to the same entity. Not so here. The benefit of running an overly tight system accrues to the generators because their assets

are better utilized. The cost of not having electricity in a dry year is borne by the consumer. (The proposed \$10 compensation per week is a joke). As it is, nobody wants to build a backup power station that probably runs only once every three years. To make things work, the generators should have to compensate the true losses to consumers, in particular business consumers. That would surely prompt them to build sufficient reserve power stations.

In summary: Electricity generation in New Zealand is not a competing industry. It is no bigger than that of a medium sized city utility overseas, so it makes no sense to run four separate companies, plus an oversight body, just to make it *appear* like competition. Security of supply must be built into the system by attaching a price to it. The wholesale market needs to be totally redesigned to serve the country, not the electricity industry. Fat chance!

**K. H. Peter Kammler**  
**Power for Our Future**  
**RD5, Warkworth 0985**

## **Electric Vehicles Seminar Papers**

The papers presented at the SEF Seminar on Electric Vehicles held on Friday 6 November 2009 are available for perusal on the SEF website at [www.sef.org.nz](http://www.sef.org.nz)

These papers are -

1. Recent developments in electric vehicle technology, by Doug Clover.
2. Greenhouse consequences of electric vehicles in New Zealand, by Steve Goldthorpe.
3. Use of electricity for transport: An overview, by Tim Jones.
4. Understanding electric vehicles in New Zealand, by Hayden Scott-Dye.

## **Signs of Change National Conference**

Date: Monday 15<sup>th</sup> November and Tuesday 16<sup>th</sup> November 2010.

Location: The Whole Country!

The first decade of the 21<sup>st</sup> century has confirmed the warnings of the previous fifty years – the historical described path is not sustainable.

The organisers of the conference are seeking Change Reports and the committee invites 250 word abstracts that describe a “Sign of Change” whenever it can be found. The Change Report to be presented to the Conference will be selected to showcase a wide range of signs of change. The outcome of the Conference will be a book to be published by Engineers for Social Responsibility (ESR) and edited by Dr Susan Krumdieck.

The meeting nucleus will be Christchurch. The presentations will be given in Christchurch with live video feed to local conference hubs in Dunedin, Wellington, Auckland, Palmerston North and Hamilton. There will be seven 20 minute invited keynote addresses at the opening of each session reviewing the state of change for the meeting topics:

Energy, Supply and Demand  
Transport  
Environment and Ecosystems  
Society  
Business and Economy  
Governance and Law  
Agriculture, Forestry and Primary Production

For further information please go to [www.aemslab.org.nz](http://www.aemslab.org.nz)

# CLIMATE CHANGE / GLOBAL WARMING

## Emissions Trading About to Cause Price Rises

On 1 July 2010, the NZ Emissions Trading Scheme (ETS) is scheduled to come into effect for the energy sector; impacting on electricity prices and petrol and diesel prices.

The ETS covers forestry, stationary energy, industrial processes, liquid fossil fuels and, unlike most other domestic trading schemes, agriculture.

The domestic forestry sector has been participating in the scheme since January 2008, and has been eligible for offset credit generation and compliance liabilities over this period.

All other sectors, with the exception of the agriculture sector, will now begin their first official compliance period as of 1 July 2010 with obligations against 50% of their emissions, increasing to 100% of their emissions from 1 January 2013. The agriculture industry will be included in the ETS from January 2015.

From 1 July 2010, carbon credits will initially be limited in price to NZ\$25 per tonne of carbon dioxide equivalent. Sellers of products which produce carbon dioxide emissions may either purchase credits from the government, or from secondary markets, or invest in approved domestic or international projects to generate offset credits.

*Reference: Westpac Bank Business Update, May 2010*

The initial increases in price due to the present ETS were earlier expected to be 5% for retail electricity and 4 cents per litre on the cost of petrol and diesel.

More recently (late May 2010) it was stated that petrol prices are expected to rise by 3 cents per litre from 1 July and electricity by 5%. The Prime Minister, John Key said on the TVNZ "Breakfast" programme that households are now expected to be paying a "modest" additional \$3 per week.

Mr Key said that over the next five years, the Government would pay about \$1.6 billion to foresters to plant trees. Of this, it would get \$900 million from taxpayers and \$600 million from other ETS revenue gathering.

Mercury Energy and Contact Energy will raise their prices by 3.3% and 3.2% respectively from 1 July when the ETS introduces a price on greenhouse gas emissions. Their gas prices will rise by 2.4% and 2.2% respectively on the same day. The other big electricity retailers, Genesis Energy and Meridian Energy are adopting a "wait and see" approach.

Of the five main electricity companies, Genesis stands to lose the most because it operates the coal and gas-fired Huntly power station, which accounts for 5% of NZ's greenhouse gas emissions. Trustpower and Meridian generate their electricity from renewable sources, including wind and hydro.

A Meridian spokesperson said that the ETS would impose a cost but it was very difficult to predict how much it would be and the company would not be making a one-off price rise because of it. A Genesis spokesperson said that the Compliance date for paying for the excess carbon dioxide emissions was not until April 2011. He said "We've got time to assess the impact on the business". A Mercury representative (Mighty River Power) said that its price was based on the company's "best estimate" of what the ETS would cost it.

ACT MP, John Boscawen said that the state-owned electricity companies will make

millions of dollars in windfall profits from the ETS. The state-owned generator retailers – Meridian, Mighty River Power and Genesis are expected to benefit from the ETS-related wholesale and retail price increases, particularly when they sell power generated from renewable sources which will not incur a carbon charge.

Mr Boscawen said the Climate Science Coalition – a coalition which doubts that man-made climate change is a threat – estimates that the additional profits may be as much as \$400 million per year, but Mr Boscawen believed that \$150 million per year was a more realistic figure.

But Environment Minister, Dr Nick Smith, said that the figures quoted by Mr Boscawen were “typical of the ACT party’s approach to the ETS – wildly exaggerated”. Dr Smith said that there was a range of views as to the opportunities for renewable electricity generators to take advantage of high marginal wholesale electricity prices set by coal and gas-fired power stations, but the most recent estimate was for gains of \$30 million per year across all renewable generators.

Prime Minister, John Key, said that Mercury Energy’s 3.3% price rise, which takes effect on 1 July, was an operational matter for the company. But the increase announced was less than what the government had expected would result from the ETS.

Mr Key said that the important point was that there would be some rise in the cost of electricity and motor fuel, but NZ had to play its part when it comes to caring for the environment.

*Reference: NZ Herald, 25, 26 and 27/5/10*

## **Copenhagen Agreement is Not Effective**

The 192-country climate change conference held in Copenhagen in December reached a standoff between the relatively wealthy

developed nations, and the poor and developing nations of the Third World. The latter believe that the developed countries are still doing far too little to combat the likely future global effects of climate change, which are likely to impact most severely on the poorest countries of the world.

At Copenhagen, a last-minute agreement was struck between five large countries - the USA, China, India, Brazil and South Africa - which got the eventual backing of the EU and, ultimately, the majority of developed and developing countries at the conference and is now known as the Copenhagen Accord.

Although they believed that the targets for greenhouse gas emissions cuts being suggested were far too small, the developing countries reluctantly joined the agreement only because of the proposed establishment of a very large fund, to be provided annually by developed countries, amounting to US\$30 billion for the period 2010 to 2012. Also, a goal would be set for the developed countries to jointly mobilise a sum of US\$100 billion annually by 2020, to address the needs of developing countries.

In the period immediately prior to the conference it was hoped that a comprehensive political agreement could be obtained which could then be turned into a legally binding treaty during 2010. But in the agreement eventually reached, there is no definite time scale for when, or even if, it can be turned into such a legally binding treaty.

