

EDITORIAL

Call for a 10-Year Moratorium on New Coal Mines in New Zealand

Professor Susan Krumdieck has instigated a call for a 10-year moratorium on investment in new coal mines in New Zealand. This call is receiving widespread support from members of the Coal Action Network of Aotearoa and a range of other organisations.

The recent visit to New Zealand by Dr James Hansen provided a renewed awareness of the need for New Zealand to play its part in moving away from reliance on fossil fuels. In his calm and matter-of-fact style Dr Hansen explained, in overflowing venues, the relationship between fossil fuel exploitation and the present and future consequences for the global environment. He concluded that for the sake of the welfare of future generations coal must be left in the ground.

Climate Change aside, the call for a moratorium on new coal mining activities in New Zealand is also made for a number of other reasons as set out in this issue.

Whilst other groups, convinced by the urgency in Dr Hansen's advice, are campaigning for a more rapid phasing out of coal, the specific call for a 10-year moratorium on new coal mining recognises



Open cast mining at Stockton, West Coast
(photo courtesy of NZ Forest and Bird)

the contribution of current coal mining activities in New Zealand, particularly to the West Coast economy, and recommends a more measured response. The on-going mining of high quality coking coal for export would not be affected by the proposed moratorium. But expansion of that industry by opencast despoliation of 200 hectares of conservation land at Denniston is seen as a step too far.

Similarly, the current plan by Solid Energy to upgrade industrial fuel supplies in Southland from raw lignite to briquettes would not to be affected by a moratorium on new mines. But aspirations to expand lignite briquetting tenfold for export followed by conversion of lignite to urea and thereafter to diesel on a massive scale are seen a strategy

that would lead New Zealand down an unsustainable energy pathway.

A ten year moratorium on new coal mines would give New Zealand the opportunity to reconsider its global responsibilities.

In this issue Tim Jones, on behalf of the Coal Action Network of Aotearoa, explains where things stand with the aspirations of Solid Energy and others to open up the Southland countryside to lignite exploitation.

The Symposium on Coal held in Wellington on 17th May heard the short term economic views of Don Elder for Solid Energy starkly contrasted with long term responsible views of Dr James Hansen. A possible bridge across that gulf was suggested by an economist who observed that innovation to solve problems typically came from the existence of fixed well defined boundaries to activities rather than economic pressures. He suggested that absolute boundaries such as “No mining of Schedule 4 land” or NZ’s no-nuclear policy provide a fixed boundary within which innovators and businesses can work. This perspective suggests that a 10-year moratorium on new coal mines in NZ would provide a “We just don’t go there” framework as a well-defined basis for moving forward.

Another current issue which has become highly polarised is the roading debate. As discussed in EW61, the closure of rural rail in favour of roads of national significance is a serious prospect. In this issue Gareth Hughes MP looks at the numbers and describes an alternative transport strategy.

On June 16th the Winter Lights symposium in Dunedin invited some people to present their vision of what the NZ energy scene might look like in 2050. I took a pessimistic view that business would continue as usual. In contrast Bob Lloyd took an optimistic view that radical changes occur. This issue of EnergyWatch includes those visions.

In recent months there has been great concern about the prospecting for oil in deep water by Petrobras off the East Cape. BP’s Deepwater Horizon accident in the Gulf of Mexico is in recent memory. Petrobras had their own major accident a decade ago, from which they hopefully learned a valuable lesson.

This issue is, as usual, wrapped up with data on the ever increasing crude oil price and observation of the widening regional differentials. The latest oil price data show the effect of a release of strategic oil reserves to hold back oil price increases. This raises the question of how long the world can put off the impact of Peak Oil by drawing down on capital reserves to meet operating costs

Best wishes from the UK where I am working for the IEA Greenhouse Gas R&D Programme until Christmas.

Steve Goldthorpe, Editor

CONTENTS

| | |
|--|----|
| Editorial | 1 |
| A 10-Year Moratorium on New Coal Mining Operations: Strategic Analysis Results | 3 |
| Southland Lignite Mining: Where things stand. | 6 |
| Small Lignite Briquetting Plant: CO ₂ Emissions | 7 |
| Budget Debate Response on Transport Issues | 8 |
| Perspectives of NZ From 2050 | |
| The Role of Coal in NZ in 2050 BAU | 10 |
| NZ in 2050 – A Radical Change | 12 |
| Petrobras Completes Raukumara Seismic Survey | 14 |
| Neil’s Oil Price Chart | 15 |
| Join our Sustainable Energy News & Discussion Group! | 16 |

A 10-YEAR MORATORIUM ON NEW COAL MINING OPERATIONS: STRATEGIC ANALYSIS RESULTS

By Dr Susan Krumdieck

I am putting out a personal call for a 10-year moratorium on all new coal mining in New Zealand.



