EnergyWatch

The Journal of the Sustainable Energy Forum Inc.

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

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Editor: Steve Goldthorpe
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EDITORIAL

Road vs Rail:

Is the debate over ?

Back in September I wrote a letter to Hon Steven Joyce, Minister of Transport challenging his statement that *"Road users will not sacrifice personal mobility, even in the light of higher oil prices"* I presented evidence from the Ministry of Transport statistics which do not support that assertion.

My letter focussed on the issue of the impending closure of the rail line into Northland and other rail closures for which his line of argument is a mainstay.

I heard nothing for two and a half months. Then I received a reply via an email, which was sent on the morning of November 28th. Coincidentally, this was the first working day after the election. Could it possibly be the case that Minister did not want this explanation of his rationale for the programme of "Roads of Significance to National" exposed to public scrutiny in the pre-election period. Could the technical reply, which was presumably drafted by Ministry staff, possibly have been embargoed until after the election?

I include my letter and Hon Steven Joyce's reply in this issue so that EnergyWatch readers can judge for themselves the validity of his logic of historical and present day narrow economics as a basis for future infrastructure development strategy in the rapidly changing world that we face.

♫ *The SEF Management Committee wishes all members a Happy New Year* ♫

May I congratulate my local MP Hon. Phil Heatley on his appointment as Minister for Energy and Resources. I hope that SEF and EnergyWatch will provide him with some useful perspectives.

Following the discussion on hydraulic fracturing presented in EnergyWatch 63, I was asked to give my perspective on the technology of underground coal gasification (UCG) which is being trialled again in the Waikato; this time by Solid Energy.

The challenge of Underground Coal Gasification is a daunting prospect. It combines many disciplines in a pot-pourri of problems in which the variables out-number the control parameters. There are a handful of adventurous companies around the world trying their luck at getting UCG to work consistently and reliably and there is a long history of UCG trials and demonstrations going back 50 years almost all of which have failed to establish the hoped for robust, replicable technology.

A former British Coal colleague led a research programme on UCG in the UK many decades ago. He characterised UCG as *"You drill two holes down into a coal seam. Then you stuff five pound notes down one of the holes and then wait expectantly for them to come back up through the other one"* Has the technology changed fundamentally over the intervening years?

Another adventure that Solid Energy is embarked upon is trying to make a silk purse out of a sow's ear by briquetting Southland lignite. Further to comments in EW63, this issue has more notes on that technology.

In December the highly respected learned Institution of Professional Engineers of New Zealand (IPENZ) published a reassuring document *"Realising our Hidden Treasure – responsible mineral and petroleum extraction"* outlining how a strategy focussed on mining and drilling in NZ might be described as environmentally sustainable. However, IPENZ, like SEF, is a broad church whose members have a wide range of views. Some IPENZ members and others take exception to the representation in that report of "*What IPENZ thinks*" Such an expression of disquiet is in this issue of EnergyWatch.

I am pleased to have now returned home permanently to New Zealand. Whilst on my extended stay in the UK, I had a ride on the new ULTra transport system at Heathrow airport. Regrettably the ride was not smooth enough to get action photographs to share with readers, but I include my perceptions.

As usual, EnergyWatch wraps up with an update on the oil price scene. It appears that in 2011 some stability returned to oil prices, perhaps settling around a norm of $100/bbl.

As always I will welcome contributions to EnergyWatch from SEF members.