A key feature of the agreement is proposed greenhouse gas emissions cuts. Countries committing to the agreement would implement quantified economy-wide emissions targets for the year 2020 as listed in Appendix 1 of the agreement, to be provided before 1 February 2010. A wide range of likely targets have been nominated by the various countries, but the emissions cuts nominated are likely to fall well short of what is really needed to limit future increases in global temperature.

This is particularly true of the world's two major greenhouse gas emitting countries. China has given a "voluntary mitigation pledge" only to curb the rate of growth of its emissions by reducing its carbon intensity. The USA is considering reducing its emissions by between 14-17% below 2005 levels by 2020 (around 4% below 1990 levels), but this would be wholly dependent on Congressional approval.

Under business as usual and at current rates of economic growth, by the year 2030 China is expected to emit 60% more carbon dioxide than the USA, and its emissions will by then dwarf those of any other country.

There is no mention made in the Copenhagen Accord of any long term global emissions cut target. The earlier suggested figure of a 50% reduction target by the year 2050 was dropped out of the agreement at the last minute.

And with the world's two largest emitting countries, the USA and China, having nominated such modest emissions targets, other countries have less incentive to set themselves challenging targets. This will remain so unless the larger emitter nations increase their commitments in the negotiations ahead, which seems at present to be unlikely.

On 1 February the Prime Minister, John Key, announced that New Zealand will join the Copenhagen Accord with the same targets as it took to the Copenhagen conference in December, which is to cut emissions by between 10-20% from 1990 levels by the year 2020. That target is subject to a series of conditions and the Government is also seeking changes to the Kyoto Protocol rules on forestry and land use. It also wants to ensure that it can meet its obligations by importing carbon credits resulting from a reduction in emissions in other countries. Some countries want to limit this use of carbon credits, seeing it as a disincentive to taking domestic action to reduce emissions.

Also of concern is the uncertain future of the Kyoto Protocol; at present the only legally binding climate change treaty. It is due to expire at the end of 2012. There is now virtually no chance of a replacement quantified treaty being in place by that time. Without a continuation of the Kyoto Protocol in some form, the penalty provisions in the existing Kyoto agreement cannot be enforced. These provisions would apply to developed country signatories that do not meet their agreed commitment to cut their emissions by 2012.

Neither the USA or China will want to commit to emissions reductions in order to join the Kyoto agreement with a view to its possible extension. And without those two countries being included, from the viewpoint of the existing signatory countries, there is a nil chance of the present Kyoto agreement expiry date of December 2012 being extended.

Japan and Canada are two larger countries which have already indicated that they will not meet their Kyoto commitment. With the larger countries that they trade with not being committed to Kyoto, it is not altogether surprising that Japan and Canada are expressing reservations about meeting their legally binding obligations under the Kyoto agreement, which might require payments of billions of dollars.

The Copenhagen Accord is a political agreement. Unlike the Kyoto Protocol it has no legal standing and this will remain so unless it can be turned into a binding agreement within the next year or so. At the moment, that appears to be rather unlikely.

Although it may provide much-needed financial assistance to meet the needs of developing countries, it is unlikely that the Copenhagen Accord will be effective in limiting the present increases in global greenhouse gas emissions, let alone reducing them as was the original intention.

## Climate Change Findings Questioned

The Intergovernmental Panel on Climate Change (IPCC) claimed in its Fourth Assessment Report in 2007, that the world had “suffered rapidly rising costs due to extreme weather-related events since the 1970’s”; suggesting that part of the increase was due to global warming.

Linking global warming to a rise in the cost of natural disasters now appears to be an incorrect claim.

The scientific paper, based on which the claim was made, was allegedly not peer reviewed or published by the time that the 2007 IPCC report was issued.

When the paper was eventually published in 2008, it came with a caveat “We find insufficient evidence to claim a statistical relationship between global temperature increase and catastrophe losses”.

Despite that concession, the IPCC failed to clarify the statement in advance of the December 2009 climate change conference in Copenhagen, where it became a central part of a claim for compensation by African nations.

Jean-Pascal van Ypersele, vice-chairman of the IPCC has now clarified that the evidence will be reviewed “We are reassessing the evidence and will publish a report on natural disasters and extreme weather with the latest findings” he said.

*Reference: Telegraph Group Ltd as reported in NZ Herald, 26/1/10*

The United Nations’ expert panel on climate change based claims about ice disappearing from the world’s mountain tops on a student’s dissertation and an article in a mountaineering magazine.

The revelation will cause fresh embarrassment for the IPCC, which had to

issue an apology in January 2010 over inaccurate statements on global warming.

In its most recent report, the IPCC stated that observed reductions in mountain ice in the Andes, the European Alps and Africa were caused by global warming, citing two papers as the source of the information.

However, one of the sources quoted was a feature article published in a popular climbing magazine which was based on anecdotal evidence from mountaineers about the changes they are seeing on the mountainsides around them.

The other source was a dissertation written by a geography student, studying for the equivalent of a Master’s degree at the University of Berne in Switzerland that quoted interviews with mountain guides in the European Alps.

The revelations have raised fresh doubts about the quality of the information contained in the IPCC Fourth Assessment Report which was published in 2007.

Neither the dissertation nor the magazine article cited as sources for this information were ever subject to the rigorous scientific review process that research published in scientific journals must undergo.

*Reference: NZ Herald, 1/2/10*

## Canada Way Off its Kyoto Target

Canada’s greenhouse gas GHG emissions will be 29% over its Kyoto target for 2012, a recent Canadian Government report has said.

The report published on the Environment Canada website details measures which their government is taking to meet its emissions reduction obligations under the international Kyoto agreement.

When Canada ratified Kyoto, it committed to reduce GHG emissions to 6% below 1990 levels between 2008 and 2012. But a lack of

effective government action to curb emissions has resulted in a large increase in GHG emissions.

In 2008, total Canadian GHG emissions were 734 million tonnes of carbon dioxide equivalent, or 24% above the 1990 levels. (This compares with the latest NZ figure of 23% for gross emissions – but NZ can then deduct its post-1990 forest sink credits to reduce its net emissions to zero, according to the latest NZ forecasts).

Canadian federal policies to slow GHG emissions growth include vehicle emission standards for new cars and light trucks. Canada is also investing US\$1.48 billion to increase supply of renewable electricity sources such as wind, solar and geothermal energy.

Canada's federal government has delayed passing regulations to cap and reduce its GHG emissions probably until the USA passes similar legislation. It argues that Canada would be at a competitive disadvantage if it passed regulation, before its biggest trading partner (the US) has similar laws in place.

*Reference: Carbon Market North America: Point Carbon News, 4/6/10*

## **ETS Affects Electricity Prices**

In a recent article in the NZ Herald (Thursday 3 June), Bryan Fallow noted announcements by Mercury Energy and Contact Energy that they will raise their electricity prices by a little over 3% as a result of the Emissions Trading Scheme (ETS), which will begin to cover the electricity sector from 1 July 2010, along with transport and industrial processes.

The introduction, after years of debate, of a price on carbon dioxide emissions will increase the cost of fuel for gas-fired and even more for coal-fired electricity generation.

Calculating the impact of carbon pricing on wholesale, and eventually retail, power prices will be a complex task, given the structure of the industry and the complexities of its wholesale market.

But it has been done for us by the Stationary Energy and Industrial Processes Technical Advisory Group, a committee of sector representatives and officials who had to wrestle with what would be the appropriate basis for compensating large trade-exposed industrial emitters for the impact of emissions trading on their electricity costs.

The number settled on was just over half a tonne of carbon dioxide per megawatt-hour. The average household uses about 8000 kilowatt-hours per year, which means four tonnes of carbon dioxide per year.