As this is a personal call for action, it is fair to understand who is making the call and how I came to this conclusion. I am an Assistant Professor in Mechanical Engineering with specialisation in Energy Systems Engineering and research experience in combustion science and all of the conventional, alternative and renewable energy technologies. I have chosen to pursue research into an emerging field, Transition Engineering, which takes advantage of the benefits of reducing risks of un-sustainable practices by change projects in existing energy systems. I have always cared passionately about conservation of wilderness and halting pollution and habitat loss. The analysis presented here is called Strategic Analysis of Complex Systems. This is an emerging engineering approach to addressing sustainability challenges. While the call for a 10-year moratorium on all new coal mining is the result of analysis, it also reflects the way I approach the transition to sustainability.

The analysis is about risks. Different people have different risk tolerance depending on what they perceive the benefits are, what time frame they consider, and what exposure they think they personally have to the risks. For example, the CEO of a company may have a conservative approach to financial risk, and yet have a high tolerance for environmental pollution risk. This analysis of the risks related to opening up new coal mining operations includes perspectives from different sectors of society and the economy. The analysis is based on current technical and scientific evidence.

The conclusion of the analysis is that opening up new coal mining operations now, anywhere in New Zealand presents very high risks that are magnified into the future. The current mining practices, regulations and uses of the coal represent benefits that will be much lower than if the resource was developed at a later date. In ten years time, the technology and economic and environmental conditions will have changed, and the possibility of opening up new coal mines can be revisited.

- The risks of acid mine drainage, air and water pollution are too high in the current regulatory and industrial climate. Solid Energy claims high standards of environmental engineering and reclamation in its operations. This has not been independently assessed, and the pollution in West Coast rivers raise questions about these claims. The previous environmental engineering efforts by Solid Energy have not been due to internal drivers. Under the current government, the risks of pollution from industrial operations are high due to the attitude toward environmental protection, the advice of the PCE and evidence presented by scientific experts.
- The current political and corporate situation is driving for rapid and large-scale development of new mining operations. This “coal rush” is a much higher risk approach because resources are depleted faster and boom and bust economic cycles are catastrophic to local communities.
- The regulatory and industry culture of worker safety is not currently at a standard to ensure workers are not exposed to unacceptable risk of injury, health effects or death.

- The scientific evidence is clear that adding fossil CO₂ to the atmosphere from any source is compounding the considerable risks to existing agriculture and built environments through disruption of climate patterns. Changes to ecosystems such as acidification of the ocean and species loss are not considered risks in this analysis. The risk of changes to historical weather patterns, precipitation extremes, and storm severity is sufficiently high to signal the moratorium on new fossil carbon oxidation *everywhere* on the planet, including New Zealand.
- The engineering and technology development of carbon capture and storage is not currently viable so is an irrelevant mitigation option to offset increased oxidation of fossil carbon.
- The engineering and technology development of high efficiency, low emissions and low pollution methods to convert coal to other forms of fuel or fertiliser are not currently needed, or easily developed.
- The decision to build a coal fertilizer manufacturing facility within the next ten years would incur significant financial risk. The signals for reducing nitrogen fertilizer intensity are much stronger than the signals for new sources.
- New coal operations on conservation and pastoral land present serious risks to future regional economic development. Assessment of the current and future value of other uses of land such as agriculture, ecosystem services, and tourism has not been carried out, so the decision to change this land use to mining places the economy of the regions at high risk.
- Assessment of the social impact of coal mining on the local communities has not been assessed, so the risks can only be inferred from analogy with other mining and non-mining communities. The risks of large-scale coal operations are most severe for Southland. Once an area becomes a coal mining district, it precludes future development such as an adventure tourism area (e.g. Queenstown) a retirement lifestyle area (e.g. Nelson) or a lifestyle high tech hub (e.g. Christchurch).
- The proposition to manufacture diesel fuel from coal carries high economic risk in the short term of ten years. In the next 10 years, we will experience the changes signalled by declining traditional oil supplies. However, during this time improved efficiency and transition to lower energy intensity modes and lifestyles will be the most economic adaptations by far. There will be no need, signal, or driver for making diesel fuel from coal in order to meet essential needs or maintain economic activity. The price of coal-derived liquids manufactured in New Zealand will not be any lower during this decade than the international price of oil and finished products.
- The risk to long-term future domestic industrial activity is high. In ten years, it will be much clearer whether New Zealand industrial use of on-shore coal resources will be much more important than revenues from export as a commodity. The economic benefits of processing and manufacturing are much greater than exporting raw resources. Loosing the future flexibility of the most easily accessible energy resources to supply our internal needs poses a substantial risk to future New Zealand industrial activity.
- The risk of irreversible loss of alternative economic developments is high. The largest boost to local economies comes from businesses with high wage positions locating there. The primary reason new,

growing businesses in soft industries choose a location is standard of living and low cost of premises and operations. There is a high risk of losing these types of high value businesses in areas that become coal-mining districts.

- The risk to local strong democracy is high if the national government imposes new coal mines on communities and on conservation land. The democratic processes are currently being subverted with un-notified consenting, ministerial decisions, and ignoring of the groundswell of public sentiment about the value of conservation land and concerns about pollution. A nationwide moratorium is the

best option for the citizens to regain control of the process.