Steve Goldthorpe, Editor

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Correspondence with the Minister of Transport

Sustainable Energy Forum

Convenor
Steve Goldthorpe
Phone 09 432 0532
editor@sef.org.nz

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Office
PO Box 11-152
Wellington 6142
New Zealand
http://www.sef.org.nz
info@sef.org.nz

Hon Steven Joyce,
Minister of Transport
Wellington
Cc: Hon. Phil Heatley, MP for Whangarei

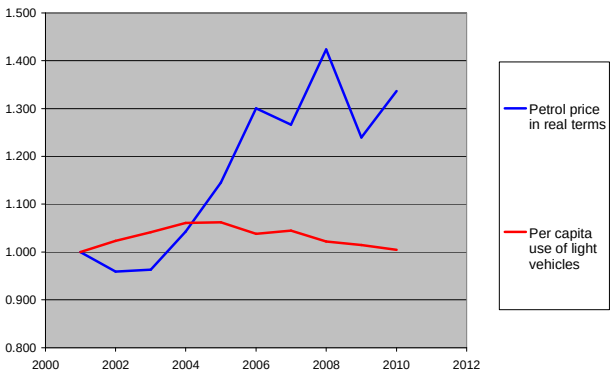
10th September 2011

Dear Mr Joyce,

I read with interest your attached letter to Alan Preston, who is campaigning to retain the rail line into Northland from Auckland.

I note your assertion that *"The Government considers that road users will not sacrifice personal mobility, even in the light of higher oil prices."* Please advise me of the quantified up to date research on which this critically important assertion is based.

Data compiled by your own ministry indicates that the opposite is actually now the case. The figures report that per capita light vehicle use, which was steadily growing at the beginning of the last decade, peaked in 2004 and has since declined at a rate of about 1% per annum, as petrol prices have increased in real terms. This chart shows a plot of these data from your ministry and from MED's Energy Data File over the last decade. Your data clearly shows that road users are reducing their personal mobility. That reduction correlates with the increase in real petrol prices.



I also note your comment that *"The Puhoi to Wellsford road will cater for both passengers and freight, which is particularly important given that freight volumes between Auckland and Northland are forecast to double in the next 10 years."*

Road freight volumes to and from Northland are indeed likely to double if the rail line into Northland is closed and the freight that it currently carries is transferred to the roads.

Does your statement mean that the Government has already decided to close the rail line into Northland? If so, then is the business review currently being undertaken by Kiwi Rail nothing more than a device to delay the announcement of the closure of the Northland rail line until after the forthcoming general election?

Yours sincerely,

Steve Goldthorpe
Editor of EnergyWatch
For the Sustainable Energy Forum

Response received on 28th November.

Office of Hon Steven Joyce

Minister of Transport
Minister for Communications and Information Technology
Minister for Tertiary Education
Associate Minister of Finance
Associate Minister for Infrastructure

28 NOV 2011

Steve Goldthorpe
Editor of Energy Watch
steve.goldthorpe@xtra.co.nz

[transcript]

Dear Steve,

Thank you for your email of 11 September 2011. You comment on a statement I made

that *"The government considers that road users will not sacrifice personal mobility, even in the light of higher oil prices"* Please accept my apologies for the delay in replying.

You also refer to data produced by the Ministry of Transport (the Ministry) which indicates a decline in the use of light vehicles of about one percent per annum since 2004.

This is correct but there are a number of measures of vehicle use produced by the Ministry, which show a mixed picture for vehicle use and travel mode. For example, the mode share of journeys to work by fulltime workers' travel between 6.00 a.m. and 9.30am has shown an increase in motor vehicle use between July 2004 and June 2010. This data is available on the Ministry's website available at: www.transport.govt.nz. It is also contained in the recently released *Connecting New Zealand: A summary of the government's policy direction for transport* also available on the Ministry website.

Land Transport New Zealand prepared a report in 2007 (research report 331) which considered the likely vehicle use response to increases in fuel prices. This report is available at : www.nzta.govt.nz. It assessed evidence of the impacts of petrol price changes on petrol consumption, traffic volume and public transport patronage in New Zealand. The impact of petrol prices on petrol consumption in New Zealand was investigated using a number of econometric models. Most of these models explicitly estimated the relationship between percentage changes in petrol prices and percentage changes in petrol consumption.

The preferred model implied that a 10 percent (real) rise in the prices of petrol will affect petrol consumption as follows.

- Petrol consumption will decrease by 1.5% within a year.
- Petrol consumption will decrease by 2 percent after 2 years.

