EnergyWatch

The Journal of the Sustainable Energy Forum Inc.

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

Published by:- The Sustainable Energy Forum Incorporated, PO Box 11-152, Wellington 6142
Email:- info@sef.org.nz Web:- www.sef.org.nz; and www.energywatch.org.nz

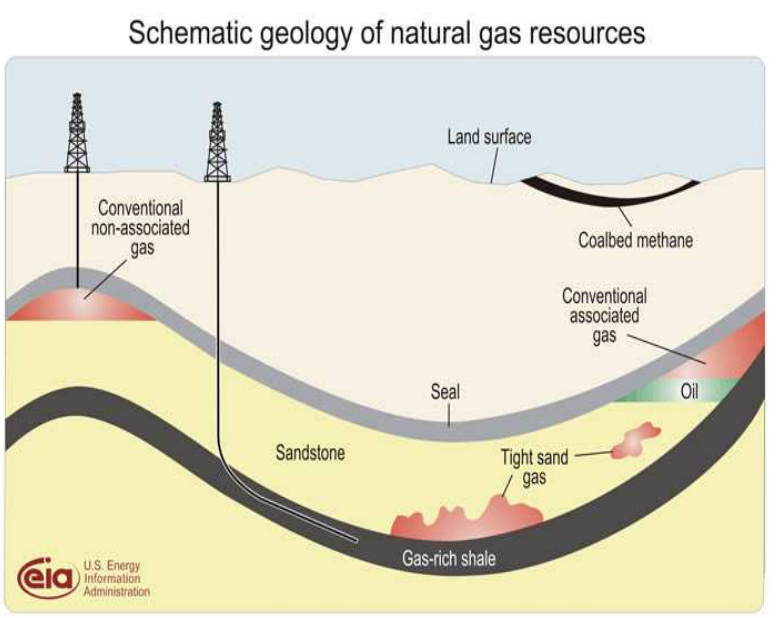
The Sustainable Energy Forum Inc. was registered as a charitable entity under the Charities Act 2005 on 30th June 2008. Its registration number is CC36438.

Issue 63, September 2011

Editor: Steve Goldthorpe
ISSN 1173-5449 (print) ISSN 1179-4054 (online)

EDITORIAL

Unnatural Gas is it the new Oil?



Unconventional natural gas, which might be abbreviated to "Unnatural Gas", is transforming the global energy scene - and is causing concern. This term refers to gas extracted from shale, tight sands and coal seams by the use of directional drilling and hydraulic fracturing. Recent advances in the capabilities of these technologies, alongside increasing energy prices have made accessing unconventional sources of natural gas a game-changing development.

It is now economically viable and technically practicable to go beyond the natural accumulations of gas in capped porous rock near the surface and to drill deep into the hydrocarbon source rocks to access residual gas. Directional drilling now allows a gas well to follow the contours of gas-rich shale. Fracking[1] allows the gas to be liberated and drawn off at commercially viable rates. Also developments in LNG technology allow gas to be transported worldwide from inconvenient places.

These realities are reflected in an IEA World Energy Outlook special report, which asks *"Are we entering the Golden Age of Gas?"* which might be styled by fashion gurus as "Gas is the New Oil".

However, a worrying analysis from Prof Bob Howarth at Cornell University identifies that, with a 20-year perspective, the methane emissions from unnatural gas could make it a more greenhouse intensive source of fossil energy than coal. That brings unnatural gas into the running with coal, lignite, oil shale and tar sands in the competition for the title of "The World's Worst Fossil Fuel."

It is generally thought that natural gas is a clean alternative to coal. Burning methane emits 50 $kgCO_2/GJ$ compared with about 70 from burning oil and about 90 $kgCO_2/GJ$ from burning coal.

[1] Hydraulic fracturing – sometimes spelled as "fraccing"

However, the picture changes when the consequential emissions from processes to create the energy products from their fossil source are taken into account.

In this issue the production of unnatural gas is described and the potential for gas mobilised deep underground to migrate to the surface is discussed.

An article from Energy Bulletin highlights areas of concern and stories of incidents that have led to the demonising of shale gas obtained with fracking technology.

The debate over the relative greenhouse footprints of natural gas, unnatural gas and coal is reviewed, with analysis of the data.

This Government's Energy Strategy has been released, which pins hopes for future energy security principally on exploration for oil and gas and envisions NZ as an oil exporting country. That is a big step from 2010 when the net imports of oil comprised 60% of NZ total oil consumption. Views on the Energy Strategy by BANZ and CANA are included.

This issue also has satirical perspectives on the Government's energy policy scene from Susan Krumdieck and Jeanette Fitzsimons.

As usual, this issue concludes with an update of the oil price compilation. A curious phenomenon is the apparent decoupling of the US domestic oil market from the global oil market.

I mentioned in the last issue of EnergyWatch that I am working for 6 months as a staff member for the IEA Greenhouse Gas R&D Programme until Christmas. My wife and I have taken this opportunity for a short OE to Europe. A description of the IEAGHG programme is included.

Our office is on the site of the former Coal Research Establishment where I worked for 16 years for British Coal before emigrating from UK to New Zealand in 1995 when British Coal was privatised. Returning to work in the same building doing the same type of project work and assessments that I was doing some 20 years earlier gives me a sense of déjà-vu.

Steve Goldthorpe, Editor

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MIGRATION OF HYDROCARBONS UNDERGROUND

Conventional natural gas refers to a gas resource that has accumulated over millennia in porous rock in pockets under an impervious cap rock. Conventional natural gas (methane) is often associated with higher hydrocarbons (known as light condensate) or crude oil. Such natural hydrocarbon resources are the result of underground migration of gas and oil from deep source rock; which is typically shale formed from old sea beds containing the remains of ancient marine life. The existence of underground pockets of collected oil and gas proves the ability of gas and oil to migrate upwards through some geological strata and also proves that conventional oil and gas fields underlie a gas-tight cap rock. That gas-tight seal must have remained intact over millennia otherwise the hydrocarbons would long since have escaped to the surface. The global oil and gas industry began when humans worked out how to drill holes into such hydrocarbon accumulations in search of "black gold".