- The risk of *not* opening up new coal-mines is low as the current land uses, tourism and property values will be preserved. Also, the resource will still be in-place and so does not lose value if not mined. In fact, the last few years have shown that the value of fuels will be higher in 10 years time.

Susan Krumdieck

**Strategic Analysis of the Complex System of Coal Mine Development in New Zealand
Indicating the Level of Risk for Different Factors over a 10-year Timeframe.**

| Risk Factor | Low Risk | Medium Risk | High Risk |
|--|-----------------|--------------------|------------------|
| Regulation of mine operations for local environmental impacts and reclamation | | | |
| Regulation of mine operations for worker health and safety | | | |
| Irreversible loss of conservation, pastoral and lifestyle economic value to local communities | | | |
| Negative sociological impacts on local communities | | | |
| Negative impact on international image (risk is low due to questionable position of the image) | | | |
| Loss of future use of energy resources that will have higher value to the economy than current export value | | | |
| Investment in and construction of coal-to-diesel manufacturing plant (economic risk) | | | |
| Investment in and construction of fertiliser manufacturing plant (economic risk) | | | |
| Risk to local strong democracy and civil processes of new mining in conservation areas | | | |
| “Coal Rush” approach to mineral development | | | |
| <i>Not</i> developing any new coal mining operations in New Zealand over the next 10 years | | | |
| Emissions of new fossil CO ₂ causing direct physical damage to New Zealand farming or built environment | | | |
| Emissions of new fossil CO ₂ increasing culpability and liability for increasingly socially unacceptable practice | | | |

SOUTHLAND LIGNITE MINING: WHERE THINGS STAND

By *Tim Jones*,
Former SEF convenor

As readers may be aware, Solid Energy and other mining companies¹ have announced plans to mine the massive reserves of lignite in the southern South Island and convert it to briquettes, urea, and diesel.



In her report "Lignite and Climate Change: The high cost of low grade coal",² the Parliamentary Commissioner for the Environment has estimated that there are at least 6 billion tonnes of economically recoverable lignite reserves in the South. Exploiting all this resource would lead to between 7 and 8 billion tonnes of CO₂-equivalent greenhouse gas emissions.

These plans have drawn both local and national concern. Many Southlanders, particularly those in Eastern Southland, are concerned about local environmental effects that are likely to include air, noise and water pollution – the latter being an especial concern, as Southland waterways are already heavily stressed by nutrient runoff from intensive dairying.

At a national level, the climate change and economic implications of allowing these projects to go ahead has been the biggest concern. Solid Energy is starting relatively small with its proposed pilot briquetting plant, but the planned urea and lignite-to-diesel plants are on a much larger scale, and the impact on New Zealand's annual greenhouse

gas emissions would be significant — as detailed in the Parliamentary Commissioner for the Environment's report. Because of the way the current Government's Emissions Trading Scheme is structured to reward big polluters with free allocations, the ETS will actually provide a major subsidy to such projects, making them easier to get off the ground.

A few months after finishing my term on the committee of the Sustainable Energy Forum, I joined the Coal Action Network Aotearoa (CAN Aotearoa), and I'm now on its organising group. Coal Action Network Aotearoa's first goal is to "Phase out coal mining and coal usage within 20 years, initially by opposing new and expanded coal mines"³ and its major focus at present is the campaign to prevent the planned expansion of lignite mining in Southland. Other environmental NGOs are also working on this issue.

CAN Aotearoa's priority for the first half of 2011 has been to build up awareness of the lignite exploitation plans and their climate consequences. This was greatly assisted by the recent visit of distinguished NASA climate scientist Dr James Hansen to New Zealand. Dr Hansen held a series of public meetings, plus closed meetings with politicians and business leaders, from Auckland to Winton. The interest created by his visit led to an almost three-fold increase in CAN Aotearoa's mailing list.

Before Dr Hansen left the country, he wrote an open letter to John Key, which you can see here:

<http://www.greenpeace.org/new->

¹ (including Greywolf, which has recently become the subject of a Serious Fraud Office investigation)

² See <http://www.pce.parliament.nz/publications/all-publications/lignite-and-climate-change-the-high-cost-of-low-grade-coal> (cited 6 June 2011)

³ See <http://coalactionnetworkaotearoa.wordpress.com/about/> (cited 6 June 2011)

zealand/en/news/blog/james-hansens-open-letter-to-john-key/blog/34935

This letter does not seem to have changed John Key's mind. On 2 June 2011, he announced that he supported Solid Energy's lignite plans – both the planned pilot briquetting plant, and larger developments in future. (<http://www.stuff.co.nz/national/politics/5094448/PM-backs-mining-souths-lignite/> cited 6 June 2011). This is no surprise, as his Government has been pushing the exploitation of fossil fuel resources ever since it came to power.