This represents a short run elasticity of -0.15 and a medium-run elasticity of -0.20.

Further modeling indicated that the short–run elasticity (the impact of prices on petrol consumption over the first year) is expected to be constant over time. This elasticity showed no indication of increasing or decreasing with time.

Therefore the response by vehicle users to increases in petrol prices does appear to be relatively inelastic.

You refer to my comments on the Puhoi to Wellsford road and the likely doubling of freight volumes in the next 10 years. Freight volumes to and from Northland are likely to double irrespective of whether they are carried by road or rail.

The Upper North Island Freight Study prepared by Richard Paling Consulting in 2010, forecast substantial growth in the volumes of freight moved between Northland and Auckland over the period 2006/07 to 2031. Freight from Northland to Auckland is forecast to grow by 194 percent, while the reverse direction flow is forecast to grow by 26 percent.

In the study the roading network was forecast to accommodate the majority of the increase in freight traffic. This reflects in part the high shares of the totals for internal and inter-regional traffic where the other modes (rail and coastal shipping) are less able to provide a competitive service. It also reflects the limited growth in the movements of a number of commodities where rail and coastal shipping has been able to achieve a reasonable modal share.

I can also confirm that KiwiRail is reviewing the future of the Northland rail line (north of Helensville) To ensure its own long-term survival KiwiRrail needs to take a pragmatic commercial approach to those parts of the business which operate at a loss, such as the Northland line.

The approximate volume of freight moved by all modes in Northland in 2006/07 was 12.36 million tonnes. The rail network handled 0.2 million tonnes (less than 2 percent of the total volume moved).

Rail is a high fixed cost business. While it has real strengths where economies of scale can be realized, its competitiveness and flexibility is reduced on routes with infrequent traffic and low volumes. Considerably more freight volumes will be needed on the Northland line in order for it to be commercially viable in the long term. Accordingly, KiwiRail will need the commitment of at least one major freight customer to secure the future of the line. If that freight business cannot be found then KiwiRail will need to consider closure of the line.

Contrary to your suggestion, the government has not made any decisions about the future of the Northland line. Any such decision would be made by KiwiRail with any decision to close requiring ratification by government.

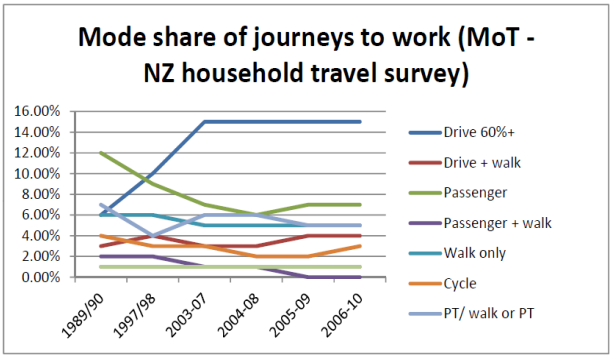
Thank you for taking the time to write to me.

Yours sincerely

Steven Joyce
Minister of Transport

Editor's notes

This figure shows the data for travel to work referred to in the Ministers letter.



Whilst this chart shows that driving to work increased as a mode share in the 1990s, the data presented on the Ministry website shows that it has been constant at 75% of journeys in the period 2004 to 2010; not increasing.

The reported modeling of the relationship between petrol pricing and petrol consumption clearly shows elasticity indicating that road users will, where they can, sacrifice personal mobility in the light of higher oil prices.

The oil price chart on page 11 shows a new median oil price of $100/bbl is possibly becoming established, which is 50% greater than the seemingly stable oil price around five years ago, when many decisions on modes of transport would have been made.

The Upper North Island Freight Study (UNIFS) does not indicate doubling of freight demand between Auckland and Northland over the next ten years. The scenario projections of that report compare historical data for 2006/7 with projected data for 2031, which is period of 25 years not 10 years. The UNIFS study notes that the scenarios are based on business as usual projections of historical activity, which do not take account of the global economic downturn experienced in recent times. The UNIFS report suggests that it might take even longer for freight demand to reach the levels projected for 2031.