Conventional vertical wells are usually drilled in likely places in search of oil. When oil wells also yield small amounts of associated gas it is often seen as a nuisance that is vented or flared in order to be able to produce the liquid crude oil. When a well is found to contain primarily gas it is "second prize", which requires more complicated infrastructure than oil to deliver an energy product. The natural gas industry grew out of the need to deal with this troublesome by-product.

The game has now fundamentally changed. The global demand for transportable energy has outstripped the ability of conventional oil wells to keep up, so the market price of oil has escalated. That has created opportunities for more expensive oil and gas production technologies to become economically viable, including harvesting residual methane from the deep source shale rock.

Immobile methane is retained in gas-rich shale adsorbed onto the residual solid kerogen, where it is permanently held by high hydrostatic pressure. Any mobile gas or liquids would have migrated over geological time either into a geological trap or to the surface. There is no need for a geological seal to retain the residual methane.

Gas-bearing rock is accessed by using directional drilling to form a longitudinal well following the contours of the shale formation. Reduction of the down hole pressure by pumping out water would then result in methane desorbing from the kerogen into the well. However, only gas in the immediate vicinity of the well would flow quickly. Therefore fracking is used to increase the effective porosity of the surrounding shale rock to increase the gas production rate. Once desorbed, the gas would be mobile and would mostly be drawn up the well. However, there could be scope for mobilized gas to find other routes via faults, fissures and aquifers to the surface.

The IEA report states that best practice in shale gas production requires *"Ensure that the well and the shale formation remain hydraulically isolated from all other strata penetrated by the well…..This must be ensured both in the design and well construction (which includes hydraulic fracturing) and the long term production processes during the life of the well."* These requirements for perfect containment suggest a greater level of monitoring and control than would be commercially motivated. Also, such requirements would present severe challenges for regulators.

The fractional loss of containment deep underground of mobilized gas is probably unquantifiable. The time taken for mobilized gas to migrate to the surface through low porosity rock could be millennia, but there could be situations in which gas migrated to the surface in a matter of years or faster. There is anecdotal evidence that such gas losses are non-zero. There is a new urgent Government initiated programme in the US to monitor methane losses from shale gas operations.

Steve Goldthorpe

FRACKING – A TALE OF GAS AND GREED AND GLOBAL WARMING

By Alexis Rowell – www.cuttingthecarbon.co.uk(abridged)

Every now and again it seems like a solution has been found to our energy problems, one that will allow us all to go on consuming (and wasting!) for decades, if not forever.

In the last few years shale gas has bubbled to the top of the pile and is now being widely touted by the oil and gas industry as: -

- a clean, green alternative to coal and oil;
- proof that Peak Oil/Gas is many years off;
- a cheaper use of government subsidies than support for renewables.

Those are pretty mighty claims, but do they really stack up? And if they don't, might there be some pretty unpleasant home truths in the shale gas story?

"*The potential for natural gas is enormous*" President Obama said in a speech earlier this year. But what he didn't say in that speech was that in the US, which is much further down the shale gas road than anywhere else; there is considerable controversy over the environmental implications of fracking.

In 2009 Wyoming failed to meet federal standards for air quality for the first time in its history, partly because of the fumes containing benzene and toluene from gas wells. In Texas a hospital operating in six counties with some of the heaviest drilling reported a 25% asthma rate for young children in 2010, more than triple the state rate of 7%.

Gas has seeped into underground drinking-water supplies in at least five US states. In the town of Bradford in northern Pennsylvania, where two homes exploded at the end of last year, entire streets have been fitted with gas detectors as a precaution against methane gas migration.

In April a gas well exploded in Pennsylvania sending toxic chemicals into the local river and forcing the evacuation of nearby homes. A number of US towns have had to warn locals to boil tap water before drinking after water treatment plants were compromised by bromides in waste water from gas-drilling projects.

Caudrilla, the company fracking near Blackpool in the UK, say they're using just three chemicals, all of them present in food and cosmetics. A recent report by Democratic members of Congress found that drilling companies sometimes injected chemicals that even they could not identify. It also found that more than 650 of the chemicals used in fracking were carcinogens.

The practice of fracking is also being blamed for increased frequency of earthquakes. This issue hit the UK recently when two small tremors were felt near Blackpool where Caudrilla were drilling for shale gas. Operations were stopped whilst investigators checked to see if there was any possible link.

In March the Energy and Climate Change Committee of the UK Parliament launched an inquiry into the exploitation of shale gas. It concluded that the UK version of fracking was safe but that there was only 18 months worth of shale gas in the UK and that importing shale gas from elsewhere risked crowding out investment in renewables.

Others have been less sanguine. The French government halted shale gas drilling in March pending an inquiry. The French National Assembly then voted to ban fracking completely. The upper house of the French parliament, the Senate, is likely to vote the ban into law soon.

The US city of Pittsburgh has now banned fracking. Other smaller municipalities in Pennsylvania and New York State have done the same, or have at least banned the dumping of toxic waste water in their areas. But for the moment it's the gold rush all over again and the industry is running well ahead of the regulators. Last year the US Environmental Prevention Agency started a review of fracking, but it's not due to report until 2014!

It's much harder work removing shale gas from the ground than conventional fossil fuels because it needs to be forced out rather than just bubbling up under its own pressure. As a result the energy return on energy invested during extraction ratio (EROEI) is low. It's considerably worse than conventional oil and gas and, according to some reports, it may be worse than oil tar sands.