But the Prime Minister has a track record of changing his mind when his Government's policies become too unpopular, and the Coal Action Network Aotearoa intends to make his support for Southland lignite mining deeply unpopular. It's our experience that, when people who care about climate change learn

about the implications of these proposals, they get concerned and involved. Throughout the rest of 2011 and into 2012, we will be continuing to spread this awareness, grow our supporters' list, and work on applying political pressure at the local, national and international level to show up these lignite mining proposals as the deeply regressive steps they are. We will also be preparing for the possibility of nonviolent direct action as part of the campaign.

If you'd like to go on our supporters' list, which is a low-impact, announcements-only list with 1-2 messages a week, please email coalactionnetwork@gmail.com with that request. After that, if you want to get more involved, you'll be most welcome!

Error! Reference source not found.

Coal Action Network Aotearoa organising group

SMALL LIGNITE BRIQUETTING PLANT: CO₂ EMISSIONS

Lignite is currently used as an industrial boiler fuel in Southland. The raw lignite has a high moisture content and presents some operational difficulties for industrial users. Solid Energy proposes to build a small briquetting plant to convert raw lignite into partly dried briquettes that would offer various operational advantages to their industrial customers.

A consequence of this proposed improved service to customers is that the consequent CO₂ emissions from the industrial premises would be reduced. However, since part of the lignite drying function, which is currently an integrated aspect of raw lignite combustion systems, would instead take place in the new lignite briquetting facility, there would be a consequent transfer of CO₂ emissions to that location.

| Meeting the needs of industry with lignite | Without Briquetting Plant | With Briquetting Plant |
|--|---------------------------|------------------------|
| Industrial fuel use – tonnes/yr | 135,000 | 90,000 |
| Industrial fuel moisture content | 48% | 27% |
| Industrial CO ₂ emissions tonnes/yr | 190,000 | 175,000 |
| Briquetting plant CO ₂ emissions | 0 | 25,000 – 30,000 |
| Total CO ₂ emissions tonnes/yr | 190,000 | 200,000 – 205,000 |
| Total lignite consumption | 135,000 | 145,000 – 150,000 |

The diesel fuel CO₂ emissions from trucks delivering fuel to the customers will be reduced because of the reduction in the tonnage of delivered fuel. However, additional diesel fuel consumption in mining 10% more lignite and delivering it to the briquetting plant is likely to more than offset that saving.

Steve Goldthorpe – Energy Analyst

BUDGET DEBATE RESPONSE ON TRANSPORT ISSUES

In a speech to the House of Representatives on June 9th Green MP and SEF member Gareth Hughes set out his preferred approach to transport issues in New Zealand. The full speech can be accessed on line at www.greens.org.nz/speeches/gareth-hughes-transport-decisions-2011-budget This is an abridged version..

By Gareth Hughes MP

Green Party Transport Spokesperson

When it comes to transport, this Government, under Steven Joyce as transport Minister, is simply on the wrong track.



This Government is creating monuments in concrete and asphalt to 1950s-style transport thinking. The roads of national significance—or the roads of significance to National—that dominate the transport budget are memorials to old-fashioned thinking, locking Kiwis into cars, trucks, and an oil-dependent future.

The transport budget is primarily delivered through the Government Policy Statement, which is currently out in draft form. It is an enormously influential document, determining how we will spend more than \$38 billion over the next 10 years.

I believe that our Government is wasting our scarce national resources on uneconomic motorways, and locking us into a car, truck, and oil-dependent future. I ask where the balance is, when for every dollar we spend on walking, cycling, buses, trains, and coastal shipping, this Government is pouring \$7 into building more roads. Walking and cycling come off particularly badly in this Budget, receiving less than 1 percent of the total transport budget even though 10 percent of Kiwis cycle or walk to work, and they would do that even more if it was safer.

This Budget is massively skewed, with \$13.7 billion, or 39 percent, of the total Land Transport Fund going towards State highways, to the detriment of local roads, police safety, transport planning, and public transport infrastructure. It is like investing in a CD store at the dawn of the iPod age. These projects lock us into old ways of getting around, and constrain the smart alternatives.

The Government Policy Statement allows for an increase of only \$90 million in subsidies for public transport services over the next 10 years. Public transport services will receive less than 10 percent of the Land Transport Fund. This suggests that the Government wants to constrain the high growth we have seen in patronage over the last 10 years.

There is no joined-up thinking in this transport budget. The Government talks about roads of national significance when it should be looking more broadly at transport corridors of national significance. The roads of significance to National that dominate the transport spend are expensive. We are talking about \$10.7 billion over 10 years, and many of the roads are uneconomic under the Government's own benefit cost ratios. That is without measuring the true cost: the externalities of climate change, obesity, and road safety.