Furthermore, the UNIFS identifies the main growth areas for tonnages of freight from Northland south are principally building aggregate and logs. These heavy, low-value commodities are not time-sensitive and are well suited to rail transport.

The CEO of KiwiRrail advised a public meeting in Whangarei that the line was currently breaking even, not running at a loss.

In view of these comments, the government's rational for a rapid road building programme and allowing KiwiRail to close the Northand rail line seems highly questionable.

Underground Coal Gasification – Why bother?

By Steve Goldthorpe

This review and assessment concludes that UCG is fraught with control issues and cannot deliver the desired fuel gas quality.

It has long been a pipe dream of the coal industry to access energy from coal seams without the need for sending men underground or creating large unsightly holes in the countryside. A small amount of energy can sometimes be accessed in the form of coal bed methane, but that is only a by-product of coalification process comprising only a few percent of the copious energy resource content of the coal seam. The alluring prospect of extracting almost all of the energy in a coal seam by underground coal gasification (UCG), out of sight underground pushes the boundaries of inventiveness and optimism of some adventurous engineers.

However, the process of coal gasification is not just partial combustion. Figure 1 shows four distinct functions of the coal gasification process. Endothermic pyrolysis requires a high temperature, anaerobic environment. The exothermic combustion zone is an oxidizing environment, whereas the steam gasification zone is a reducing environment, where the thermal balance is controlled by the energy demands of the evaporation zone. Successful coal gasification needs at least two and preferably three or four distinct zones to be maintained and well controlled.

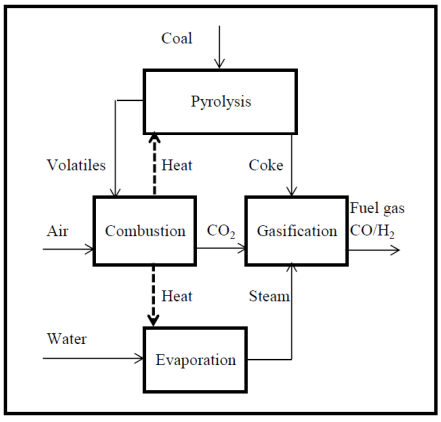


Figure 1 – Coal gasification

There are many commercial coal gasifier designs in which the pressure, temperature, coal/oxidant ratio and oxidant/steam ratio, are carefully controlled within zones in a well-constrained engineered system. Some use oxygen as the oxidant to produce a medium calorific value synthesis gas suitable for further processing to petrochemicals. Other coal gasification processes use air as the oxidant to produce a low calorific value gas, which is only useful as a fuel gas. In some designs the fuel gas CV is enhanced by arranging for some of the hydrocarbon volatiles to bypass the combustion zone and report as methane etc. in the fuel gas product.

In the case of UCG, the ability to design and control the coal gasification process is severely constrained. The aim is to create the required gasification zones as moving cavity within the coal seam, which is the primary reactant. In principle, the UCG control engineer has only two control parameters; the rate of addition of oxidant via the injection well and the rate of release of product gas up the production well. The balance of these two parameters controls the pressure in the cavity, which controls groundwater ingress.

If too much groundwater flows into the reaction zones the temperatures reduce, the pyrolysis and combustion processes are impaired and ultimately the reactions stop. If too little groundwater flows into the reaction zones the gasification process is impaired and ultimately the process becomes a coal burner delivering only products of combustion. Another problem with inadequate net ingress of groundwater is the potential for partial egress of contaminated groundwater.

Two control parameters are inadequate to manage the coal gasification process, which requires at least the four parameters of pressure, temperature, coal/oxidant ratio and oxidant/steam ratio to be accurately controlled throughout all active UCG operating zones.

In the early 1990s a trial 12-day UCG burn was conducted in the thick unminable coal seams beneath Waikato wetlands. A few years later ECNZ revisited the concept, but thought better of it and shelved the idea; finding it based on guesswork and optimism.

