



Electricity Commission
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Carbon Tax
C/- The Deputy Commissioner
Policy Advice Division
Inland Revenue Department
PO Box 2198
WELLINGTON

Submission on Proposed Approach to Implementing the Carbon Tax

Dear Deputy Commissioner

The Electricity Commission welcomes the opportunity to make a submission on the Government's proposed approach to implementing the carbon tax.

The Electricity Commission is concerned that the proposed approach to taxing thermal power station fuel stocks could have implications for security of electricity supply. However, the Commission considers that its concerns could be addressed cost effectively and in a manner that is more consistent with Government's overall policy objectives in introducing the carbon tax.

The Commission's concerns and suggested remedy are set out in the attached submission.

Should you wish to discuss any aspect of this submission, please do not hesitate to contact Gari Bickers (Senior Advisor, Reserve Generation) on 04 460 8846.

Yours sincerely

Peter Harris
Electricity Commissioner

Proposed Approach to Implementing the Carbon Tax

Electricity Commission Submission

Electricity Commission's Interest

1. The Electricity Commission (Commission) commenced operating in September 2003. It was established by government to address its concerns about previous industry self governance arrangements and about the electricity market's ability to meet security of supply requirements in dry years. The Commission is responsible for regulating the electricity sector and markets in accordance with the Electricity Act and government energy policy.
2. Government's expectations of the Commission's are set out in the Government Policy Statement of October 2004 (GPS). Ensuring that the electricity market is able to meet consumer demand in a one in sixty year hydro drought without the need for emergency conservation measures is a key expectation of the Commission. The one in sixty dry year security of supply objective was set by government following the winters of 2001 and 2003 when national electricity savings campaigns were necessary.
3. A primary focus for the Commission since its establishment has therefore been on developing dry year security of supply policies. The Commission's role is expected to be one of facilitation rather than intervention in the market. However, the Commission has available the back-stop measure of procuring a limited amount of reserve energy (such as the Whirinaki power station built by government) to supplement the electricity market if that is needed to achieve the one in sixty dry year security of electricity supply requirement.
4. While dry year policy development has been a primary focus for the Commission, it also has a wider interest in security of electricity supply generally.
5. The Commission therefore has a direct interest in any measures that could affect the commercial incentives of electricity market participants with respect to security of supply. The Commission understands government's overall policy objectives in introducing a carbon tax on greenhouse gas emissions. However, the Commission is concerned that the proposed treatment of thermal fuel stocks has implications for security of electricity supply. This is the focus of the Commission's submission.

NZ Electricity Supply System

6. On average, approximately 65% of NZ's electricity needs are supplied by hydro power stations. This makes NZ electricity supply particularly vulnerable to hydro

droughts. Flexible back-up sources of electricity supply are therefore vital to ensuring security of supply. Hydro storage lakes and thermal power stations provide this flexibility. Other forms of supply, such as wind or geothermal, are largely uncontrollable – generating when the wind or geothermal fluid are available rather than in response to electricity demand. Increasing amounts of geothermal and wind supply development can be expected with the introduction of the carbon tax. This is already being observed.

7. While, on average 65% of electricity needs are supplied from hydro generation New Zealand's hydro storage lakes, when full, can only store 10% of annual electricity supply requirements. Seasonally, overall hydro inflows are not well correlated to electricity demand¹. These factors mean that thermal power station flexibility is critical to the efficient use of hydro resources and to security of supply electricity when hydro droughts occur. When inflows are high, thermal power stations can reduce production to compensate. Otherwise, hydro storage lakes would fill up and water would be wasted or spilled. When hydro inflows or storage are low, thermal power stations can increase production to compensate. Otherwise, there would be insufficient supply in dry periods.
8. In order to provide this flexibility, thermal power stations need correspondingly flexible fuel supplies. Historically, natural gas, coal and oil have underpinned thermal power station fuel supplies. The large Maui gas field has provided significant seasonal supply flexibility but is now in decline. It is likely that for economic and commercial factors new gas supplies will be less flexible. It is not practical to store gas and so the flexibility of gas fired power stations will be directly correlated to gas supply delivery.
9. In contrast, coal and oil supplies can be stockpiled at thermal power stations to provide significant flexibility and dry year reserves. For example, Genesis Energy maintains a coal stockpile at its Huntly power station site. This enables it to ramp production up and down as electricity market conditions alter and in particular to maintain reserve fuel for dry year purposes. Similarly, Contact Energy maintains oil stocks at its New Plymouth power station.
10. If the carbon tax were to be implemented in a way that altered thermal generator incentives to maintain fuel stocks, the Commission would be concerned. In the longer term, other fuel stocks could also be relevant (for example, possible coal fired plants on the West Coast and at Marsden have been discussed by investors).