The OECD report reference to the National Infrastructure Plan shows there is no correlation in New Zealand between motorways and economic growth, yet there is a strong positive correlation between investment in other types of local roads and rail. Recent research from the United States shows that the economic stimulus spending

there on public transport created twice as many jobs per dollar as that spent on motorways. We hear from Steven Joyce, that motorway projects are good for creating jobs. However, that makes no sense when each job costs between half a million dollars and \$1 million to create. Even Don Brash, in his latest 2025 task force, said of one of the roads of significance to National that there was no evidence that the project would provide a net benefit to the economy.

Many of these projects are not even needed. For example, the Western Link Road, which was the community's preferred option over the Kapiti Expressway, or, north of Auckland, the Campaign for Transport's "lifesaver highway" instead of the \$1.7 billion "holiday highway" would cost considerably less and do considerably more for road safety in the short term.

These roads benefit trucks primarily, and are roads of trucking significance. They run through iconic and important communities of national significance, and they lock us into an increase in greenhouse gases, which are already up by 70 percent since 1990 in the transport sector, as if the climate were not of significance. The Government is woefully and wilfully ignoring the price of oil. None of the business cases take into account the volatile and rising oil prices, nor the huge impact that current world prices are having on road traffic levels, which have declined over 3 percent over the last year.

Unlike many businesses, councils, and foreign Governments, this Government has no plan—or plan to start planning—to reduce our dependence on oil, which accounts for 16 percent of our gross domestic product or 99 percent of our transport fuel. This huge fortune we are wasting on our motorways is based on a fuel of declining significance. These roads of significance to National will not even help motorists stuck on our crowded roads.

Building roads to deal with congestion is like dieting by extending the belt buckles. These roads will increase sprawl significantly in low urban housing density, mean higher infrastructure costs, higher household commuting costs, and constraining public transport more akin to the 1950s than the 21st century.

We are at a turning point. If we keep doing things the way we always did, building more motorways and spending the vast majority of the Budget on roads for trucks, we will not get a different outcome. We need smart transport solutions.

Just before Bill English read out his Budget speech, I highlighted the major missing piece of the Budget, funding for the central business district rail link, when I tabled my petition signed by thousands of Aucklanders. Building the link would transform the rail network, whose patronage grew over 20 percent in the last year, it would unlock the rail network, unlock its constrained capacity, and transform the central business district. Primarily it would benefit motorists by taking cars off the road massively benefiting the regional economy. This Government however is determined to continue the heritage of previous National Governments by thwarting Auckland's ambition for a central business district rail link.

In summary, these uneconomic, and, in many cases, unneeded, roads of National Party electoral significance and roads of trucking significance rammed through under a terrible process through communities of national significance based on a fuel of declining significance—as if the climate was not significant—must be stopped.

Gareth Hughes MP

PERSPECTIVES OF NZ FROM 2050

On June 16, NERI held a Winter Lights symposium in Dunedin including a Pecha Keucha session where some visions of New Zealand from a 2050 perspective were presented as a focus for discussion. <http://www.neri.org.nz/news-and-events/news/winter-lights-report-and-presentations/> Steve Goldthorpe took a business-as-usual (BAU) view and Bob Lloyd took a radical-change view.

THE ROLE OF COAL IN NZ IN 2050 – BAU

by Steve Goldthorpe

It is an honour to be invited here by my great-grandson David to speak to his Year 9 Civic Responsibilities class about the Role of Coal in New Zealand in 2050.

It was also a great honour for me to receive today a message from King William congratulating me on my one hundredth birthday. Thanks to modern medicine I am still with you all today.

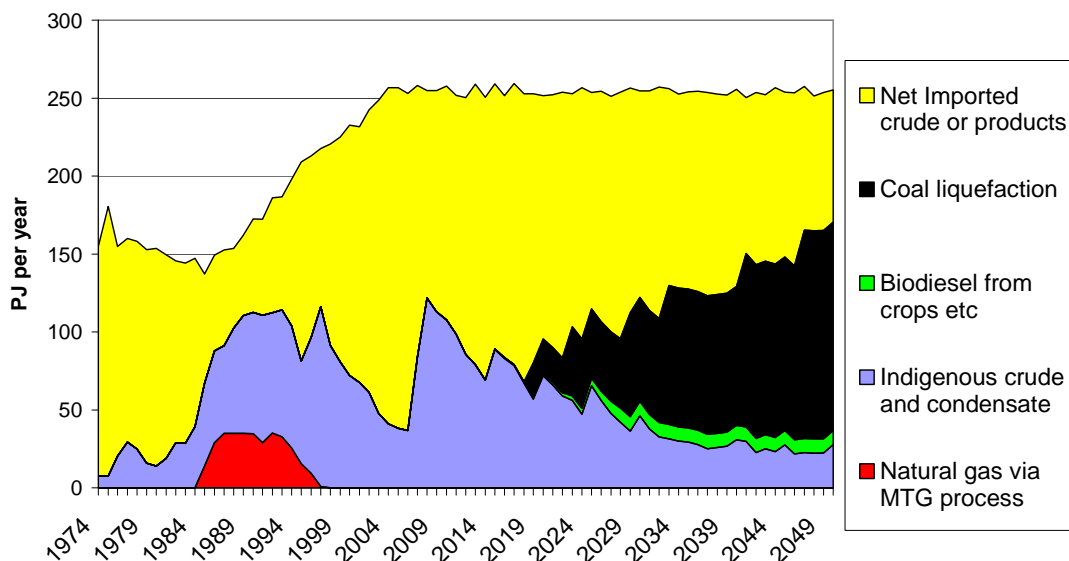
David and I share a proud family heritage in the UK coal industry. My grandfather was an underground coal miner in the Barnsley coal field. My father, (young David's great great grandfather), was an administrator with the National Coal Board. As a young man, I worked in R&D for British Coal investigating the viability of coal liquefaction and also carbon capture and storage technologies.