Peak Oil/Gas theory predicts that EROEI will fall for fossil fuels as they get harder to extract. Some have suggested that this might work hand in hand with finding a solution to climate change – as EROEI falls making fossil fuels more expensive that creates incentives to move to other fuels which produce fewer greenhouse gases. But in the case of shale gas it's also possible that the leakage of methane – which is 33 times more powerful than carbon dioxide as a greenhouse gas – has the potential to cause considerable damage to the climate.

In May 2010 the US Council of Scientific Society Presidents wrote to President Obama urging great caution against a national policy of developing shale gas without a better scientific basis for the policy. This umbrella organisation which represents 1.4 million US scientists argued that, because of methane leakage, shale gas might actually aggravate global warming, rather than help to mitigate it.

In January 2011 a report by the UK's Tyndall Centre for Climate Change made the same argument based on research into US drilling sites. They also said there was no evidence of a switch from coal to gas in the US – they found it was being burned in addition to coal.

Then came the first peer-reviewed study, by academics at Cornell University, which suggested that, because of methane releases caused during fracking, shale gas had a carbon footprint that could be as much as 20% higher than coal.

Unsurprisingly the gas industry, which claims fracking has only half the emissions of coal, has come out fighting and has denounced the Cornell report, especially the leaking methane claim, as bad science.

The authors of the Cornell study say they do not believe they have published the definitive science on fracking and admit that some of their data is not well documented. Either way, it's a perfectly valid and utterly critical topic of discussion.

The shale gas frenzy appears to prove the theory of Peak Oil/Gas/Fossil Fuels, but decouples it from the solution to climate change. *"If we are serious in our commitment to avoid dangerous climate change, the only safe place for shale gas remains in the ground*" says Kevin Anderson of the Tyndall Centre.

It's possible the shale gas bubble will burst of its own accord. The New York Times recently published an article suggesting the economics of shale gas were being over-hyped. It quoted an analyst in the US Energy Dept as saying: "*…does it seem like everyone and their mothers are endorsing shale gas without getting a really good understanding of the economics at the business level?*"

Prof Robert Howarth, lead author of the Cornell study, said: "*My strong belief is that shale gas has been promoted far beyond the objective evidence of what it can and cannot do. It is time to step back, and objectively analyze whether this is a reasonable energy technology for our future. It is also time to analyze how environmental issues associated with the technology might be reduced, and at what cost.*"

It's time for those of us who subscribe to Peak Oil theory to start thinking about what happens if unconventional fossil fuels stretch the peak out for years, maybe decades, and cause untold damage in terms of climate change. *Alexis Rowell*

This article is abridged from a fully referenced article downloadable from:-
http://energybulletin.net/stories/2011-07-05

France has banned the fracking technology. See:-
http://www.europeanenergyreview.eu/site/pagina.php?id=3154

THE COMPARATIVE GREENHOUSE FOOTPRINTS OF NATURAL AND UNNATURAL GAS AND COAL PRODUCTION

The Full Fuel Cycle methodology, as described on Page 8, provides a means of comparing the greenhouse footprints of alternative fossil fuels. Based on data and assumptions listed on Page 7, estimates of typical precombustion emissions for natural and unnatural gas are shown in Figure 1.

Figure 1 - GWP=25 (100 year horizon)

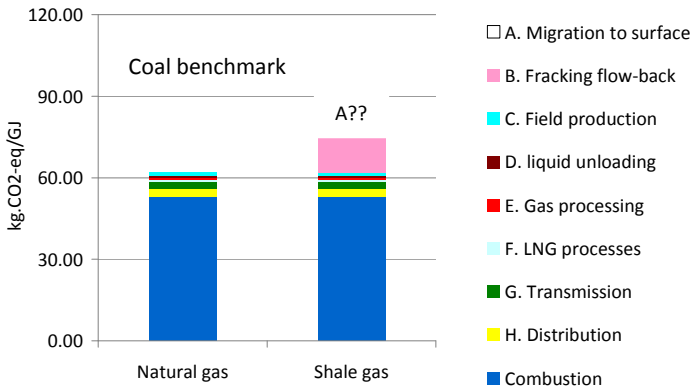
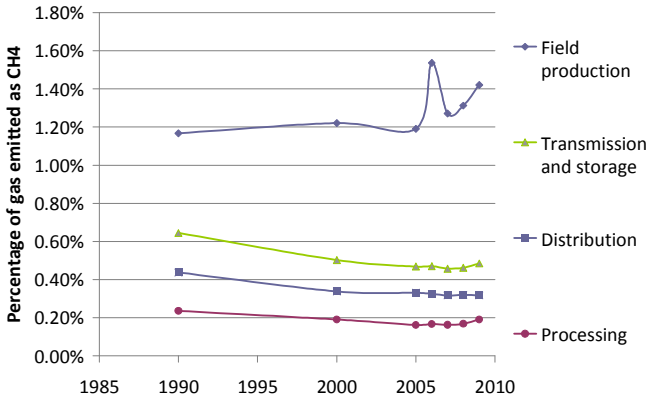


Figure 1 shows that the effect of the additional emissions of methane from the flowback of fracking fluids on completion or reworking of a shale gas well could be about the same as all the other precombustion emissions from gas production combined.

Two big uncertainties are how much of that methane can be captured and flared (NETL suggest 15%) and how many years of gas production result from each fracking job. (assumed 3 years - Howarth reports a maximum of 2.6 years). Descriptions of shale gas exploitation indicate that gas production rates fall off rapidly. The assumed 3 years of full production corresponds to a half-life of 18 months for a typical declining shale gas well.