But actually the immediate cost is only half that figure. The Government has decided that as a transitional measure, for the first 2.5 years of the scheme until 1 January 2013, that the taxpayer will pick up the bill for half of the cost. A generator will therefore only have to surrender one emissions unit for every 2 tonnes of carbon dioxide emitted over the next 2.5 years. It has also capped the price at NZ\$25 per tonne.

On that basis, the additional cost per household should average \$50 per year, which is close to the indicative figure of \$5 per month per household which Mercury Energy has announced.

Sometimes people ask why power companies whose generation assets are largely or wholly renewable should also get the benefit of the general uplift in wholesale electricity prices arising from the ETS. Their costs will not have risen.

Well that is just the way that markets work!

The foregoing discussion is about short-term marginal cost. But the electricity market not only has to make it worthwhile for a generator to fire up its existing thermal plant when

needed, but it also has to make it worthwhile to invest in new generation capacity.

That is needed both to cope with demand growth and to allow for the eventual closure of old power stations.

The carbon price is now a clear factor in estimating the long-term costs of different generation options, with capital costs and the expected price path for various fuels.

It has almost certainly put paid to any possibility of building coal-fired power plants, unless and until carbon capture and storage technology becomes viable.

However, for gas-fired base load plants, it is more likely that a lack of gas is a bigger problem than future carbon dioxide emissions prices.

In any case, apart from gas-fired plants designed for a peaking role, such as that which Contact Energy is in the process of commissioning at Stratford, all new generating capacity at present committed to or under construction is geothermal, wind or hydro.

This indicates that the prospect of carbon pricing from 1 July, which has been clearly on the cards for some years now, has already had the desired effect of influencing the future investment decisions of electricity generating companies.

*Reference: NZ Herald, 3/6/10*

## ENERGY STATISTICS

### Five Year High For Renewable Energy

In a media release dated 17 March 2010, Energy and Resources Minister, Gerry Brownlee, announced that renewable energy generation accounted for 73% of electricity generated in NZ in the 2009 calendar year.

“This was the highest level of renewable generation since 2004 and was just one of the highlights from the New Zealand Energy Quarterly – December Quarter 2009 announced today”.

“The high levels of renewable generation were primarily due to well stocked hydro-lakes, and increased geothermal and wind generation”, Mr Brownlee said.

“The increase in renewable generation, at the expense of thermal generation, resulted in 2009 recording the lowest electricity

generation-related carbon dioxide emissions since 2002, and down 27% on 2008”.

For the December Quarter, electricity emissions dropped as much as 21% over the previous quarter, in line with seasonal variations.

The New Zealand Energy Quarterly also recorded production from the Kupe oil and gas field for the first time. This field will supply natural gas directly into Vector’s transmission grid, will collect LPG for supply to the NZ market, and export oil from Port Taranaki.

The New Zealand Energy Quarterly presents quarterly statistics on the supply of major fuels, electricity generation and greenhouse gas emissions, and prices to the end of December 2009.

*Reference: [www.med.govt.nz/energy/NZeq](http://www.med.govt.nz/energy/NZeq)*

**Editor’s Note:** The percentage of increased electricity generation is quite weather-dependent and during a year with a very dry winter, can fall to 60% or less. E.g. in the statistics presented in the NZ Energy Quarterly, the quarter ending June 2008 had only 56% renewable electricity generation.

# Highlights from NZ Energy Quarterly

## Electricity Generation Percentages

During the December Quarter 2009

Hydro	59.2%
Natural Gas	18.4%
Geothermal	10.5%
Coal	5.6%
Wind	4.9%
Other	1.4%

## Breakdown of Quarterly Electricity Generation (GWh)

Renewable Generation	Sept 09	Dec 09
Hydro	6340	6187
Geothermal	1198	1094
Wind	377	511
Wood	75	84
Biogas	49	47
<b>Total Renewable</b>	<b>8039</b>	<b>7923</b>
Thermal Generation		
Gas	2280	1927
Coal	853	585
Oil	3	3
Waste Heat	16	14
<b>Total Thermal</b>	<b>3152</b>	<b>2529</b>
<b>Total Generation</b>	<b>11191</b>	<b>10452</b>
<b>Renewable %</b>	<b>72%</b>	<b>76%</b>

For the second consecutive quarter, electricity generation from wind set a record high in NZ. The completion of Meridian Energy's 143 MW West Wind project in December saw wind generation of 511 GWh (4.9% of total electricity generation) in the December Quarter 2009.

Over the 2009 calendar year, a total of 42,012 GWh of electricity was generated, with 73% of energy from renewable resources – the

highest renewable share of total electricity generation since 2004.

Total annual consumption of electricity in 2009 was the lowest since 2005. Much of this drop followed a transformer failure at the Tiwai Point aluminium smelter (near Bluff), which led to the shutdown of a pot-line during the first five months of 2009.

## Greenhouse Gas Emissions

In the December Quarter 2009, NZ's electricity generation produced 1380 kt of carbon dioxide equivalent emissions. This was 20% less than in the same quarter of 2008.

The high levels of low-emission renewable energy continued this quarter, and as a result, 2009 has recorded the lowest annual total of greenhouse gas emissions from electricity generation since 2002, and is down 23% on 2008 levels. This is primarily due to increased hydro, geothermal and wind generation, now operating in place of fossil and thermal plants.

## Crude Oil, Condensate and Oil Products

Nearly a quarter of a century after its initial discovery, the Kupe oil and gas field began production in the December Quarter. Kupe will supply natural gas directly into Vector's pipeline network, collect LPG for supply to the NZ market and export oil from Port Taranaki.

Nationally, crude oil production in the December 2009 Quarter was down slightly from the September Quarter, with 30.8 PJ being extracted, but still remains high compared with historical production levels.

A breakdown of quarterly production of oil and imports and exports for the December Quarter is as follows: -

1.	Domestic crude oil supply	
	Production	30.8 PJ
	Imports	57.5 PJ
	Exports	-25.5 PJ
2.	Oil Product supply	
	Refinery output	55.5 PJ
	Imports	22.4 PJ
	Exports	-1.7 PJ
3.	Oil Product Demand	
	Total petrol	28.8 PJ
	Diesel	27.5 PJ
	Other*	7.2 PJ

\* Including fuel oil, aviation fuel, kerosene, bitumen, lubricants and other oil products.

For the calendar year 2009, demand for both petrol and diesel was lower than for all years since 2004. The diesel demand drop of nearly 6% in 2009 would seem to largely reflect the economic conditions of the recession period.

### Gas Production

Although gas production in 2009 was at its highest level since 2003, due to continued flaring at the Maari and Tui oil fields, gas supply was similar to previous quarters.

Total production in the December Quarter of 2009 was 47.3 PJ; down only slightly on the September Quarter. Compared with the December Quarter of 2008, gas production was up 19%.

The first gas from the Kupe oil and gas field was pumped 30km ashore to the recently completed processing facility during the December Quarter 2009. Kupe is expected to provide up to 10% to 15% of the nation's natural gas demand over the next 15-20 years.

A breakdown of gas production during the December 2009 Quarter is given below. Gas supply is calculated as the difference between the total amount of gas produced and the amount of gas flared, re-injected, extracted as

LPG, and losses and own use during gas production.

Gas production	47.8 PJ
Less gas re-injected	1.6 PJ
LPG extracted	1.0 PJ
Flared	2.6 PJ
Losses and own use	1.9 PJ
Gas supply	40.7 PJ

### Coal

New Zealand's coal production plummeted in the December 2009 Quarter. Coal production at 819,000 tonnes was at its lowest level since the March Quarter of 2000. This was a 34% decrease from the September Quarter and a 13% decrease compared with the same time last year.

The reason for this low level was primarily the strike action involving 1000 Solid Energy miners. As a result, less high value coking coal was able to be produced.