When the industry was privatized R&D was closed down. I emigrated to New Zealand and in due course became a commentator on the New Zealand Energy Scene. From that historical perspective I will try to explain to you how New Zealand got to where it is today.

The story begins, not with coal but with oil. The 20th century development of New Zealand as a prosperous country was in part due to a plentiful supply of cheap oil and gas. Most of the oil was imported. However, after the turn of the century the global oil supply peaked and at the same time New Zealand's indigenous gas supply dwindled. That pushed energy prices up - permanently. The consequent recession halted the rise in demand for transport fuels.

This chart shows the history of the net supply of refined liquid fuels in New Zealand.

Sources of NZ liquid transport fuel



The indigenous oil production is shown in blue. The early oil bonanza from the Maui field was followed by a boost from the Pohokura, Tui and Maari fields, but these followed the classic Hubert resource depletion curve. Subsequent extensive oil and gas exploration failed to find enough big new resources to save the day. Further oil discoveries only provided temporary respites in the decline of New Zealand's indigenous net oil supply.

During the Maui bonanza natural gas was converted to petrol for 10 years.

The manufacture of biodiesel from vegetable oils was initially seen as a desirable renewable supply of transport fuel. But it was in competition with other land uses and became constrained. For the last quarter of a century about ten percent of New Zealand's arable land has been farmed for fuel, which provides farmers with a cash crop, but does not make a major contribution meeting our transport fuel needs.

After the 2015 oil crisis the world faced a permanent shortage of liquid fuels and New Zealand was unable to increase imports of oil at any price. The peak of global oil production in 2006 corresponded with New Zealand's biggest ever oil import rate at about one thousandth of the global supply of oil. As the global supply tightened that share of the global pool of oil became a constraint that New Zealand was never able to exceed.

The demand for petrol was eased by the advent of small electric cars, but the needs of a growing population following the kiwi dream of living the rural lifestyle mean that the electric cars did not make a net reduction in the demand for petrol.

Unfortunately, the short term economic view prevailing after the 2011 general election resulted in the closure of most of the rural rail network in 2012 in favour of spending on roads. Once the rail corridors were closed they were soon adapted for other uses. That fuel efficient mode of freight transport was

never reinstated. This locked New Zealand into dependence on trucks to carry primary production from the rural areas to the market place. Incremental improvements in the efficiency of vehicle design and use only offset the demands of the increasing population.

The outcome was that the net demand for liquid transport fuel in New Zealand has remained roughly constant for 40 years.

The oil crisis in 2015 finally confirmed that New Zealand could no longer rely on the world market to supply the oil to which we had become addicted, so the technology of last resort had to be adopted. The first coal liquefaction plant was built in New Zealand in 2019

This was not the thermally inefficient production of diesel from low grade lignite that had been promoted some eight years earlier, but used good quality coal from the Waikato coalfield in an efficient 10,000 barrels per day direct liquefaction process that I had helped develop in the UK some 35 years earlier after the oil crisis of the 1970s.

We now have 6 of these modular coal liquefaction plants in New Zealand, which have so far consumed about one quarter of New Zealand's sub-bituminous recoverable coal resource (WEC 2002). The lignite underlying Southland still remains largely unexploited.

In contrast to the major role of coal to provide transport fuel in New Zealand, coal has a more minor, albeit vital, role in today's electricity supply scene. The expansion of geothermal and wave generation took over from natural gas turbines as the main supporting technology for hydropower in New Zealand and achieved 90% renewable electricity generation by 2025. In combination with demand management and distributed generation the security of electricity supply is still well maintained including the additional loads for electric vehicles.

However, there is still a need for a large reserve generation capacity to accommodate dry years and major plant breakdowns or maintenance outages. The refurbished Huntly power station, with its large stockpile of coal, fulfills that stand-by role. In some years it is not used at all. Nevertheless, “they also serve who only stand and wait”. Huntly power station is now used in the same way as the old petrol generator that the owner of an off grid renewable domestic system keeps in his shed for emergency use.

In common with many other small countries, the oil crisis of 2015 and the decision to liquefy coal to meet our liquid fuel needs, signaled the end of any serious policy by New Zealand to artificially control fossil fuel CO₂ emissions. The Emissions Trading Scheme and ideas of Carbon Capture and Storage were abandoned in 2015. That policy direction reflected a world-wide shift in strategy from mitigation of CO₂ emissions to adaptation to the effects of Climate Change.