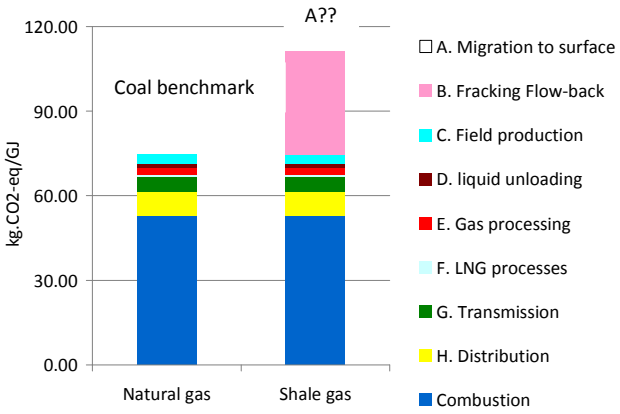
The US EPA UNFCCC greenhouse gas inventory indicates a significant upswing in methane emissions from natural gas field production recently, as shown in Figure 2. The US inventory is based on equipment in use. This increase in reported methane emissions correlates precisely with the growth in shale gas exploitation in the US (to 14% on 2009) and indicates 2.5 times more methane emissions in the field from shale gas exploitation than from conventional natural gas, with a much greater (anomalous) methane emission figure reported in 2006.

Table 2 - USEPA GHG inventory data



The IPCC Fourth Assessment Report in 2007 reviewed the climatic effect of methane, which decays more rapidly in the atmosphere than CO_2. The revised IPCC Global Warming Potential (GWP) of methane is 25 over a 100 year horizon and 72 when considered over a 20-year horizon. Figure 3 shows relative FFC data for gas and coal over 20 years, which indicates that shale gas can be more greenhouse intensive than coal.

Figure 3 - GWP=72 (20-year horizon)



Howarth notes that, with indirect effects, methane GWP is 105, which, with worst case data, makes shale gas FFC factor twice coal's.

Steve Goldthorpe

STOP PRESS.

A report released this week by the US Geological Service requires the US Energy Information Administration to reduce their estimates of Marcellus shale gas (>50% of US resource) from 410 tcf to 84 tcf. This would severely impact long term US energy security.
http://www.timesleader.com/news/US-to-cut-estimate-of-Marcellus-Shale-gas-reserves-.html

HOW MUCH GAS IS LOST FROM WELL TO CUSTOMER?

Assessments by Howarth[2], NETL[3] and IEA[4] provide data for comparative Full Fuel Cycle analyses of natural and unnatural gas.

A. Migration from Underground

The potential for mobilized methane to percolate to the surface and disperse without causing local environmental issues is discussed on Page 3. No attempt is made in any of the studies to quantify such methane emissions, if any, to atmosphere.

B. Losses from well completion

Well completion after fracking shale results in a large flowback of water from which gas evolves. The NETL study indicates a gas loss of 11,643 MCF per well completion for a well that subsequently produces 274 MCF/day. The NETL study also indicates that 3.5 workovers, each with the same gas loss, would give a 30 year well life; and 15% of that gas can be captured and flared. Thus a 1.75% gas loss is indicated if the well produces for 6.7 years between each fracking.

The gas production from a fracked shale gas well declines rapidly. Howarth and other sources indicate a productive life between fracking jobs of 0.9 to 2.6 years for shale gas wells. Howarth reports examples in which 0.6% to 3.2% of the lifetime production is emitted during flowback plus 0.62% for losses during drill out activities.

[Figure 1 uses the NETL gas flow data with 15% flaring and an effective well lifetime at full capacity of three years; i.e. 3.9% loss before flaring. (The IEA best case is 1.3%)]

C. Leaks from wellsite equipment

The NETL study reports 0.096 lb CH_4/MCF fugitive emissions from pneumatic devices and other sources at the well-site for both conventional and unconventional gas production. This corresponds to 0.27% fugitive losses, of which virtually none can be captured and flared. Howarth reports wellsite leaks as 0.3% to 1.9%.

[Figure 1 uses 0.3% loss with no flaring.]

D. Loss for liquid unloading

The NETL study indicates a conventional onshore gas well would have 930 liquid unloading episodes over 30 years each discharging 23.5 MCF, of which 50% would be flared, with a well lifetime yield of 8.6 BCF. This corresponds to a loss before flaring of 0.25%. Howarth reports 0 to 0.25% as the gas loss for liquids unloading.

[Figure 1 uses 0.25% loss with 50% flaring]

E. Gas Processing

The NETL study indicates 0.14 lb/MCF loss in gas processing with 43% flared, i.e. 0.39% loss before flaring. The EPA factor for fugitive methane emission after flaring is 0.19% of throughput. This assumes no CO_2 stripping from the source gas is required.

[Figure 1 uses 0.39% loss with 43% flaring]

F. Shipping gas as LNG

Production of liquid natural gas at -161^{o}C in state-of-the-art facilities is reported to have an overall energy efficiency of 91%; i.e. a 9% gas loss. A further 2% boil off during transport and 1% gas use in regasification are assumed. The IEA report indicates that 10% of all gas will be moved via the LNG process.

[Figure 1 uses 1.2% gas use, all as CO_2.]

G. Pipeline Transmission

The NETL study indicates 0.15 lb/MCF leaks from gas transmission systems for an average 450 mile pipeline. i.e. 0.42% loss with no flaring. Howarth reports an average fugitive loss of methane of 0.5%.

[Figure 1 uses 0.42% loss with no flaring. In addition, own use of gas in compressors is estimated to use 2% of the gas pipelined]

H. Low pressure distribution

The NETL study only considers gas supply to large consumers; no low pressure distribution.

Howarth reports various sources and suggests a range of 1.4% to 3.6% loss in transmission and distribution with a mean of 2.5%, i.e. 2% loss for distribution only. Assuming that about 40% of all natural gas is distributed at low pressure to small consumers, the average overall distribution loss would be 0.8%.