The first shipment of coal from the Pike River coal mine set sail in February 2010, when 20,000 tonnes of hard coking coal was exported from the Port of Lyttelton.

The shortfall of local production was balanced by an increase in coal imports which in the December Quarter was up 36% compared with this time in 2009, the highest level since December 2006.

Quarterly coal production, exports and imports were as follows during the December 2009 Quarter –

Bituminous Coal	315 ktonnes
Sub-bituminous Coal	418 ktonnes
Lignite	88 ktonnes
Total production	819 ktonnes
Exports	406 ktonnes
Imports	244 ktonnes

*Reference: NZ Energy Quarterly: December Quarter 2009*

[www.med.govt.nz/energy/nzeq](http://www.med.govt.nz/energy/nzeq)

# FUELS

## Oil Prices Steady in 2010

Oil prices have been holding reasonably steady at around US\$75 – 85 per barrel during the first few months of 2010.

The Organisation of Petroleum Exporting Countries (OPEC) met in Vienna on Wednesday 17<sup>th</sup> March and decided to hold its oil production, and, therefore prices, steady for now. The oil cartel decided to make no changes in its production quotas and stated that the current oil price of about US\$80 per barrel was high enough to spur new exploration and production, and low enough to avoid killing the global economy’s fragile recovery.

During 2009, crude oil prices averaged US\$61.95 per barrel. So far during 2010, the

price of West Texas Intermediate-grade crude oil – a widely used industry benchmark – has averaged more than US\$77 per barrel. This is a more expensive start than in any year other than 2008, when prices began at US\$90 per barrel and the later spiked to nearly US\$150 per barrel before descending steeply again to nearly US\$30 per barrel at the end of 2008.

Citing “persistently high” petroleum levels in storage tanks of industrial nations, and an expected increase in oil output from non-OPEC countries during 2010, the OPEC ministries said that there is no need to boost production at the moment.

*Reference: The Washington Post, 18/3/10, as quoted in NZ Energy and Environment Digest 17-23 March 2010*

Figure 1, provided by SEF member Neil Mander, plots crude oil price variations over time since May 2004. This graph is also available from the Members Views section of the SEF website as a pdf file. Figure 2 is a narrower time span from the same graph for the last 12 months up to 5 June 2010. The crude oil prices are for oil from four different areas.

Brent = North Sea; Dubai = Middle East; Tapis = Singapore; West Texas Int = USA

New Zealand’s main supply is from Dubai and is usually at the cheaper end of the spread. The price of gold in US\$ per fine ounce, divided by 10, is also shown.

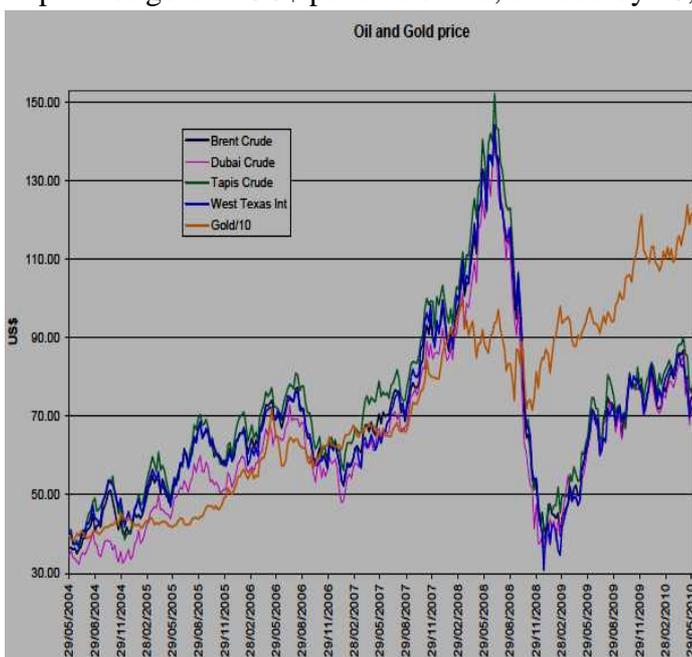


Figure 1 – Oil prices over 6 years

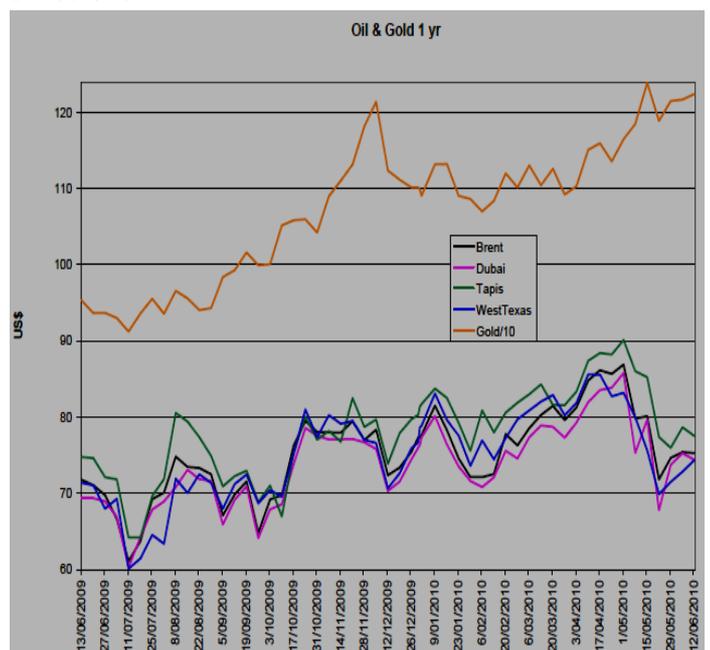


Figure 2 – Oil prices over 12 months

## Future Predictions

Bank of America and Barclays Capital have both warned clients that crude oil could be trading above US\$100 per barrel by 2011, before it pushes relentlessly higher over the next decade.

Barclays says that it thinks that the price could reach US\$137 per barrel by 2015. They say that global spare capacity is likely to be reduced to low levels within a relatively short time. **The recent global economic crisis has postponed but not cancelled a supply crunch which would otherwise be starting to bite now.**

Bank of America Merrill Lynch says that crude oil may reach US\$105 per barrel during 2011 with US\$150 per barrel being possible by 2014.

*Reference: NZ Energy and Environment Digest, 24/2/10*

## Oil Demand Forecast Decreases

In EnergyWatch Issue 55 – December 2009 (page 20) reference is made to the World Energy Outlook – 2009 released by the International Energy Agency (IEA) on 10 November 2009. Oil production was estimated to be down to an average of 84.18 million barrels per day (bpd) during 2009.

Oil production had been running at an average of well over 86 million bpd throughout 2008 and reaching a peak of around 86.8 million bpd in July 2008.

However, as the economic recession reached its low point, oil production then dropped significantly to just over 84 million bpd during the first part of 2009 before it began to rise again. The IEA now estimates that for the overall 2009 year, oil production averaged 84.6 million bpd.

The latest IEA reference scenario shows oil demand recovering in 2010, reaching 88 million bpd in 2015 and on to 105 million bpd in 2030 (but no comment is made on whether or not global oil production has the capacity to reach 105 million bpd).

The IEA's earlier (September 2009) report had said that crude oil consumption in 2010 – led by emerging markets like China – is forecast to grow by 1.4 million bpd above 2009 to 86.1 million bpd.

*Reference: The Wall Street Journal, 10 -11 October 2009*

This would mean that the expected oil demand in 2010 would be on a par with levels seen in 2007/08, underscoring the relative weakness of present economic activity.

However, in a recent statement, the Organisation of Petroleum Exporting Countries (OPEC) has given its forecast of projected oil demand in 2010 and is now expecting demand to average 85.24 million bpd during 2010.