Solid Energy is now following in the footsteps of ECNZ, prompted by higher energy prices, and embarking on the challenging adventure of UCG trials in the Waikato. See www.huntlyucg.co.nz.

Solid Energy now claim that new technologies can make a difference, that gas is more amenable to CO_2 removal than coal and that the gas is suitable for conversion to electricity, petrochemicals and liquid fuels.

To explore the UCG process further I have constructed a spreadsheet model of the net mass, energy and element balance that must exist underground. This model is based on the use of air as the oxidant and bituminous coal with 8% ash and a gross dry ash free calorific value of 36.5 MJ/kg as the energy resource. To model the gas composition I assumed that the water-gas shift equilibrium is 200 degrees Celcius above the gas exit temperature and heat loss to the surrounding strata is 2% of the energy release.

This model indicates that viable conditions are methane production up to 20% of the weight of coal reacted, air input 20% to 30% of the stoichiometric demand and water ingress from 10% to 90% of the weight of coal consumed. Figure 2 shows the sensitivity of the resulting gas composition to these parameters and the gas exit temperature.

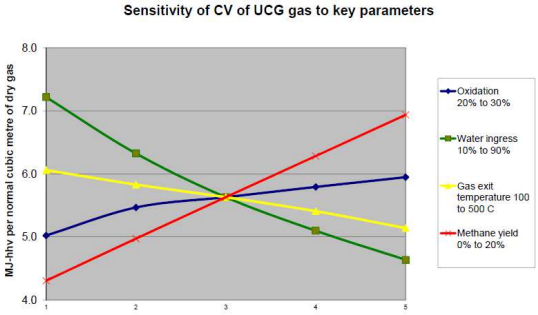


Figure 2 – Air blown UCG gas CV

Since the gas product contains unreacted CO_2 and a large part of the energy is in the form of CO, the subsequent combustion of that fuel gas would have a high yield of CO_2. Figure 3 shows the sensitivity of the greenhouse intensity of the UCG gas to those variables.

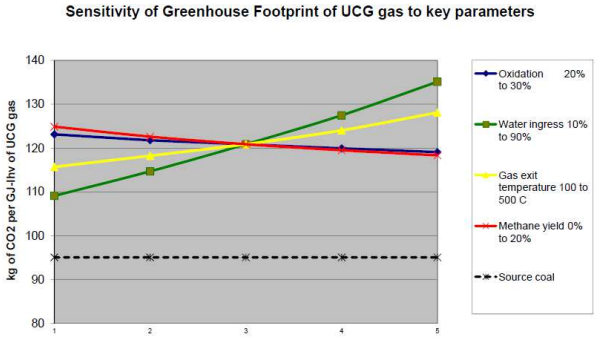


Figure 3 - UCG gas GHG intensity per GJ

Figure 3 shows that the emission factor of UCG gas is 110 – 135 kg CO_2/GJ_{lhv} The comparative emission factor of coal is about 95 kg CO_2/GJ_{lhv}; i.e. 15% to 30% lower.

Natural gas used in a modern base load combined cycle power plant can be up to 30% more energy efficient than a modern coal-fired power plant. However, low CV gas from air-blown UCG has about one seventh of the volumetric energy density of natural gas and cannot achieve as high an efficiency as natural gas in a combined cycle power plant. It is no more than 10% better than coal.

Therefore the use of UCG gas for power generation would result in higher CO_2 emissions per unit of electricity than from an equivalent modern coal fired power station.

Have the claims made on the Solid Energy website been critically reviewed? Does the advanced technology include the controversial hydraulic fracturing technique to preprocess the coal? Has an analysis of pre-combustion CO_2 removal from gas been rigorously compared with the benchmark of post-combustion CO_2 capture from coal? Even if these boxes can be ticked, the 50% nitrogen content of the air-blown UCG gas makes it unsuitable for hydrocarbon manufacture.

Why bother?

Lignite Briquettes – Will they hold together ?