[Figure 1 uses 0.8% loss with no flaring]

Steve Goldthorpe

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[2] http://www.sustainablefuture.cornell.edu/news/attachments/Howarth-EtAl-2011.pdf The Cornell University paper

[3] http://www.netl.doe.gov/energy-analyses/refshelf/PubDetails.aspx?Action=View&PubId=386 The US-DOE rebuttal

[4] http://www.iea.org/weo/docs/weo2011/WEO2011_GoldenAgeofGasReport.pdf - The IEA Special Report

ARE WE ENTERING THE GOLDEN AGE OF GAS?

A special report with this sub-title has just been published as an adjunct to the IEA World Energy Outlook 2010. This detailed report builds a "Golden Age of Gas" scenario, which quantifies global demand and supply pathways. This report states:

- The factors driving natural gas demand and supply intensity point to a future in which natural gas plays a greater role in the global energy mix.
- When replacing other fossil fuels, natural gas can lead to lower emissions of greenhouse gases and local pollutants.
- The global natural gas resource is vast and widely dispersed geographically.
- Unconventional gas now makes up 60% of marketed production in the United states. *(Ed – comprising coal bed methane, tight gas and shale gas)*
- Use of hydraulic fracturing in unconventional natural gas has raised serious environmental concerns and tested existing regulatory regimes.
- Based on available data, we estimate that shale gas produced to proper standards of environmental responsibility has slightly higher "well to burner" emissions than conventional gas.

The discussion in the Special Report identifies that a typical shale gas well with a lifetime production of 45 Mcm[5] would release 0.57 Mcm of gas during well completion after fracking, i.e. a 1.3% gas loss. Assuming complete flaring of that gas, the "well to burner" emissions are stated as only 3.5% greater than equivalent conventional gas.

IEA World Energy Outlook

[5] Million cubic metres

FULL FUEL CYCLE METHODOLOGY

Although the IEA Special report notes "There is no universally accepted method of accounting for the full range of emission of a given fuel" the Full Fuel Cycle (FFC) methodology has been extensively used to assess the comparative greenhouse footprint of the use of fossil fuels. FFC analysis includes pre combustion emissions from use of fuel and fugitive emissions in the production, and processing of fuel with the combustion emissions of that fuel. The FFC methodology does not include indirect emissions such as those resulting from the manufacture of equipment, as would be included in a full life cycle analysis (LCA).

The combustion emission factor for black coal is typically about 90 kg.CO_2/GJ_{hhv}. And about 95 kg.CO_2/GJ_{hhv} for lignite. The precombustion emissions from underground coal mining, including own use and methane emissions are typically in the order of 10 kg.$CO_{2\text{-eq}}$/GJ, whereas for open cast lignite the precombustion emissions might be about 5 kg.CO_2/GJ. Therefore a generic FFC emission factor for both coal and lignite is about 100 kg.CO_2/GJ_{hhv}. This round number provides a useful benchmark for comparison with other fuels.

The combustion emission factor for pure methane is 50 kg.CO_2/GJ. However, pipeline natural gas often contains CO_2, ethane and higher hydrocarbons typically resulting in an emission factor of about 53 kg.CO_2/GJ.

The production and processing transmission and distribution of conventional natural gas involves own use and losses of gas, some as methane. The resulting FFC emission factor is about 60-65 kg.$CO_{2\text{-eq}}$/GJ_{hhv}.

Electricity can be generated from gas more efficiently than from coal, so when electricity generation is the basis of comparison conventional natural gas has about half the greenhouse footprint of coal.

Editor

NZ CLEAN ENERGY EXPO TO FEATURE PUBLIC WORKSHOP ON ELECTRIC VEHICLES

13th – 16th October 2011

The Inaugural NZ Clean Energy Expo takes place at the NZ Clean Energy Centre (NZCEC) in Taupo October 13-16. The event spans four days. Day 1 is a Geothermal Workshop which includes a field trip to Mokai to see geothermal energy being used not only for electricity generation, but also for glasshouses, milk processing and worm farming. Day 2 is a bioenergy workshop. Days 3 and 4 offer a Public Expo along with several free informational workshops.

One such workshop is titled "The Car of the Future: - Is it Electric?" The workshop will feature presentations from global leaders in the electric vehicle market as well as others currently involved in this niche market and will examine the value proposition of current Electric Vehicles, the implications for society and environment, why EV's will be a catalyst for change, and more. All Expo attendees will also be given opportunities to test drive electric cars and to see what the "fuel station of the future" looks like (NZ's only networked EV charging station is installed at the NZ Clean Energy Centre).

Rob McEwen, CEO of the NZCEC, says "The Expo provides an opportunity for all New Zealanders to see what's available today and what may be available in the near future as far as solutions that either produce or use clean, renewable energy.

"Our Centre produces all of its own space heating and hot water from a combination of geothermal and solar systems, and produces much of its own electricity from two wind turbines and two solar photovoltaic systems.

"Visitors will be able to tour our Centre and see first-hand how these solutions work. In addition, more than 20 exhibitors have so far booked space to display their solutions under marquee at the Expo."

The Public Expo is open from 10am to 4pm on October 15 & 16, with an entrance fee of $10 per adult; kids free. More information is available at www.cleanenergyexpo.co.nz.

About the NZ Clean Energy Centre

The NZ Clean Energy Centre has been established to accelerate the adoption of clean energy solutions by industry, communities, businesses and households in New Zealand.

The building offers office space in a collaborative cluster environment to a number of clean energy tenants, it is a demonstration venue and showcase for a wide variety of clean energy solutions and it is a central hub for the hosting of clean energy related events.

The Centre is increasingly being used by universities and schools as an experiential component of their science and energy curricula. The Centre is owned by a Taupo based Community Trust.

