



DOMESTIC ENERGY USERS' NETWORK

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SUBMISSION ON INFRASTRUCTURE: FACTS AND ISSUES. 6 October 2009

<http://www.infrastructure.govt.nz/plan/inf-facts-issues-sep09.pdf>

SUMMARISED CONCLUSIONS

1. DEUN supports Principle 4 on page 16 of the discussion document, that decisions on infrastructure should consider social cost-benefit analysis, distributional or equity effects and affordability (in the Crown's budget). Any cost-benefit study on electricity infrastructure should specifically include deadweight losses from householders unable to afford the energy they require for health and for participation in society.
2. Infrastructure investment is a critically important issue for domestic energy users. DEUN considers the term "infrastructure" covers the entire electricity supply chain – starting where appropriate with the fuel supply. Whether the driver for investment is commercial or national benefit, any shortage or surplus of infrastructure directly affects residential prices.
3. DEUN welcomes large transmission projects to the extent they make the wholesale market more competitive. They are of concern to us if they make small-scale local energy development less competitive.
4. Economies of scale in hydro and gas kept electricity prices down for all consumers from the 1950s till the turn of the century. When cheap Maui gas ran out, wholesale gas prices doubled – and increased further with development of more costly gas fields. Residential consumers observably face the ever-increasing cost of new generation, while the non-residential sector is still typically paying costs of generation from existing power stations.
5. New Zealand gas prices will almost certainly be linked to international prices of LNG - the more gas is exported as methanol, the sooner this will happen. As happened with milk and milk products, New Zealand prices will rise – but electricity is even more essential to New Zealand householders than are milk products, which at least have some substitutes.
6. DEUN therefore recommends analysis of the costs and benefits of any investment in essential infrastructure, not only transmission. For electricity, this should incorporate future as well as present values of fuel. Critically

important is the inclusion of the deadweight losses – through calculation not mere political judgement – that result from householders being deprived of the energy they need for physical health and for active participation in society.

SUBMISSION

7. DEUN welcomes the opportunity to respond to this discussion document, and to consider infrastructure in the wider context of needs for services and desires for economic growth.
8. This submission from DEUN does not address all the facts and issues in the discussion document. It addresses only those on which DEUN has particular expertise to provide a meaningful contribution.

Electricity sector

Scope

9. The discussion document gives a high priority to transmission infrastructure investment. DEUN strongly agrees with this, as transmission constraints can inhibit low-cost generation from reaching markets.
10. If however transmission investment is increased for the purpose of facilitating large-scale generation remote from load, it may inhibit local generation. This is usually smaller scale and much closer to load. Local generation may be, (but is not always) more costly per kilowatt-hour, yet may add security to local supply. It may even be less costly when transmission costs are counted.
11. Because electricity supply is so integrated, with fuel source, generation, transmission, distribution, and retailing all required to supply household energy, DEUN considers the entire electricity supply chain to be within the scope of “infrastructure”.

Metering

12. Clause 165 identifies the limited demand response from the residential sector.
13. There are a number of factors for this, the primary one being lack of timely information currently available for residential customers.
14. DEUN considers that appropriate interactive metering would provide the necessary information to allow customers to make demand decisions.
15. This requires that all new meters being installed should be truly ‘smart’ and allow for two way interaction between the retailer and consumer. It further requires that the distribution networks in all future upgrades/ modifications, make provision for two-wayflow not only of data but also of energy.

16. In order to minimise the potential to either lock consumers into a nonresponsive system, or incur potentially redundant capital expenditure from non-smart meters and systems, DEUN is strongly urging an immediate moratorium on energy retailers installing further meters. The moratorium need only remain until the industry establishes a proper set of standards for the ‘smart meters’, and a standard set of protocols with an open architectural platform to ensure two way communication between any smart meter and any retailer irrespective of the source of energy supply.