*Reference: NZ Energy and environmental Digest, 10 – 16 March 2010*

This is actually 100,000 bpd greater than its forecast in February 2010 when it was forecasting demand to average 85.14 million bpd.

In a statement issued on 10 March 2010, OPEC cautioned that its forecast increase in demand hinges on a sustained global economic rebound, particularly in the USA. OPEC is the supplier of about 35% of the world's crude oil and notes that some of its members were still over-producing leading to a surplus of oil on the market.

OPEC described 2009 as “The worst year in the industry in oil demand since the oil crisis in the 1980's”. The 12-member bloc said in its March 2010 report that global oil demand “has been highly dependent upon the world

economy, supported by government-led stimulus plans”.

Figure 3 is an update of the information given on Figure 2 of EnergyWatch Issue 55, page 19 showing both the September 2009 IEA forecast for global oil demand in 2010, and the more recent (March 2010) and significantly lower OPEC forecast for 2010.

Projecting forward on Figure 3 from the 2009 average and 2010 estimate will give considerably lower predictions of future oil demand if the OPEC March 2010 forecast is used, rather than the IEA September 2009 forecast.

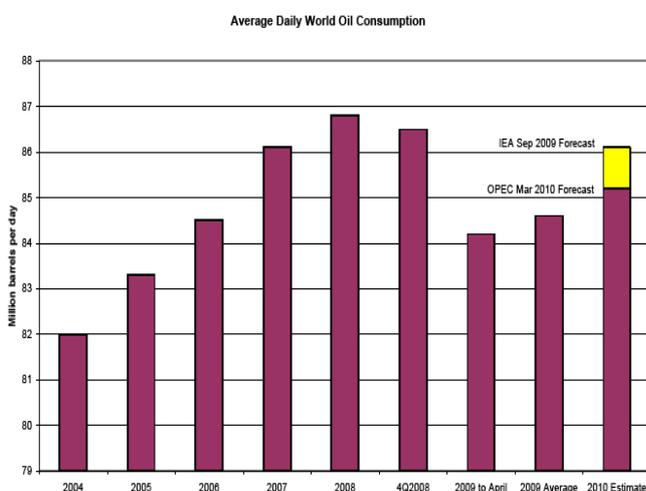


Figure 3 Average daily world oil consumption

## Iraq to Boost Oil Output

Providing that it can maintain political stability, Iraq could become the world’s third biggest oil producing country within about five years.

With new found political stability enabling the country to exploit oil requests, its output is expected to be 5 million barrels per day (bpd) by 2015, which would more than double its output in recent years.

If Iraq can reach that target of 5 million bpd by 2015, this would boost it from its current rank of 9<sup>th</sup> biggest oil producer.

Saudi Arabia and Russia are each producing around 10 million bpd. Iraq may have the potential to produce the same amount within about a decade, provided that it can obtain the

necessary investment from western oil companies with the most up-to-date technology, and that of course will depend very much on maintaining political stability in Iraq.

*Reference: NZ Energy and Environment Business Weekly, 3/3/10*

**Editors Note:** In EnergyWatch Issue 42 – December 2006 (page 19) it was reported that Russia was about to overtake Saudi Arabia as the world’s largest oil producer with a figure of 9.24 million bpd. It seems that more than three years later, these two countries are still running neck and neck, each producing around 10 million bpd. Combined, these two countries produce around 23% of the worlds’ crude oil supplies.

## PM Opens Kupe Facility

In officially opening the NZ\$1.3 billion Kupe oil and gas project near Hawera in Taranaki in mid-March, the Prime Minister, John Key, said that the development will play a critical role in securing NZ’s future gas supply needs. At peak, Kupe is expected to produce 10 – 15% of NZ’s current annual gas demand and half of its LPG requirement.

The project will supply natural gas to the country’s gas transmission networks in the North Island (with Genesis Energy contracted to take the bulk of its gas production). It will also supply LPG for national distribution, and light crude oil for export to refineries in Australia and the South Pacific.

The project has taken more than three years to complete. At the peak of construction, more than 1000 people worked on the production station site near Hawera. Origin Energy, which has a majority stake in Kupe, says that around 375 NZ companies supplied or produced services to the Kupe project, and the value of orders placed in NZ was \$620 million.

Kupe has reserves of 254 petajoules (PJ) of gas and 14 million barrels of light crude oil. Current daily production is 0.07 PJ of gas per day, 300 tonnes of LPG per day, and 7500 barrels of light crude oil per day. The joint venture estimates royalty payments to the Crown will be around NZ\$306 million over the life of the project.

*Reference: NZ Energy and Environment Business Weekly, 24/3/10*

This project has been a substantial undertaking and is made up of –

- Three production wells
- An unmanned offshore platform above the wells
- A subsea pipeline to bring fluids from the platform to the shore
- A subsea umbilical carrying electricity and fibre optics communications between the platform and the shore
- Tunnels drilled through the coastal cliffs, from sea to shore
- An onshore production station, near Hawera
- A sales gas pipeline from the production station to Kapuni (where it feeds into the North Island gas transmission system)
- Light crude handling, storage and export facilities near Port Taranaki

The LPG is taken from the production station by road tankers to be sold to buyers around New Zealand.

The light crude oil is trucked from the production station to the project's tank farms on the western edge of New Plymouth and stored there until it is ready to be pumped to the port and loaded on to the tanker ships for export.

*Reference: Advertising Supplement in the Taranaki Daily News, 18/3/10*

**Editor's Note:** As noted in EnergyWatch Issue 54 – August 2009 (page 22) Genesis

Energy has contracted to take 20PJ of gas per year from Kupe for electricity generation. Kupe will also produce almost 2 million barrels of light oil and 100,000 tonnes of LPG per year.

Reserves on which the project's financing has undertaken were put at 254 PJ of gas, 14.7 million barrels of light oil and 1.1 million tonnes of LPG.

## Maari Oil Field Celebrates First Year

Speaking at a function one year on to mark the commissioning of the Maari project, Energy and Resources Minister, Gerry Brownlee said that the Maari offshore oil field is proving to be a success.

The main field has produced 6.5 million barrels of oil in its first year of operation, an average of 17,800 barrels per day. The Maari project is majority-owned by Austrian-based oil producing company OMV.

In EnergyWatch Issue 53 – June 2009 (page 25), it was reported that the Maari field was now getting into full production and was expected to reach its initial production peak of about 35,000 barrels per day later in 2009, but is then expected to reduce production from that time on.

*Reference: NZ Energy and Environment Business News, 10.3.10*

**Editor's Note:** In comparison with Kupe, Maari has averaged 2.35 times as much crude oil production as Kupe in its first year, but Kupe is primarily a gas field, whereas Maari produces no gas for sale. (Most of the gas which comes to the surface at the Maari field is being flared off).

## Electric Cars Reduce Oil Demand

Demand for oil in New Zealand could drop by 40% by the year 2030 because of more efficient cars, electric vehicles and use of biofuels, according to the Ministry of Economic Development's latest Energy Outlook report.

This forecast is in a scenario for the year 2030 of high uptake of alternative fuel sources. An oil price of US\$180 (NZ\$250) per barrel and an emissions price of \$100 per tonne of carbon dioxide, under this scenario, would lead to petrol pump prices in real terms of NZ\$3.50 per litre (almost double today's price).

"At such prices, motorists are expected to dampen their travel demand, use public transport options where these are available in metropolitan areas, and increasingly move to smaller and more fuel efficient motor vehicles", the report says.

In the scenario, vehicle efficiency gains result from engine improvements such as the use of direct petrol injection, turbo-chargers, advanced transmissions, stop-start technology, improvements in tyre performance, lighter vehicles and increased use of hybrid and other technologies.

Greater demand for light diesel vehicles is expected to grow numbers of such vehicles by 30% by 2025.