We are now well aware of the consequences of those decisions made decades ago.

- We have adapted our houses and infrastructure to cope with the frequent severe storms,
- Each of our coastal communities have made decisions either to pursue a strategy of managed retreat or a strategy of building coastal defences against the advancing oceans; and

- You children can only marvel at the pictures in your natural history books of the rich diversity of flora and fauna that existed when I came to New Zealand fifty five years ago.

If New Zealand had maintained and developed its rural railway network and the people had learned to live in compact communities using a lot less liquid fuel then perhaps we could have avoided the need to build six coal liquefaction plants. If so, then the atmosphere would now contain 400 million tonnes less CO₂.

Whilst New Zealand is a very small country in the global context, that single source of CO₂ emission has brought forward the entire global consequences of Climate Change by a full two weeks.

As a member of the baby boomer generation, I feel that I must offer your generation an unreserved apology.

- We understood the effects of our lifestyle on the ecology of this planet;
- We knew what needed to be done to leave Planet Earth in good shape for future generations;
- But we failed to get our self-serving habits under control;
- By living to my great age I have become a part of the problem;
- You young people will have to live with the consequences.

I am sorry.

Steve Goldthorpe

NZ IN 2050 – A RADICAL CHANGE

by Professor Bob Lloyd

The increasing incidence of climate change disasters by 2020 including, flooding, large scale forest fires, cyclones, tornadoes and droughts in various places in the world finally

convinced the country that Jim Hansen was right and NZ proceeded to completely ban all forms of coal mining by 2022; including coal for export.

Nuclear power too was shut down worldwide shortly after in 2023 when the then 63 year old light water reactors at Indian Point, just outside NY, finally succumbed to lack of maintenance and went critical, dispersing radioactive isotopes over a 155 mile radius affecting the entire city of New York.

Proponents of nuclear power who would not give up their advocacy were given community service detentions, looking after the accumulated waste from the worlds reactors: to be served by themselves and their descendants for the next 250,000 years.

NZ became the first country in the world to have a fully renewable energy supply by 2050. This feat came after a 100% renewable electricity supply, which was achieved by 2030 the latter being accomplished by utilising a combination of wind, geothermal and hydro resources.

Transport was initially thought to be problematic in terms of energy supply but the world financial crashes of early 2013 and late 2016 convinced the population of NZ that continued economic growth, based on capitalist economics and consuming an ever increasing range of products was just not possible.

The first steps to be put in place to reduce conspicuous consumption were restrictions on advertising. Committees were established to enable clear guidelines for commercial advertising. In particular neuro-marketing and overt psychological approaches were banned for both industrial and political advertising.

After peak oil in 2012 oil supply began to gradually decrease causing some increase in petrol and diesel prices but the real decrease in personal transport came about due to the restrictions placed on motor vehicle advertising, which followed the example of cigarette advertising.

Similar to cigarette packets all personal motor vehicles were made to have garish warning signs painted all over them: explaining that

the vehicles were a health hazard and a threat to the global environment. The shame was too great for all but thick skinned, petrol heads and most people reverted to free public transport; when they could not cycle or walk.

Most industrial output aimed at the consumer market declined dramatically in NZ, as in the rest of the world, but in NZ local production of food and handcrafts more than made up for the loss. The emphasis was on services with a low energy footprint, which encouraged well being and human development, rather than just having more stuff.

To this end television stations were taken over by communities to present educational products which encouraged community participation, local food production and discouraged overt consumption. The new cool was frugal, branding was bad and flaunting any form of energy intensive living was frowned upon.

Communities were redesigned so that they could be used without vehicles, with cycle ways and pedestrian access being made a priority. Such measures improved health and cut down on obesity. Some fossil fuel transport was still available for emergency vehicles and limited electric vehicles were available for shared use.

Scientific research in NZ was redirected to be of direct benefit to people and the long term future of the planet. Not to corporations and industrial development. Any research which would lead to increased national or personal energy consumption or increased pollution had to pass stringent ethical approval processes.

Renewable energy research and development of course accelerated and became a major industry in NZ. The aluminium smelter in Invercargill was converted to make solar grade silicon in 2021 and by 2050 NZ had become one of the main suppliers of PV systems to redeveloping countries.

International tourism declined dramatically both in NZ and the rest of the world as the environmental effects of air travel were made apparent to would be travellers. Travel by sailing boat was the preferred mode. The big problem for the world, however, was climate refugees.

The NZ taxation system was completely revised after the 2017 elections to tax the rich more heavily in order to reduce the reputation of NZ being one of the more unequal countries in the developed world. The second financial crash of 2016 assisted in the process of redistributing wealth as this time the government finally refused to bail out “too large to fail companies” and many CEOs lost their fortunes.