Distribution Networks

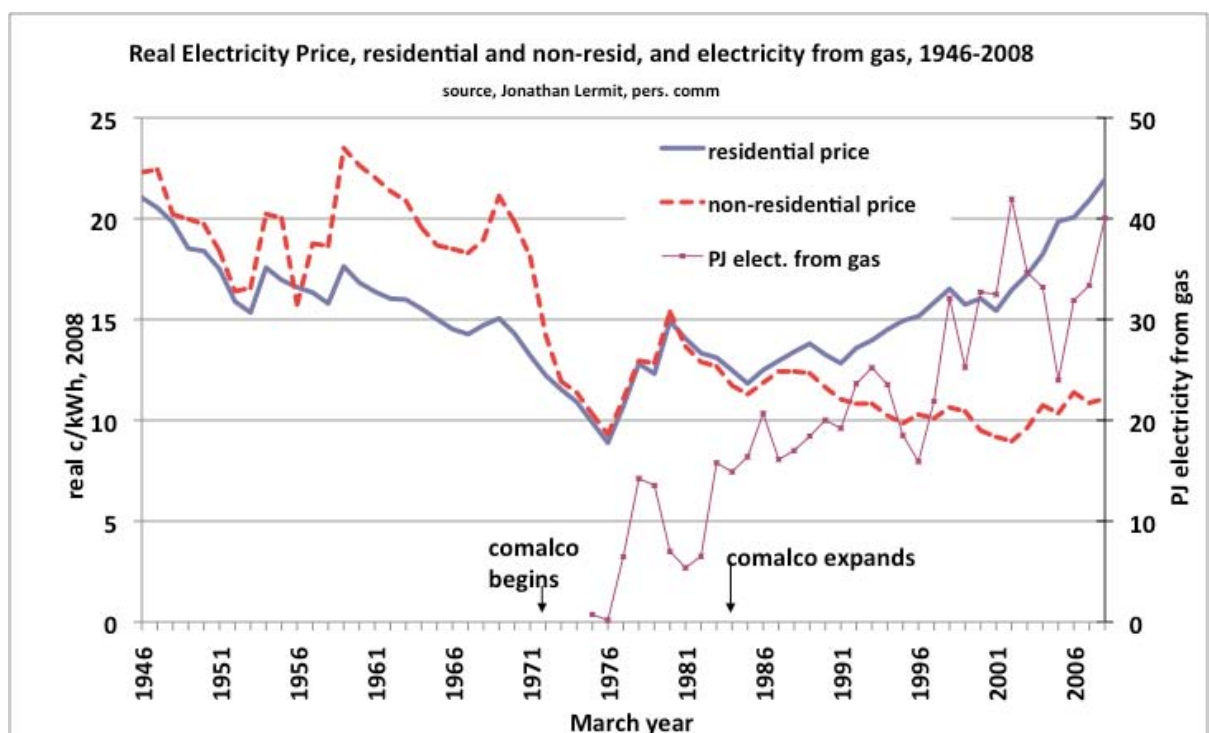
17. In order to achieve the maximum benefit from real interactive response by consumers, all distribution networks need move towards “smart grid” technology with the features outlined above. This issue is identified here as it is seen as falling into the category described in clause 47 as an infrastructure asset not the direct responsibility of central government.

18. DEUN considers however that due to the commercial pressures that may apply to the individual lines companies, Government may need to establish regulatory provisions to achieve the uniform technical environment necessary.

Gas is infrastructure too

19. Gas development has a strong influence on electricity prices, and hence on affordability of household energy. Indeed a very long-term graph of electricity prices, from 1946 to the present, shows that the reduction of prices in real terms which resulted from the large-scale hydro projects of the 60s and 70s was maintained in the 80s and 90s by use of low-cost Kapuni and Maui gas.