The higher oil prices also allow greater scope for alternative fuels and vehicles to be developed and become competitive with petrol-powered products. The two major developments included in this scenario are electric vehicles and increased use of biofuels.

During 2009, many of the world's major car makers confirmed plans for the production of both full electric vehicles and plug-in hybrid electric vehicles. These are expected to start appearing from late 2010 and their initial EnergyWatch 56

uptake will be bolstered by a range of financial incentives now being offered by some governments.

Initially it is likely that the supply of these vehicles into New Zealand will be limited and the purchase price will be high, the report says. However it is expected that by 2020, these vehicles will be widely available, relatively economic, and become a popular option for light cars in urban centres and also for light commercial vehicles and small delivery trucks.

The impact of electric vehicles on electricity demand is expected to be minor. Even with 35% of the light fleet being electric by 2020, total electricity demand in New Zealand is expected to be only 5% higher than what it would otherwise be.

Although the impact of electric vehicle recharging on electricity demand is minor, it still requires more generation capacity to be built. The mix of new base load and peaking plant needed to meet the demand will depend on the daily pattern of electric vehicle charging.

Increased electricity demand will also affect wholesale electricity prices, which could increase by 3% to 5% for all electricity users as a result of demand from electric vehicles.

*Reference: NZ Herald, 28/4/10*

**Editor's Note:** In the above scenario, there appears to be no mention of hydrogen-powered vehicles operating on fuel cells. This is presumably because it is perceived that these vehicles will still be too highly priced to come into common use by the year 2030. But overseas, the price of experimental fuel cell vehicles has been steeply declining over the past twelve months.

# VEHICLES

## Sales of New Cars and Imports Recover

During 2010, the new-vehicle market in New Zealand is expected to quickly bounce back from recession with a predicted 5-7% increase in sales during the year to around 75,000 sales, compared with 70,000 sales in 2009.

It is also now predicted that new car sales could return to more than 100,000 sales per year by 2013 to 2015.

The economic recession hit the New Zealand motoring industry hard during 2009 with sales down 32% on the 2008 figure of around 102,000 new-vehicle sales.

Between 15-20% of dealerships went out of business during 2009 and sales of used car imports slumped by 46%. The question is “will the market now climb back up again gradually, or will it bounce back quickly?”

It has to be assumed that population growth will help support vehicle sales, whether by natural growth or by immigration, but that is only a few per cent per year. Rising fuel prices and higher standards for warrants of fitness will contribute to force older vehicles off the roads.

Also, increasing compliance requirements and safety standards could limit the number of used imported cars entering New Zealand, and shift the supply mix towards new vehicles, as has already happened in the last two years.

New Zealand has a population of 4.35 million and a car fleet of 2.8 million vehicles, or 643 cars for every 1000 people. The average age of the fleet is 12.5 years and the age profile is completely unbalanced.

Due to the glut of used car imports in the mid-2000's and the distorting effect of the frontal

impact rule which effectively boosted sales of 1996 vehicles, New Zealand has one of the strangest shaped vehicle fleet profiles in the world.

The most common car on our roads is a 1996 Toyota and at 14 years of age, is probably within six years of the end of its life. This means that we are going to have a sudden shortage of vehicles over the next decade.

About 6% of the New Zealand vehicle fleet (i.e. around 170,000 vehicles) are scrapped each year. Annual sales growth of around 5% in both new cars and used car imports will not be enough to keep up with the scrappage over the next few years.

The volume of additional car registrations will have to rise significantly, or the alternative is that the number of cars per 1000 people will fall significantly, which seems unlikely because New Zealanders love their cars and will find ways of keeping them going beyond the end of their economic life, if that is necessary.

Therefore the outlook for total market growth in both new-vehicle sales and used car imports is very positive, even without taking account of the population growth and the modernising of the vehicle fleet to bring lower fuel costs or meet Kyoto Protocol obligations.

*Reference: NZ Herald, 20/2/10*

**Editor's Note:** However from the viewpoint of the Kyoto Protocol obligation to lower fossil fuel use, if it was politically acceptable it would be much more effective to lower the number of cars per 1000 people than to raise the number of modern and more fuel efficient cars being imported.

New car registrations in March 2010 of 5392 units were up by 10.4% on those recorded in March 2009 and 9.5% over the first three months of the year compared with 2009.

The chief of the Motor Industry Association, Perry Kerr, said that the market is improving slowly but steadily which is what they had predicted at the beginning of the year.

After the first three months of the year, 15,295 new cars had been registered which compares with 13,972 in 2009. However commercial vehicle sales over the first three months of 2010, at 4045 units, were almost identical with those in 2009 (4039 units).

Around 7800 used car imports were also registered in March 2010. So far this year, 21,389 used car imports have been registered compared with 15,185 units for the first three months of 2009, an increase of 40%.

For every one new car registered so far in New Zealand in 2010, there were 1.4 used imported cars registered.

*Reference: NZ Herald 10/4/10*

## **U.S. Tightens Fuel Consumption Rules**

In a coup that achieves something President Bill Clinton promised but never delivered, President Barack Obama has forced the big three US car makers, and their unions, to accept tough new fuel consumption rules for new cars and sport utility vehicles (SUV's).

The change ends a notorious loophole in US law whereby SUV's were exempt from emissions standards, which applied to new cars, because they were described as "light trucks". This made them more profitable to produce by US manufacturers than smaller vehicles.

The new rules will cut emissions from new vehicles by more than one third over the next

four years, and the average cost of a new car or SUV is expected to rise by US\$1000 as a result.

The union movement in the US auto industry is not happy about the changes but the reform has been welcomed by the industry itself and by environmentalists.

The US Alliance of Automobile Manufacturers had little choice but to accept the new standards after the US\$25 billion bailout of Chrysler and General Motors.

The decline of SUV sales coincides with the first mass-produced "plug in" electric car in the United States, the Chevrolet Volt, which finally began to roll off a Michigan production line in late March.

As noted in EnergyWatch Issue 54, August 2009 (page 26), General Motors is putting its faith in the Chevrolet Volt, which it hopes to put into full production during 2010. However, the expected US\$40,000 price tag (NZ\$58,000) looks to be too expensive to sell, except into a niche market. (Note that this estimated price has now been lowered to about US\$35,000 less a US\$7,500 tax credit.)

*Reference: Sunday Star Times, 4/4/10*

Meanwhile it has been reported that Texas, the United States oil state, has filed a federal lawsuit to block the United States Environmental Protection Agency (EPA) restrictions on tailpipe exhaust emissions of greenhouse gases.

The EPA has ruled that since motor vehicles account for 23% of the United States' total greenhouse gases, it is obliged to regulate them under the US Clean Air Act.

But the lawyers for the State of Texas say that the EPA's assumptions about global warming are based on "scientific errors and fraud".

Texan Governor, Rick Perry, focuses on economics, insisting that the EPA's

“misguided plan” paints a big target on the backs of Texas energy producers and the nearly 200,000 Texans whom they employ.

*Reference: NZ Herald, 20/2/10*

## US Car Sales Expected to Increase

Two leading US economists have predicted a return to more normal economic conditions by the end of 2010.

As a result US vehicle sales are forecast to increase as follows –

2010	11.8	million
2011	14.0	million
2012	15.8	million
2013	17.0	million

This compares with around 9.7 million new cars and light trucks sold in the United States during 2009.

So the forecast is for US light vehicle sales to increase to 14 million units by 2011 and to grow back to previous sales levels of 17 million units and above by 2013.

In the automobile sector, the sales resurgence will not be driven by a return of the old ways of subprime loans, home equity-driven purchases and an over-abundance of cheap leases, but rather the sheer force of demographic trends will trigger a return to more robust sales.

The increasing population of Generation Y is just entering a flaccid job market, but once the economy is rolling by 2013, about 70 to 75 million young consumers will progressively enter the car market.