NZ ENERGY STRATEGY - UNLEASHING THE BIOENERGY BONANZA OFFERS NZ INC. HUGE OPPORTUNITIES

The Bioenergy Association of New Zealand

The Bioenergy Association of New Zealand has welcomed the release of the New Zealand Energy Strategy by the Acting Minister of Energy and Resources and is pleased to see that the Government wishes to work with the sector to unleash the bioenergy bonanza. Bioenergy is potentially a $6 billion industry which is twice what is currently received from petroleum royalties. The Energy Strategy identifies the range of resources including bioenergy available to grow the New Zealand economy to deliver greater prosperity, security and opportunities for all New Zealanders.

The Chair of the Bioenergy Association of New Zealand, Rob Mallinson said "Supportive government policies such as are outlined in the Energy Strategy can assist New Zealand to achieve greater utilisation of its huge indigenous renewable energy resources. New Zealand is rich in bioenergy sources, and has the skills and technology to convert these abundant resources into heat, biogas, transport biofuels and electricity – and it is available here and now. However we can't do it alone so it is encouraging that the Government will support business to unleash this immense wealth and build on the advantage that bioenergy offers the NZ economy. We would now like to follow up on previous discussions with officials to develop some concrete programmes to help us deliver on the potential.

"The Bioenergy Association believes that this potential can best be realised through the association and government departments working closely together to understand the opportunities and formulate constructive policy that encourages this economic transition.

"The Bioenergy Association is keen to work with Government to ensuring a market for wood fuels quickly evolves, and that the market for transport biofuels is equitable for New Zealand based fuel producers."

Mr Mallinson said "The bottom line is this - biofuels present a 'win-win' for New Zealand now and into the future. As over 30 years of evidence from Europe demonstrates, all forms of bioenergy are good for business, security of energy supply, waste utilisation, employment levels, sustainability and economic growth."

The Bioenergy Association:

- Mission Statement is "to promote the maximum utilisation of all forms of sustainable bioenergy in New Zealand".
- Vision is that "Bioenergy in all its forms will supply more than 25% of the country's energy needs, including 30% of the country's transport fuels by around 2040."
- Has over 300 hundred members working across the length and breadth of the various supply chains.
- Provides a central focus point for liaison with Government agencies, the dissemination of information amongst the industry and long-term positioning of bioenergy into New Zealand's energy system.
- Works closely with the Energy Efficiency and Conservation Authority (EECA) and New Zealand Trade and Enterprise

For further information see
www.bioenergy.org.nz

REVISED ENERGY STRATEGY SHOWS GOVERNMENT RUNNING SCARED ON LIGNITE MINING ISSUE

Coal Action Network Aotearora

Coal Action Network Aotearoa says that changes to the New Zealand Energy Strategy, released today, show that the Government is running scared of growing public opposition to its plans to mine massive quantities of lignite in Southland.

"In April, we obtained a copy of the latest version of the Government's New Zealand Energy Strategy and released it to the media," said Coal Action Network Aotearoa spokesperson Frances Mountier.(1)

"That version talked about making urea and liquid fuels from coal, which is what Government-owned Solid Energy wants to do with the billions of tonnes of low-quality brown coal, called lignite, which lies beneath prime Southland farmland. That is a massively polluting process. It would be terrible for greenhouse gas emissions, and terrible for the local environment.

"Since April, there has been a groundswell of public and political opinion against these lignite mining plans. Only last week, National list MP Michael Woodhouse announced his public opposition to lignite mining at a pre-election meeting in Dunedin.(2)

"Now the Government has finally got around to releasing its New Zealand Energy Strategy, it has dropped the references to making urea and liquid fuels from coal. That tells us that the Government is feeling the pressure from public opposition to lignite mining.

"We're pleased they have made this change," continued Ms Mountier, "but the strategy as a whole demonstrates the Government's determination to leap boldly back to the 1950s. After a few weasel words about the need to reduce greenhouse gas emissions, the Strategy gets down to its real business, which is promoting the exploitation of fossil fuels in every which way the Government thinks it can get away with. At the very time when the Government's energy focus should be on reducing greenhouse gas emissions, it has chosen to treat the climate and the planet with contempt.

"Well, we're here to tell them they won't get away with it. They are already having to soft-pedal their lignite mining plans. Until the Government abandons its outdated approach to energy strategy, which completely ignores the risks of catastrophic climate change, they are going to feel the heat of public opposition up and down the country," Frances Mountier concluded.

(1) This draft version is available on the Coal Action Network Aotearoa website at http://coalactionnetworkaotearoa.wordpress.com/2011/04/04/press-release-advance-copy-of-the-governments-new-zealand-energy-strategy/

(2) http://coalactionnetworkaotearoa.wordpress.com/2011/08/29/politics-watch/

CAN Aotearoa objectives are to:

1. Phase out coal mining and coal usage within 20 years, initially by opposing new and expanded coal mines.
2. Promote a cultural change so that mining and using coal are unacceptable.
3. Work towards a society where people and the environment are not exploited for profit.
4. Be part of a just transition to a coal-free Aotearoa New Zealand.

Find out more at:
http://coalactionnetworkaotearoa.wordpress.com/

PM SUSAN KRUMDIECK ADDRESSES THE NATION

Dr Susan Krumdieck was asked what she would do if she was made Prime Minister. She wrote "After the Denniston Mine Consent disaster, I thought a little fantasising was in order." This was her light-hearted musing.

Kia Ora Kiwis

Look, I'm going to be honest with you New Zealand. There is a chance the All Blacks could lose the World Cup. We'll get over that.
But there are some other actually important things that I want to be up-front about.

The oil supply has peaked and is in decline. Petrol will be expensive - forever. You will want to be planning to organise yourself, your family, and your business to be able to use less petrol. The amount we use will need to decline about 4-6% each year, which should be doable and will actually end up improving things anyway. But we really need to get to work now.