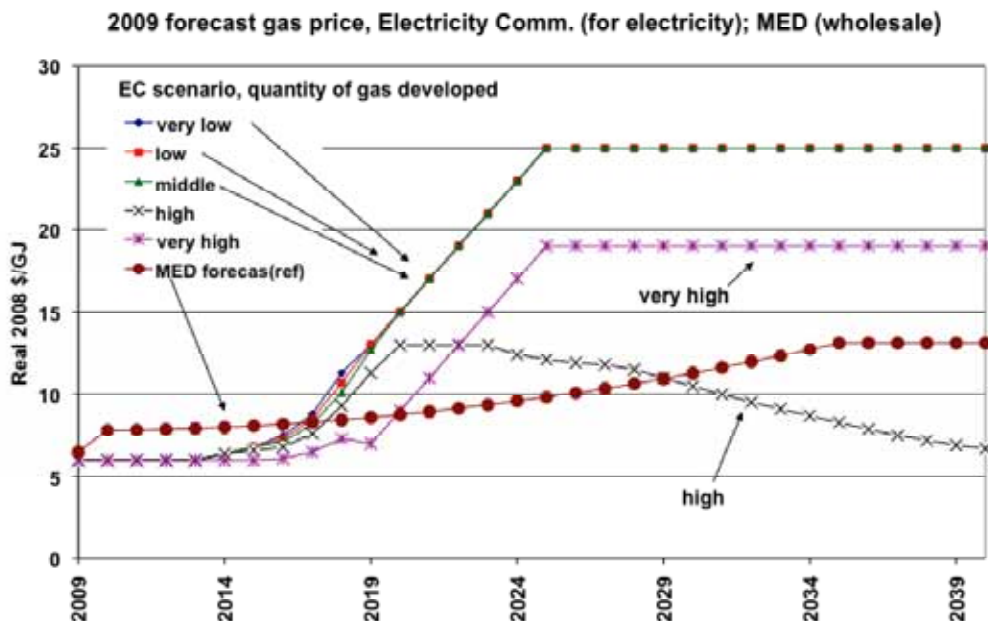
20. The graph suggests that residential prices rises since the market began in 1991 reflect mainly the long-run costs of new generation. Non-residential prices are much closer to short-run costs of existing generation.



21. New generation costs are rising with costly new gas development. New renewable generation is now generally cheaper than base-load gas generation, with costs of 7-12c/kWh. The cheapest is not necessarily the first to be developed. DEUN is therefore very concerned that the continuing growth in demand is driving costly new generation which in turn is leading to energy poverty. Infrastructure may be needed for economic development, but the returns to the NZ economy must be consistent with the infrastructure costs.
22. Oil and gas development is part of Government's economic programme for the next three to five years. Although not on the infrastructure priority list, it is indeed productive infrastructure in the sense of para 372. as were the development of Manapouri and other hydro resources, and of the Maui field.
23. In terms of para 380 of the discussion document, we consider not simply why, but what impacts large-scale gas investment may have on household energy users. Cost-benefit assessment of this investment must recognise the future value of gas in a carbon-constrained world. For New Zealand, this must include the capability of gas generation to integrate renewables into the electricity system at low cost.
24. MED's just-released Energy Outlook reference scenario is available at http://www.med.govt.nz/templates/MultipageDocumentTOC_41969.aspx

It assumes gas production from new discoveries will average 100 PJ per year, with production beginning about 2017. It assumes wholesale gas prices rising from \$6.5/GJ (real,2008) to \$8.8/GJ in 2020, and to \$13/GJ by 2035.

25. Less well-known are the Electricity Commission's Gas-Generation Scenarios <http://www.electricitycommission.govt.nz/pdfs/opdev/modelling/pdfsmodelling/gas-generation.pdf>
 These are based on scenarios of new gas developments, and observations of wholesale gas prices during times of scarcity or surplus. They predict a drop in gas production from 2013 to 2018, caused by the lack of new fields discovered in the last few years and the long lead time for development of new fields. They all assume Methanex will use about 40 PJ per year of gas, two thirds of the current use of gas for electricity.



26. Methanex's proposal to increase its export of methanol is the elephant in the room. The Electricity Commission report assumed Methanex would use 40 PJ/yr, but Methanex is now seeking contracts for 90 PJ/year for eight years. This compares with 60 PJ/year used on average for electricity in recent years.
27. Large gas contracts are likely to be commercially attractive to Contact Energy, who appears to be keen to see New Zealand dependent on LNG. This suggests that the commercial preference is not to make best use of scarce premium resources, but to use them up fast so as to recoup investment costs, which rapidly drives prices towards the more expensive alternative.
28. The above graph shows the disconnect between the results of MED's energy modeling and that based on observations of commercial behaviour.