By Steve Goldthorpe

In my student days I worked for two summer vacations at the National Coal Board's Roomheat smokeless fuel briquetting plant near Doncaster. This plant used a cupped roller technology for pressing square-shaped briquettes. NCB also operated, at that time, a sister plant near Coventry making Homefire hexagonal briquettes using an extrusion process. Both of these commercial products were supplied to the domestic market for use in enclosed burners as a smokeless (compared with raw coal) fuel.

The process involved three stages, conversion of coal into a hot char, compression of the char into briquettes and finally cooling of the briquettes in a water bath. In the first stage crushed coal was heated with recycled fuel gas in the absence of air to produce a sticky char and volatile gases. A bituminous coal was used. That descriptor indicates its propensity to produce bitumen when heated. The sticky char was compressed in a heated press to produce briquettes which were bound together by the bitumen, which also made them water resistant.

A principal performance requirement of the briquettes was their ability to accommodate rough handling. They had to be able to withstand being tipped into a heap, moved by a front-end loader and still retain their dimensional integrity by the time they reached the customer. Minimising broken briquette rejects was a key production metric.

The briquettes were subjected to stringent laboratory test criteria for compression, abrasion and impact. However, perhaps the most severe test that they were exposed to was the lads playing football with a briquette in the concrete yard during their lunch break.

In comparison with this experience I am puzzled by the proposal to make briquettes out of lignite and I am wondering how they will be bound to make them robust to cope with rough handling and be fit for purpose.

The briquetting process proposed by Solid Energy New Zealand (SENZ) apparently will dewater lignite and form it into "pea-sized" pellets just by compressing it.[1]

Figure 4 – Lignite Briquettes (www.coalnz.com)

There is no mention of the use of a binder material to hold the pellets together, nor any mention of an energy consuming thermal process to release any natural binding material from the lignite itself.

The process vendor is GTL Energy from Australia. Some trial samples have reportedly been produced from NZ lignite by GTLE and successfully burned in industrial applications. As expected, lignite burns more efficiently when its moisture content is reduced.

One would be confident in the dewatering and pelletising technology if it had a proven track record. However, the GTL Energy website[2] notes *"The SENZ choice of GTLE's proprietary process and equipment represents a substantial vote of confidence in the technology and its readiness for commercial deployment"*

It is to be hoped that our state-owned enterprise has negotiated a good performance guarantee for product structural integrity.

[1] www.coalnz.com/index.cfm/3,169,368/lignite_factsheet.pdf

[2] www.gtlenergy.com.au/news/26-solid-energy-breaks-ground-on-gtle-plant.html

IPENZ – Realising our Hidden Treasure

Responsible Mineral and Petroleum Extraction (?)

In December IPENZ published a paper founded on the premise that:-

New Zealanders aspire to have living standards similar to other highly developed countries. Realising this aspiration requires economic growth, particularly export-led growth which improves New Zealand's overall balance of payments. A diverse economy is important and agriculture, tourism and high technology manufacturing can all make their contribution to New Zealand's economic growth. IPENZ believes the mineral and petroleum extraction sectors can also be increased to contribute to growing our exports.

It is noted that IPENZ*"...seeks to contribute to the community of national interest. One part of its contribution is to issue position papers, which gave a learned view on important issues, independently of any commercial interest. Such papers are not consensus papers of the Institution membership"*

The IPENZ paper can be accessed at:-

http://www.ipenz.org.nz/ipenz/media_comm/documents/IPENZMineralsandPetroleumFinalDec2011_000.pdf

A questioning view is expressed by an IPENZ member in this letter to the IPENZ board.

Dear Members,

I write concerning your December 2011 position paper explaining that New Zealand should not be deterred by environmental considerations in maximising the economic benefits to be gained by mining activities.

May I enquire who the writers of this document were, and if it was approved by the board?