Commission's Concerns

11. The Government discussion paper states that the carbon tax will be levied on fuel suppliers. The Commission understands that this is intended to reduce overall administrative costs by minimising the number of obligation points for the tax. To the extent that fuel suppliers pass on the tax, thermal generators with fuel

¹ The higher inflows into the South Island reservoirs occur in spring and summer. Highest electricity demand occurs in winter

stockpiles would face increased holding costs. The Commission is aware that Solid Energy has publicly indicated its intent to pass all of the tax onto coal purchasers.

12. The discussion paper also proposes that existing fuel stocks be taxed at 1 April 2007 when the carbon tax is introduced. The Commission understands that this is to ensure that all emissions after 1 April 2007 do not avoid the tax. This would increase thermal generator fuel stock holding costs.
13. The Commission is therefore concerned that generator incentives to maintain thermal fuel stocks will be weakened with potential flow on effects to security of electricity supply. Attachment 1 provides some insights into how generator incentives could be affected.
14. It is difficult to assess how a generator might respond. However, the direct commercial implications for it in holding lower average fuel stock levels will be a greater factor in its decision making than the implications for the market and for security of supply outcomes generally. These may or may not be aligned.
15. To the extent that there is a need to have larger stockpiles in future, thermal generators would have weaker incentives to do so. For example, less flexible gas supplies and increasing levels of wind and geothermal supply can be expected to increase the value of flexible thermal back-up supply in relation to security of supply. A number of other uncertainties could influence generator incentives as well. For example, it is unclear what will happen to the tax in 2012 and the level of the tax is understood to be subject to review.
16. While it is difficult to quantify the implications of the proposed approach to implementing the carbon tax, the Commission considers that the treatment of thermal power station fuel stocks is distortionary:
 - From a climate change policy perspective, there would be a misalignment between the occurrence of emissions and the application of the tax²;
 - Thermal generators with fuel stocks would pay an additional tax for holding carbon in stock whether emissions occurred or not;
 - Thermal generator incentives would be distorted in relation to fuel stock management; and
 - There would be commercial incentives to lower overall fuel stocks with potential implications for security of supply.
17. It would be preferable therefore to align the application of the tax more closely to actual emissions. The Commission believes this could be achieved in a cost effective manner.

² Paragraph 2.6, “The carbon tax aims to price all major greenhouse emissions”, emphasis added. Fuel could be stockpiled for several years before use.

Alternative Approach

18. For relatively modest costs, it should be practical to implement the tax in respect of fuel stocks in a way that accounts for changes in thermal generator fuel stockpiles rather than effectively applying the tax to stocks. This would avoid the one off payment at 1 April 2007 for existing stocks and the additional ongoing cost of maintaining a given fuel stock level. It could have the added benefit of imposing the tax when emissions actually occur, thus aligning decision making more closely to policy objectives (although the Commission concedes that climate change policy design is not its area of expertise). In other words:
 - The environmental cost which the tax is intended to signal would be more properly taken into account at the time decisions are being made about whether to burn fuel or not; and
 - Thermal generator fuel stock management incentives would not be distorted by increased stock holding costs and concerns about the treatment of stockpiles at the end of the first commitment period in 2012.
19. In principle, administration of such an arrangement in a very small number of instances should be no more complex than will be involved in levying the tax on fuel suppliers. Very similar measurement, audit and compliance issues will exist in taxing fuel suppliers.
20. Such an arrangement would also avoid potentially significant issues under the current proposals. For example, estimating “existing coal stocks” as at 1 April 2007 will inevitably be a difficult exercise. While stockpile surveying techniques exist there would be debates about the physical amount of coal in stock and also whether all of it would ever be economically retrievable given its age, quality and contamination with dirt at the base etc.
21. In the limited number of situations where there are large fuel stockpiles (e.g. New Plymouth oil, Huntly coal) it would be practical to track fuel deliveries onto site and actual fuel burn in order to account for stock increases or decreases. Inland Revenue Department could then:
 - Rebate the tax to the generator in a tax period (say monthly) where the fuel stock pile is built up (more fuel delivered than burned); and
 - Tax the generator in a tax period when stock was drawn down.
22. The effect of this would be that in a period when a generator coal stockpile, for example, did not alter, the generator would have paid the tax on each unit of coal delivered and burned. The generator would avoid the increased holding cost associated with the current proposal and would not incur additional holding costs when building stocks. Generator concerns about what happens at the end of the initial commitment period or the possibility that a future government may cancel the tax or modify it would also be eliminated.
23. Government may be concerned about the precedent that would be set if such an approach were to be adopted. However, that could be addressed by setting a