CONTEXT: ABOUT INFRASTRUCTURE

Infrastructure decisions are purely political

29. Infrastructure decisions are the pure exercise of political entitlement. Infrastructure enables Governments to directly make "New Zealand the way we want it".
30. Prime Minister Vogel's railway programme was the most obvious historic example. The building of remote large-scale power stations and transmission lines to bring electricity to load centres was an even more pervasive influence on the environment of New Zealand society and business. More recent examples are decisions to build motorways.

Infrastructure suppresses alternatives

31. Once infrastructure is built, its sunk costs affect the economics of all alternative ways of meeting the same end-use needs. Roads upgraded to take large trucks make rail options less economic (and less safe – a story we won't pursue here). Remote generation enabled by large-scale transmission makes distributed generation less economic.
32. The capital costs of infrastructure are funded publicly, whether through taxes or user-pays charges from those consumers who are essentially captive to the infrastructure facilities. This makes alternative solutions less economic, as their consumers pay for the capital costs of both the infrastructure and the competing alternative.

Three ways of making infrastructure happen

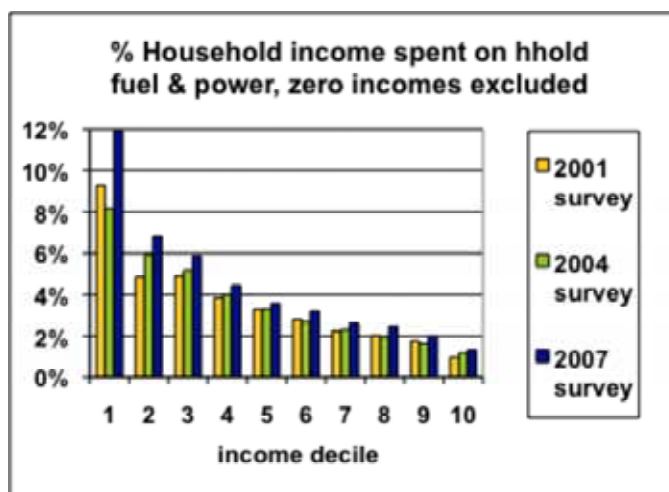
33. Direct funding, from central government or (for non-State roading) local government, is the most obvious way of "making NZ the way we want it". Of the four proposed infrastructure priorities, Rugby World Cup, roads of national interest, and broadband are to be directly funded.

34. Another way governments can influence infrastructure development is through regulation. Transpower is assured of funds for capital development because of pricing policies regulated through the Electricity Commission, and monitored by the Commerce Commission. Historically, town and country regulation post World War II enabled creation of today's suburban housing patterns.
35. A third way is through contracts. New Zealand's biggest energy sources - Manapouri and the Maui gas field - were launched through contracts with overseas developers. Part way through the Manapouri development, the company pulled out and the government completed the project. Companies contracted to develop resources are invariably assured future revenues from the schemes, thus ensuring users will pay. This in turn suppresses alternative solutions to end-use needs.
36. The first and third ways of promoting infrastructure development are through Government decisions directly. The second requires the assent of Parliament, at least to set purposes and governance structures for the regulatory bodies involved.