With the failure of the international monetary system, NZ introduced a new currency, the Kiwi, backed by a bag of commodities including sheep, milk and timber. In addition communities started local currencies to facilitate trade and exchange of labour. Dunedin had the Dunner , 50 Duffers to the Kiwi in December 2050.

Also in Dunedin in that year the new Mayor, Geraldine Mc Tavish (daughter of previous councillor Jinty McTavish) praised the city

for its transformation to a fully self sustaining community. The student community, however, was still problematic but at least had progressed from burning synthetic couches to burning organically grown timber furniture.

Dunedin community gardens now exported produce to places as far away as Gore and Oamaru. Again the selection of crops had been assisted by global warming and oranges and apricots were easily grown in Dunedin, on north facing slopes. Grape production was also in full swing.

Dunedin and NZ in particular had been lucky by world standards, population started to stabilise at 120,000 and 6 million respectively by 2050. The situation in some other countries around the world had managed to mirror the NZ transformation but many others failed with catastrophic results. Climate and economic refugees, however, remained an unsolved problem.

The US in particular, failed badly. A second dispute on Government funding between the two main parties led to a permanent shut down of **Federal** Government in 2026. Most inhabitants, however, found that the country actually operated better with no national government and many overseas wars were averted. *Bob Lloyd*

Petrobras Completes Raukumara Seismic Survey

Petrobras International Braspetro NZ branch has announced it completed its initial 2D seismic survey in PEP 52707, offshore the east coast of New Zealand’s North Island, where it was subject of a *Greenpeace* flotilla protest. Petrobras says “*as usual and expected, the seismic research activity had no impacts and the whole planned acquisition survey was efficiently completed within 30 days of operation.*” Petrobras has until May 2012 to analyse the data acquired before deciding next steps.

*New Zealand Energy and Environment
Business Week 10th May 2010*

SEF member Gerry Coates sent in the story of the demise of Petrobras P-36 production rig, of which a Petrobras executive had earlier claimed “*The project successfully rejected the established constricting and negative influences of prescriptive engineering, onerous quality requirements, and outdated concepts of inspection and client control. The elimination of these unnecessary straitjackets was delivering superior financial performance.*”

On March 20, 2001, the largest offshore oil production platform in the world sank to the bottom of the ocean about 150 kilometers off the coast of Brazil. A series of explosions claimed the lives of 11 crew members and crippled one of the four main support columns, which resulted in the massive flooding of Petrobras Platform P36 through an improbable but devastating chain of events. Approximately 1,200 m³ of diesel oil and 300 m³ of oil spilled into the Atlantic Ocean's Campos Basin, and the \$496 million rig was declared a total loss



NASA
System Failure Case Studies October 2008

Neil's Oil Price Chart

This chart, compiled by Neil Mander, tracks a basket of oil prices in comparison with the gold price. Oil prices are from the NZ Herald for Brent (UK North Sea), Dubai (Middle East), Tapis (Singapore) and West Texas (USA). A noticeable trend this year is the widening disparity between the four regional oil markets. The far east (Tapis) oil price is now 25% higher than the West Texas (USA) price. Does this indicate that there is no longer a functioning global market for oil, but that the oil market has effectively become regionalised?



Oil Tumbles on Plan to Release International Reserves

Chris Kahn – Associated Press Energy Writer – 23rd June 2011

Oil tumbled Thursday after the International Energy Agency, which includes the U.S., said it will release some of its emergency oil supplies to stave off a possible spike in energy prices that could strain the global economic recovery.

The IEA, based in Paris, will make 60 million barrels available over a 30-day period. Half of that will come from the U.S. Strategic Petroleum Reserve, which currently holds 727 million barrels of crude. The SPR was last tapped in 2008 as oil rose to a record \$147 per barrel.

Join our sustainable energy news & discussion group

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

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

As with all Yahoo groups, SEFnews emails can be received “individually” (as they are sent) or as a “daily digest” (grouped into one email per day). If you have a Yahoo ID you can also switch emails on and off, or read the news on the web – a handy option for travelling Kiwis. YahooGroups saves all of our text emails for later reference, and there is a search function so that you can review the thousands already stored over the last 6 years.

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

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

EnergyWatch

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

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

Publication is now bi-monthly, and EnergyWatch is posted on the SEF website (www.energywatch.org.nz) as a PDF file, two months after distribution to SEF members.

Contributions Welcomed

Readers are invited to submit material for consideration for publication.

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

Material can be sent to the SEF Office, PO Box 11-152, Wellington 6142, or by email to editor@sef.org.nz, or by directly contacting the Editor, Steve Goldthorpe at PO Box 96, Waipu 0545.

SEF membership

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

Membership rates are:

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

Mail the form below, with your payment or order, to The Sustainable Energy Forum Inc, P O Box 11-152, Wellington 6142. A receipt will be sent on request.

Name:

Organisation:.....

Address:

.....

Home Phone:.....

Work Phone:.....

Mobile Phone:.....

E-mail:.....

Membership type:.....

Amount enclosed: \$.....