The amount of diesel we use to freight Chinese-made stuff, processed food and rubbish around the country is a joke. You are going to have to work out how to grow local businesses to supply more of what you need and to generate less waste. The government is re-instituting apprenticeship programmes and calling on retirees to step up and do their part volunteering to train young people before too much knowledge is lost. Yes, things will cost a bit more if more Kiwis are making the things we need. But what goes around in our country comes back around. And if more of your neighbours have jobs they can buy more from you.

The Government will not be developing more roads, and we'll be doing well just to keep the existing roads in decent shape, so we're going to start restricting how many trucks can move on the roads. The Australian supermarket chains are going to have to re-think their sourcing and warehousing to reduce truck traffic. The government is setting up new regulations for towns and cities to designate local weekend market areas, product testing and local currencies. We also have community supported agriculture and community garden and waste reclamation initiatives. This local market growth initiative should add at least 1-3 new professional jobs per town, and spur growth in new local production and manufacturing enterprises.

We rely quite heavily on gas. I'm going to be honest and let you know that there will never be another big gas field like Maui. Yes, there will be some new developments, and we will hype those appropriately to generate investment. But, the supply is going into decline. We are building more geothermal plants, but you and your families and businesses are going to have to start making energy management plans for how you can cut back on electricity use when needed. You will want to improve efficiency wherever possible because the price is going to continue to climb.

The Government will be supporting new training and professional enterprises in energy management and transition engineering. This should add 1-2 new professional jobs per 5000 population all across the country and help you sort out how to get all of your good ideas going. If you want to invest in solar that's a good idea, but your neighbour's taxes aren't going to be used to help you pay for it. Rather, the regional lines companies, under the new "Generate Yourself NZ" scheme, will be able to profit from local distributed generation and efficiency improvement. The Government is investing in programmes with

the universities to set up energy research centres and training programmes and to work with the lines companies to develop their integrated management approach to local power supply. Oh, and I'm going to sort out the power market so our grid is smart, not dumb, but that is going to take a while.

To be honest, coal is really dirty dangerous crap. Mining coal, and well, really mining anything, is guaranteed to be an environmental disaster for more than just one generation. The thing is that we can't have any kind of industrial society without coal and without minerals. So, what we are going to have to do is recognise that coal use is going to decline, it's going to get more expensive, we are going to have to spend 50-90% more on technology when we mine it and use it to make sure we don't muck things up, and we are going to have to make hard choices about what we really need and don't need. What is really worth burning coal for and what isn't. We are not going to burn coal for electricity. Those days are over. We are not going to sell our coal resources off-shore. We'll need them some day. But we are also going to face up to the facts about coal and we are going to do everything we can to reduce what we dig up - including a 10 year moratorium on new coal mining as a period to take stock, get the international corporations jaws un-clamped from around our necks, and decide what we really need to do.

There are no substitutes, there are no technology fixes. You were probably thinking that we could use wood or wind or solar or some other green thing to substitute for coal and oil and gas. But the truth is, while we support the development of renewable energy, and it might add some more jobs, the reducing fossil fuel supplies mean big changes. No amount of renewable energy development will change that fact. You're going to have to get much more efficient, and waste of any kind of resource will become a Kiwi anathema (means a bad thing that people are ashamed to do) rather than a Kiwi norm. We do have enough energy - just not enough to waste.

We need to work together to restore our environment and build resilience wherever we can. The new RRMA (Resource Recovery and Management Act) requires that every town in New Zealand will have at least one land and one water (fresh or sea) reserve designated and under management by 2013. So, every town needs to get busy organising groups to look at the local resources and start working with people to come up with your designations.

We have programmes with the universities to help out with assessing, planning and organising. This will mean jobs for some of your local, university educated young people back in their home towns planning and managing and monitoring the local reserves, and organising the new tourism opportunities, like connecting up reserves by bike trail.

We need to figure out how to innovate so that we can build wealth - not from spreading ourselves open to the rest of the world to come and take what we've got - but by building real value, by having high quality of life, by long term thinking and by participatory, strongly democratic, fact-informed planning.

The government is going to focus on basic services to keep everything working and everyone healthy, and we are going to get tough about regulation to keep everything fair and ensure the long-term is always there in our short-term thinking and actions.

You all need to get to work sorting yourselves out. Just let us know how you get on.

(Rt. Hon. Susan Krumdieck)

Are there any other EnergyWatch readers who would like to share their vision for a sustainable energy future for New Zealand?

Editor

CLIMATE CHANGE, ENERGY AND RESILIENCE

Introduction to **Jeanette Fitzsimons'** speech to the ECO conference July 2011.

"Hurry up", said the white rabbit, "more coal!"

"But", said Alice, "what about climate change?"

"Our target", said the Red Queen, "is 50% by 2050. Of course we have a plan to get there – it's called deep sea oil drilling!"

"But", said Alice, "isn't the climate changing *now*?"

"Fracking", said the white rabbit. "That's what we need! Bust open the shale and get the gas!"

"But", said Alice, "isn't the climate changing *fast?"*

"Economic Growth!" Said the Red Queen. "Everyone wants that. We need to dig up those lignites and be like Australia."

"But", said Alice, "isn't…"

"Silence!" roared the Red Queen. "Off with her head! Surely you want to be like Australia? Another word and I'll cut your benefit."

"I don't have a benefit", said Alice.. "but I would like some resilience."

"Why?" said the Red Queen. "Australia doesn't have any."

Trying to put NZ's energy and climate policy in the same sentence as resilience led me inevitably to Alice in Wonderland. But we won't be waking up from this dream any time soon.