Also while scrappage demand will not return to high percentages, (as a result of the withdrawal of scrappage incentive schemes and thanks to ever-increasing quality lengthening the ownership cycle), there is

pent-up demand that will see more replacement purchases in the near term.

*Reference: NZ Herald 10/4/10*

## Hydrogen Car Progress Slows

As with electric cars, the driving force behind research into hydrogen cars is the need to break away from oil and rein in emissions of greenhouse gases blamed for climate change, especially carbon dioxide from industry and transport. Transportation adds about 13% of man-made carbon dioxide into the atmosphere.

Hydrogen claims zero emissions, but this of course depends on where the energy comes from to make the hydrogen. It can be produced from water through electrolysis, or harvested as a waste product from chemical plants or nuclear reactors, or produced from natural gas (methane).

However, for now car makers are still much more focused on developing battery-powered cars. At the Geneva Motor Show in March 2010, nearly all major manufacturers displayed their latest electric vehicles or plans to produce them. The few hydrogen cars on the floor attracted little attention.

It was not always that way. US President George W Bush allocated US\$1.2 billion for hydrogen research and said in his 2003 State of the Union address “The first car driven by a child born today could be powered by hydrogen and be pollution-free”. The Obama administration has largely scrapped the hydrogen research programme.

In Europe too, hydrogen research is low-priority. For example, the Dutch government recently announced a NZ\$9.4 million subsidy for hydrogen, but gave eight times more for electric cars. Buyers of plug-in hybrids get tax breaks, and rebates, and cities like London

and Amsterdam are planning to install electricity charge-up pillars in their streets.

The main reason is cost. Electric cars are now becoming road-ready and in production, while hydrogen cars are still experimental and with very few distribution systems available for dispensing the hydrogen.

*Reference: NZ Herald 24/4/10*

## Hybrid and Electric Vehicle Progress

As noted in EnergyWatch Issue 54 - August 2009 (pages 25 – 26) Mitsubishi launched its electric vehicle, the i-Mi EV in June 2009 with a price tag of US\$48,000 or NZ\$74,000. It was noted that Mitsubishi has acknowledged that this vehicle is “too pricey” and said that it aims to cut the price in the future.

However it has recently been reported (*NZ Herald 3 April 2010*) that Mitsubishi Australia now admits that the all-electric i-Mi EV runabout will cost A\$70,000 (NZ\$90,000) new when it hits the road in Australia.

The car went on sale in Japan during 2009 and was due to appear in Australia and New Zealand in late 2010, but strong overseas demand – partly caused by an order for 100,000 examples to be rebadged as Citroens and Peugeots in France – has delayed its introduction in the rest of the world.

EnergyWatch Issue 54 noted that the Electric Vehicles Team at Meridian Energy had suggested that the i-Mi EV will be available in New Zealand by 2012, but as a second-hand import.

This now seems increasingly likely to be the only way that the vehicle will be introduced into New Zealand, because otherwise its purchase cost is becoming uncompetitive.

However other large manufacturers appear to believe that they can market electric cars at a considerably lower price. Chrysler Group has announced that it will develop an electric version of the Fiat 500 small car for the USA in 2012. They state that the Fiat 500 is a small, lightweight platform perfect for integrating electric-vehicle technology.

Chrysler said that pricing would be announced close to launch but their CEO said at the Detroit motor show that the Fiat 500 EV concept would sell for about US\$32,000 (NZ\$45,500) if it went on the market.

Chrysler did not announce a production target for the Fiat 500 EV, although their CEO had said earlier that Chrysler expects to produce about 56,000 electric vehicles annually by 2014.

Chrysler Group will also build 140 Ram plug-in hybrid electric pick-up trucks for use in a three-year demonstration fleet. Funding for the plug-in hybrid Ram will come from a United States Department of Energy grant of up to US\$48 million, from the Departments’ vehicle electrification programme; part of the US\$2.4 billion American Recovery and Reinvestment Act.

The Ram plug-in hybrid will use a 5.7 litre Hemi V8 petrol engine that is mated to a two mode hybrid emission and a 12 kilowatt hour lithium-ion battery. The vehicle is capable of travelling up to 35 kms on electricity alone.

*Reference: NZ Herald 27/3/10*

Nissan has signed a US\$1.4 billion deal with the US Government to help re-tool a factory in Tennessee to build up to 150,000 all-electric cars a year and up to 200,000 lithium-ion battery packs a year for the vehicles.

Steven Chu, the US Energy Secretary said “This is an investment in our clean energy future. We are committed to making strides to re-vitalise the US auto industry and

supporting the development of clean energy vehicles”.

Nissan will use the government funding to build its all-electric car called the Leaf. It plans to begin selling the Leaf in the US late in 2010 as a Japanese import. The Tennessee plant is expected to begin production in 2012.

*Reference: NZ Herald 4/2/10*

On the west coast of the USA several cities are preparing battery charging infrastructure as car makers prepare to introduce the first mass-market electric cars late in 2010. It is increasingly evident that these cars will get their most serious tryout in just a handful of cities.

In cities like San Francisco, Portland and San Diego a combination of green consciousness and enthusiasm for new technology seems to be stirring interest in these cars.

The first wave of electric car buying is expected to begin in December 2010, when Nissan introduces the Leaf, a five-passenger electric car that will have a range of 160km on a fully charged battery and be priced for middle-class families.

About the same time, General Motors will introduce the Chevrolet Volt, a plug-in hybrid vehicle able to go 65km on electricity before its small petrol engine kicks in.

Nissan’s president and chief executive predicted 10% of the new cars being sold would be electric vehicles by 2020. However, some transportation experts are sceptical that electric vehicles will catch on anywhere in the United States, in large part because the batteries and the installation of home recharging units are expensive.

Dan Sperling, the director of the Institute of Transportation Studies at the University of California, estimated that a typical electrical car battery would cost the car maker

US\$12,000 and a 240-volt charging unit would cost a household at least US\$1500.

Without large subsidies “the reality is, these electric vehicles are not going to sweep the industry and become a major share of the market for a very long time”, Sperling said.

Despite that, the US Federal Government is putting considerable money into the effort, including billions of dollars in loans to car manufacturers.

Under the 2009 Stimulus Package, nearly US\$200 million will support Nissan’s introduction of the Leaf by permitting the installation of 13,000 charging stations around cities in Oregon, Washington, California, Arizona and Tennessee.

Before the first Nissan Leafs and Chevrolet Volts reach the showrooms, an electric car infrastructure is getting a trial run in the San Francisco Bay area in a limited way.

The electric car is poised to become a mainstream option. In Berkeley, California, a town known for its environmental sensitivities, one out of five new cars sold today is a Toyota Prius. If electric cars are adopted that broadly in the next few years, problems could ensue.

“If you just allow willy-nilly random charging, are we are going to have neighbourhood blackouts?” asked a utility executive. He said that a single electric car could consume three times as much electricity while charging as a typical San Francisco home.

Meanwhile in Britain, the Government used the lead up of the “greener” Geneva Motor Show to introduce its own environmental incentive – a NZ\$500 million policy package aimed at getting people into ultra-low emission cars.

From 2011, British motorists will be entitled to a grant of up to NZ\$11,000 to buy an electric, plug-in hybrid or hydrogen fuel cell

car that meets performance and warranty standards.

The Government has also put in place Stage 1 of infrastructure to support electric vehicles, with 11,000 charging posts to be provided in and around London and England's north-east. Other regions wanting to join the scheme include Northern Ireland.

The chief executive of the Electric Car Corporation said the policy would stimulate the electric car market. "It is undoubtedly the only way United Kingdom motorists will be persuaded to change their motoring habits and give up their petrol cars", he said.