In my opinion the discussion of the climate change effects of mining fossil fuels was dealt with in an extraordinarily shallow way. The writer or writers expressed satisfaction that, in contributing to climate change effects, the producer of fossil fuels is, by agreement, exonerated. The user is responsible – whether in terms of ultimate culpability for despoiling the Earth or for paying carbon credits, the writer doesn't say, because the issue has been dealt with as far as they were concerned. No further examination was needed.

The writer appears to believe that *"the New Zealand regulatory environment already provides direct economic signals to private investors so fossil fuel users and producers are able to operate in a market that embodies the effect of greenhouse gas emissions."*

They note, in the next paragraph, that the Parliamentary Commissioner for the Environment has expressed concern about New Zealand far exceeding its promised emissions limits, and about the inability of the Emissions Trading Scheme as an effective instrument to curb this. Undaunted, the writer expresses the view that this has nothing to do with the mining industry. It is for others to deal with.

The writer appears quite satisfied with Solid Energy's claims that it will compensate for the massive planned increase in carbon emissions by plantings, purchase of carbon credits and by carbon capture and storage. It is unworthy of a professional writer that this claim was subjected to no criticism. Solid Energy cannot possibly plant enough trees to compensate for its emissions. There isn't

enough land available. Carbon capture and storage is an immature technology, unlikely to have reached feasibility by the time Solid Energy begins pouring more carbon into the atmosphere. No site in the area has been identified as suitable for carbon storage.

Astonishingly, the only reference used in this entire section is to Solid Energy's document, *Southland Lignite.* This reader concludes that the writer does not know or understand the gravity of climate change issues and the heavy responsibility of fossil fuel mining in contributing to this issue. Nor have they demonstrated any capacity for moral analysis of this responsibility. The document reads as an apologia for the mining industry. Indeed, I suspect this was the motivation of the writer.

Do the engineers of IPENZ really want to put their imprimatur on this document? This would be pretty disappointing for a professional body. May I suggest you retract this very questionable offering and produce another document examining the same important issue, and written by someone with some depth of knowledge in climate change and other ecological issues?

Yours sincerely,

Joanna Santa Barbara
MB.BS, FRANZCP, FRCP(C), O.Ont.,

Editor's note on CCS.

I have been working for the last 6 months at the IEA Greenhouse Gas R&D programme (IEAGHG), in the UK, which is considered by many to be the authoritative international clearing house for information on carbon capture and storage (CCS) technology and economics.

I disagree with the generally held view that CCS is an immature technology. On the contrary CCS is not a single technology, but involves combining and integrating a number of mostly well established mature technologies.

The reason why very few CCS demonstrations have been fully implemented is simple economics. The cost of typical CCS scheme is in the region of US$50-US$100 per tonne of CO_2 emission avoided, so there is no economic incentive to spend a large amount of money on an unproductive pollution control system whilst the carbon price in the marketplace is currently less than US$10 per tonne of CO_2 emission avoided.

The statement by Solid Energy, uncritically repeated in the IPENZ paper, that they intend to explore ways of reducing emissions with CCS is hollow. There is no need to do exploration to come up with the answer that CCS will be grossly uneconomic until the carbon price increases dramatically.

At IEAGHG I found that the technical and economic reality of CCS is little different now from what it was 20 years ago when I was previously involved in CCS R&D. There are still three potential capture routes; post-combustion capture, pre-combustion capture and oxyfuel combustion, with no clear winner from a technical or economic perspective.

The three alternative capture processes still rely on the need for a secure underground storage location for CO_2. The oil industry has established the transport and injection of CO_2 as a mature technology via its application for enhanced oil recovery. The barriers to underground CO_2 injection are not awaiting any technological advance, but are inhibited by the reality that every case will be site specific and one successful demonstration does not mean that CO_2 storage can necessarily be replicated in other places.

At IEAGHG, I found that over the last two decades there have been refinements in the technology and costs of components, but no game-changing breakthroughs to bring CCS any closer to widespread application.

Steve Goldthorpe, Editor

ULTra Personal Rapid Transit System

The website www.ultraglobalprt.com website describes an innvovative transit system. A demonstration scale application has been installed at Heathrow airport.