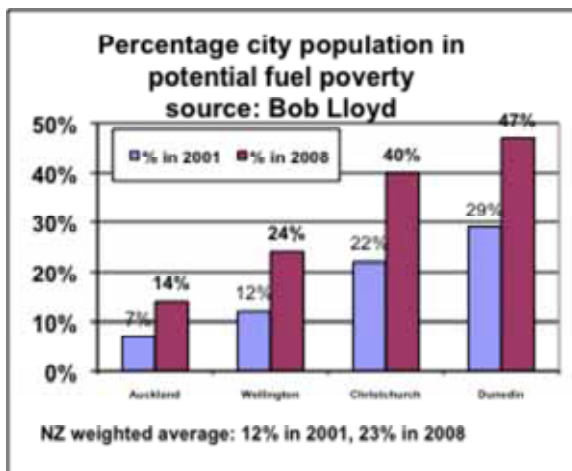
Infrastructure and society

37. Infrastructure is important to society because it sets the style of economic development. This in turn provides for employment, opportunity for self-improvement, provision of educational and health services, meaningful use of leisure time, and maintenance of healthy indoor and outdoor environment.
38. This brings us to energy poverty, which causes very significant deadweight losses. DEUN considers a household is in energy poverty when an undue proportion of its income is required to maintain healthy and safe indoor environments (heating, lighting, cooking, refrigeration) and provide the services to enable full participation in society (especially communications).

39. The graph from NZ Statistics Household Economic Survey shows that from 2001 to 2007, an increasing number of low-income earners, especially in decile 1, were spending near or above 10% of their household expenditure on household fuel and power – this is the conventional definition of “fuel poverty” in the UK.



40. Bob Lloyd from Otago University has compared incomes and heating



requirements for the four main cities, and concluded that potential fuel poverty is present in a quarter of New Zealand's households, and nearly half of the Dunedin population. DEUN notes that many rural households are in cold inland climates, and have low incomes, so the Dunedin situation may well be replicated there.

Beyond infrastructure: natural resources

41. Natural resources share some characteristics with built infrastructure. Though not built, they are part of New Zealand's birthright. They play a major part in determining the nature of economic development. New Zealand's resources of agricultural land, water, minerals (including quarries) forests and fisheries provide for many of New Zealand's own needs, and much export income. Coal, hydroelectricity and natural gas have provided much of New Zealand's energy supply, which in turn supports food processing, forest products, metals, and smaller-scale industry, as well as urban development.
42. Governments are profoundly involved in how, and when, these resources are developed. Initially most (other than the likes of kauri and whale products) served New Zealand needs directly. Exporting resources, whether directly or through added value to New Zealand products, adds to New Zealand's foreign exchange earnings and makes the economy more robust.
43. Some natural resources are renewable, others are replaceable (such as native timbers by exotic timbers), and others are renewable only by good management (especially soils). The planet's climate is a recently recognized resource that is being rapidly but perhaps not hopelessly degraded. Government policies profoundly affect the long-term availability of all these, and thus the long-term material and non-material wealth of New Zealand society.
44. DEUN is concerned to ensure that any export of natural resources to stimulate economic growth does not compromise the long-term affordability of resources that are needed to provide for New Zealand householders and businesses.

POSTSCRIPT

45. In consulting on this submission, DEUN has become aware of updated Electricity Commission forecasts of gas availability for electricity generation: <http://www.electricitycommission.govt.nz/pdfs/opdev/modelling/pdfsmodellinq/2009-Gas-assumptions.pdf>
46. The Commission's 2009 gas reserve estimate is based on updated estimates of reserves from known gas fields. It has dropped by 330 PJ compared to last year. This could mean, over the short term, 20 PJ/year less gas being available for electricity generation, compared to the 2008 estimate. It indicates gas prices rising between 2015 and 2020 faster than did the Commission's 2008 forecast.
47. This does not take account of the possible use of up to 90 PJ/year of gas for export methanol, which would seem to require gas importing much sooner.
48. As in last year's forecast, there is a small chance of finding exactly enough gas to forestall the installation of LNG facilities, in which case New Zealand wholesale gas prices would be expected to fall gradually back to the present price of about \$7/GJ. This has been wryly referred to as the "Goldilocks case". As in last year's forecast, four out of the five gas discovery scenarios tie New Zealand's gas prices to international LNG prices.
49. Comparing this year's gas price forecast to the MED one, the Commission's forecast could be described as a "price holiday" until 2014, followed by a very steep price rise. This reverses temporarily in the event of a very high gas discovery, and for a long period in the "Goldilocks case".
50. Any major commitment of new gas to methanol would of course reduce gas available for electricity by much more than 20 PJ per year. The effect of this on gas price should be urgently investigated through a cost-benefit analysis incorporating consumer deadweight losses.