NZ is on the brink of the most massive binge of fossil fuel extraction ever seen. Just some of what is going on now:

- Deep sea oil drilling, in very deep waters with no environmental rules; Petrobras off E Cape, others soon off Canterbury; companies nosing around Golden Bay.
- W Coast coking coal - now over $300/tonne and very lucrative
  - Cypress mine (the gorgeous Happy Valley red tussocks and beech and kiwi and snails) all consents granted, bulldozers likely to begin any time,
  - Pike River – several companies bursting to buy the bankrupt mine, even before the royal commission has started its hearings to find out who was responsible for killing 29 men;
  - Escarpment mine, Denniston Plateau (Australian Bathurst Resources, now bought by L&M, calling itself Buller Coal) initial application for 6.1MT in consent process, but presentation to industry conference shows 8 prospective mine locations along plateau, total inferred resource 125-167MT
- Solid Energy exploring gas from coal seams Waikato-Hauraki
- Lignites in Southland (6.8 Billion Tonnes in total)
  - Solid Energy, L&M, Greywolf all have permits and very active.
  - SE has applied for pilot briquetting plant, Mataura, to remove water from lignite for domestic sales. Non-notified by councils.
  - Plans second plant ten times bigger, for export,
  - then lignite to urea,
  - then lignite to diesel. Collectively Se projects raise NZ greenhouse gas emissions 20%
- Now L&M have permit to explore 27m km2 of Waiau basin for shale gas to be extracted by fracking.

Resilience – how can one even talk about it in this context?

Resilience is 'in' word since the quake – assumed to mean ability to resist stresses and bounce back from disasters. Is this the new word for Sustainability?

IEAGHG

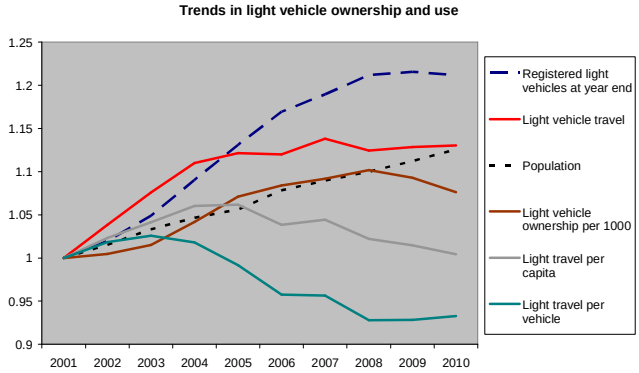
IEAGHG is an International Energy Agency programme, which is charged with investigating all aspects of technologies for reducing Greenhouse Gas emissions. The programme is funded by contributions from members, comprising mostly governments (including New Zealand) with also some large energy companies.

The IEAGHG projects are selected and funded by an executive committee of the members, with the aim of producing a series of public domain authoritative reports on technical and economic assessments and technology reviews. Projects have mostly focussed on carbon capture and storage but more wide ranging approaches to GHG emission reduction are now being included.

The projects are often based on desk studies which are sub-contracted to research institutes and engineering contractors.

LIGHT VEHICLE TRENDS

Data on light vehicle registration and use is compiled by the Ministry. of Transport. This chart shows trends over the last decade.



These trends show a levelling off of light vehicle use despite the number of vehicles increasing faster than the population increase. Do we need lots of new roads? *Editor*

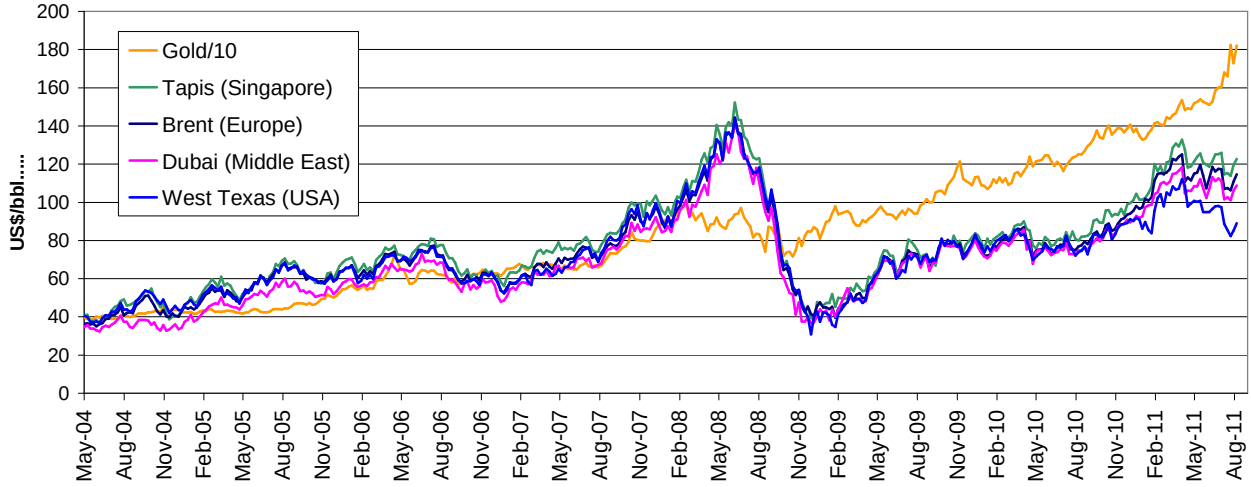
Rainbow Warrior 3

The Greenpeace flagship has a special place in the hearts of New Zealanders. Readers may be interested in the next chapter. See:-

http://anewwarrior.greenpeace.org/

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 recent phenomenon, which is unprecedented, is the breaking away of the West Texas (USA) price from prices in the other three regional oil markets. Over the last few months, whilst the oil market's signal prices in the rest of the world have ranged between $105 and $125, the West Texas price has been well below $100/tonne and is currently about three quarters of the globally traded oil price. Could this be a consequence of the releases of strategic reserves into the US domestic market preventing their oil price going into three figures?



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

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.

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