When I was there recently I went in search of the cute little vehicles, known locally as "pods". Terminal Five, at the Western extremity of the Heathrow complex, was almost deserted on a Wednesday evening. After a long search I eventually found the pod boarding location at the far end of a mid level in the terminal car park.

The installation is a park and ride facility from two off-site car parks. It comprises 18 pod units operating on dedicated narrow concrete channels. I only saw one other person using the system. I did not spot the battery recharging facilities. It would seem an ideal system for induction loop charging.

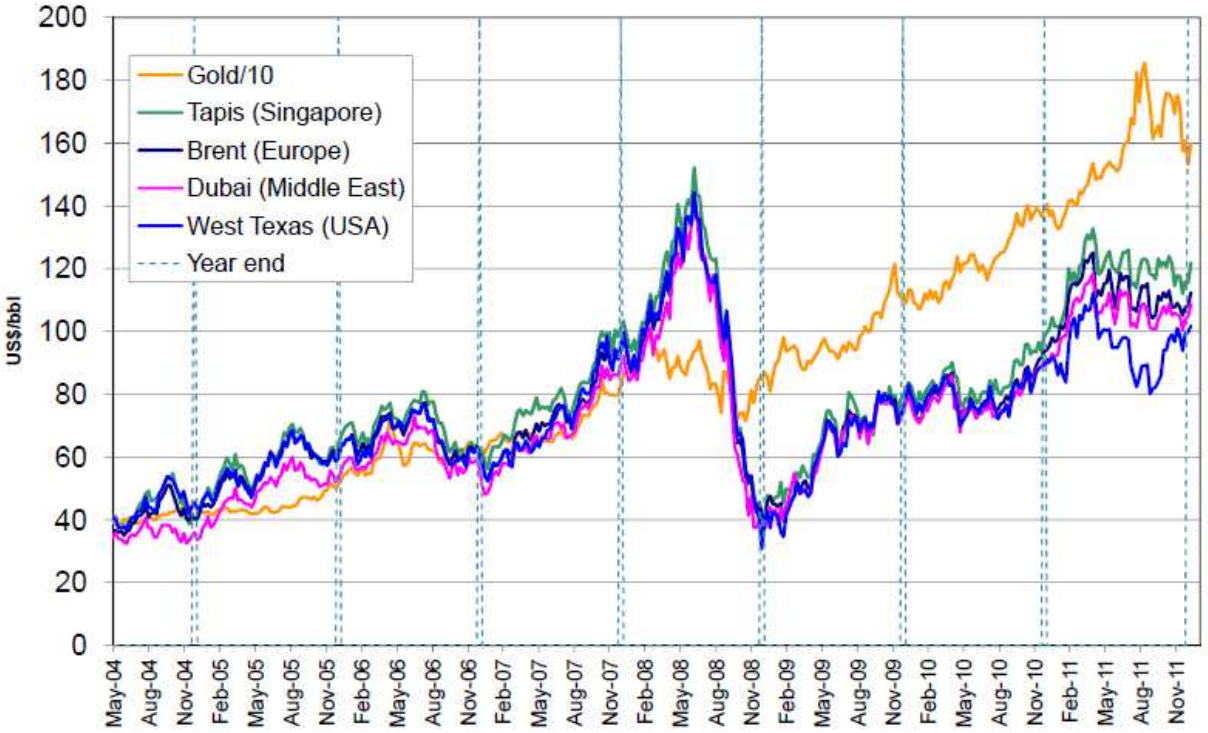
I took the six minute free ride out to one of the car parks and back. The system is all automated with simple touch screen destination selection and a friendly disembodied voice providing information. I tried to take some photographs, but the ride was too bumpy for that, despite the fairly slow speed reminiscent of a fair ground ride.

The absence of signs of contact with the low walls shows that the location of the pod on the track is accurately controlled.

Editor

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).



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

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:

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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: $.....