The announcement came as the Geneva show was getting ready to follow the Detroit show the previous month and display more ultra-low emissions cars.

*Reference: NZ Herald, 27/2/10*

Nissan is to build its new electric car called the Leaf in the United Kingdom at its Sunderland plant. Hundreds of jobs are expected to be safeguarded once production begins in 2013. About 50,000 Nissan Leaf hatchbacks, which run entirely on lithium-ion batteries, will roll off the Sunderland production line each year.

*Reference: NZ Energy and Environmental Business Week, 24/3/10*

Japanese car maker, Nissan, has just announced that it will sell its "Leaf" electric car at a base price of US\$32,780 (NZ\$46,700) in the United States and will begin taking orders on 20 April.

When combined with a US\$7500 federal tax credit, the Leaf would be priced at US\$25,280.

Nissan said that it will also sell the battery-powered Leaf hatchbacks starting at 3.76million Yen (NZ\$58,000) in Japan. After

accounting for Japanese government subsidies, Nissan said that the net bill to consumers to buy a new Leaf would be around 2.99 million Yen (NZ\$46,200).

The cost of batteries and the reluctance of consumers to pay more upfront for fuel saving technology are seen as the major hurdles to mass-market adoption of battery-powered electric vehicles.

By comparison, Toyota's petrol-electric Prius hybrid, now in its third generation, has a base model starting price of just 2 million Yen (NZ\$31,700) in Japan.

However, Nissan has said that it expects that 10% of the world's automotive market (for new cars) will be electric vehicles by 2020, a rate at the top of industry projections.

Meanwhile, Mitsubishi Motors has significantly lowered the price in Japan of its electric i-Mi EV car by 619,000 Yen to 3.98 million Yen (NZ\$61,000), comparable to the price of Nissan's Leaf in Japan. (But the i-Mi EV is a mini car, whereas the Leaf is a medium-sized five passenger hatchback car).

Mitsubishi began sales to individuals recently after selling the i-Mi EV mainly to corporate customers since July 2009. If Japan extends its substantial subsidies on electric cars, the i-Mi EV would be eligible for subsidies of 1.14 million Yen, leaving the Japanese customer with a price tag of around NZ\$43,000.

*Reference: NZ Herald 10/4/10*

## PRICE COMPARISON

Based on the latest available figures for the United States market (before deducting any subsidies) the comparable price of these plug-in hybrid and battery-electric cars is likely to be as follows:

Make	Type	\$US	\$NZ
Fiat 500 EV	E	32,000	45,500
Nissan Leaf	E	32,780	46,700
Chevrolet Volt	P	35,000	50,000
Mitsubishi i-Mi EV	E	42,800*	61,000*

E = battery-electric vehicle P = plug-in hybrid

\*N.B. The Mitsubishi i-Mi EV price is a recently-announced reduced price in Japan, where the Nissan Leaf will sell for NZ\$58,000, but the i-Mi EV price in the United States is likely to be competitive with the Leaf price.

## Pessimism on Electric Vehicles

Glenn Harris, Marketing Chief for Mazda New Zealand, said recently “We expect the greatest challenge for the car industry in this next decade to come not from financial fallouts, but from global warming and the need for the industry to meet very strict emissions targets”.

He said that while the “landscape of change” is dominated by electric, hybrid and hydrogen concepts, “They still remain expensive and could take another decade of development to become mainstream”.

“The reality is that consumers are unlikely to pay a premium for this type of technology, as global warming at this point has no personal relevance to the vast majority. There is clear evidence of this in Japan and the US where hybrid sales (and electric vehicles) have gained traction, but only as a result of generous subsidies from the government”.

Harris said “Mazda’s position is that the most practical ways of meeting emissions targets over the next five years are improvement to conventional engines, a greater proliferation

of diesel engines and consumers choosing smaller cars.

“Mazda believes that in 2020 the vast majority of vehicles will still be using internal combustion engines.”

*Reference: NZ Herald 17/4/10*

**Editor’s note:** Mazda’s forecast for 2020 is in fact very similar to that of Nissan which states that it expects 10% of the world’s automotive market (for new cars) will be electric vehicles by 2020, a rate of the top of industry projections. And yet Nissan is much more optimistic about the immediate future of electric vehicles. Is this a case of whether the glass is seen as being half full or half empty?

## Sporting Hybrid-Electric Vehicles

At the ultra high performance end of the car market, changes are also taking place. Three plug-in hybrid systems were on show at Geneva as Lotus, Porsche and Ferrari each unveiled sports cars driven partly by electric motors.

Of the three hybrid systems seen at Geneva, the one from Lotus is the most electrified. Their experimental Evova uses two electric motors which power the rear wheels independently. In addition, the car is fitted with a small “range extending” internal combustion engine. This does not drive the wheels but tops up the batteries if they are in danger of going flat.

Porsche has adopted a different approach in its 918 Spyder. Its V8 petrol engine is connected to the rear wheels with a seven-speed automated gearbox. It also has an electric motor that provides additional power to the rear wheels (through the same gearbox) and there is a second electric motor connected directly to the front axle.

Four different running modes are available. “E-Drive” powers the vehicle using only the electric motors for a modest 25km range – enough for commuting. “Hybrid” mode uses electric motors and combustion engine separately or in combination, according to the driving conditions. “Sport Hybrid” emphasises performance and “Race Hybrid” really lets rip. It includes a “push to pass” button that boosts acceleration by piling on the electric power.

*Reference: Business Herald, 26/3/10*

## Chinese Mini Electric Vehicle

General Motors and its Chinese partner SAIC will showcase a new mini electric vehicle at Shanghai Expo which opens on 1 May and continues for six months.

The two wheel, two seater EN-V which looks something like an oversized vacuum cleaner, is not just about making vehicles small, lightweight and emissions free, but completely re-doing the automobile, a GM spokesperson said.

The EN-V occupies 1.5 metres of space, five will fit in the parking space needed for one conventional vehicle and it is a pure electric mini-vehicle meant strictly for city driving.

What better place to suggest such a solution than in smoggy, accident plagued, traffic congested China, home to 1.3 billion people?

By 2040, GM suggests that there will be 1.2 billion cars on earth, and 60% of humanity will be living in cities. In megacity countries like China, the explosion in the use of conventional automobiles has already turned into a nightmare of smog, jammed roadways and non-existing parking.

*Reference: NZ Herald 8/4/10*

## New Hybrid Toyota Camry

In New Zealand, Toyota’s hybrid Camry is now mixing power with economy. The car is about 90kg heavier than the standard model Camry. It mates a 2.4 litre four cylinder petrol engine with an electric motor/generator and a battery pack that stores electrical energy. The Hybrid Synergy Drive system delivers a maximum of 140kw.

It will take Camry’s efficiency to a new level, offering a best economy of around 6.0 litres/100km (48 mpg). By contrast, the petrol-only Camry is good for 8.9 litres/100km (32 mpg).

The petrol engine is based on the VVT-i Camry engine modified to use a different operating cycle known as the Atkinson cycle. It optimises fuel economy but delivers less torque. The electrics can deliver the torque boost.

The first electric motor acts primarily as a generator, storing surplus petrol engine power in the hybrid battery. It also acts as a starter motor for the petrol engine.

The second motor acts mainly as an electric drive motor, but also acts as a generator during regenerative braking.

On the road, the hybrid Camry is a better drive than the petrol example. It is quieter, more stable and handles and rides better.

There are two versions of the hybrid Camry available: the entry level model at \$48,990 and the better equipped i-Tech at \$54,990. The price won’t be a problem for Toyota judging from the interest it says it has received from both fleet and private buyers. What will halt sales is supply: the factory in Melbourne has told Toyota New Zealand that it can only supply them with 470 hybrid Camry cars during 2010.

*Reference: NZ Herald, 20/2/10*

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