suitably high threshold regarding the level of stocks involved and by requiring stock pile owners above the threshold to bear the cost of accreditation and independent audit etc. The latter issues will presumably exist for the tax to be levied on fuel suppliers anyway.

Conclusions

24. The Commission's proposal for the treatment of large thermal generator fuel stocks will:
 - a) Overcome concerns about thermal generator incentives regarding fuel stock management and security of electricity supply;
 - b) More closely align the incidence of emissions and the carbon tax, consistent with government's overall policy objectives; and
 - c) Be relatively inexpensive to implement as it will:
 - only apply to a very small number of large thermal generators with oil or coal stocks ;
 - rely on the same mechanisms being used to tax fuel suppliers; and
 - avoid problems and costs associated with having to ascertain initial stock levels, especially for coal.

ATTACHMENT ONE

Insights into Generator Incentives

1. A detailed quantitative analysis of how generator commercial incentives could be affected by the proposed treatment of fuel stockpiles would be a particularly complex undertaking. However, it is possible to gain some insights.

Prior to 1 April 2007

2. For example, the \$15 carbon tax represents an additional cost of approximately \$30 per tonne of coal. Assuming a cost of coal at around \$4 per GJ, the effective cost of coal would rise from around \$90 per tonne to around \$120 per tonne when the carbon tax is introduced.
3. By burning extra coal to make a one-off reduction in its coal stockpile prior to the application of the tax, a generator could avoid some of the proposed stockpile tax on 1 April 2007. For example, a one-off reduction to lower the average future level of its stockpile by 100,000 tonnes³ prior to 1 April 2007 could avoid a tax payment of approximately \$3m on 1 April 2007.
4. In reducing the size of the coal stockpile to avoid the \$3m carbon tax payment the generator could earn a similar amount of net revenue from the extra generation (approximately 217GWh)⁴. Its actions would thus generate an overall cash benefit of approximately \$6m leading up to the implementation of the tax.
5. From the electricity market's perspective, a permanent reduction in average fuel stock levels of 100,000 tonnes would mean 217GWh of emergency fuel stocks would not be available. The value of that in a dry year (or other security of supply contingency) could be very high.
6. The generator should in principle have incentives to maintain coal stocks so as to profit from high spot prices when supply is restricted (e.g. a dry year). However, generator commercial incentives to maintain fuel stock levels would be influenced by the certainty of increased stock holding costs against the relatively low possibility of profiting from electricity supply restrictions in a dry year.

³ 100,000 tonnes is approximately 10% of Genesis' current coal stockpile.

⁴ For example, assuming an average spot price of say \$55 per MWh (and that this is not materially affected by the additional fuel burn) an extra \$3m of net revenue could be earned assuming the cost of coal burned to be around \$4 per GJ.

7. Security of electricity supply concerns that led to an emergency national electricity savings campaign in 2003 were in part due to constrained thermal power station fuel supplies and stockpiles of coal. The proposal to apply the tax to existing fuel stocks as at 1 April 2007, in advance of the fuel actually being burned to produce emissions, would weaken commercial incentives to maintain thermal fuel stock piles for rare events.

After 1 April 2007

8. It is also possible to gain insights into the implications of generators incurring stock holding costs as a result of the tax being applied to the level of stock at 1 April 2007 and at the time of future fuel deliveries rather than when the fuel is burned and emissions actually occur.
9. For example, a generator⁵ with a coal stockpile of 750,000 tonnes at 1 April 2007 would expect to pay around \$23m of tax to the Inland Revenue Department on that date. That would increase stock holding costs by roughly one third. In NPV terms, the increase in stock holding costs until 2012 would be of the order of \$8m⁶. Without a clear indication of the policy to be implemented beyond 2012, it would be reasonable for a generator to consider the increase in stockpile holding costs over a longer time-frame. The corresponding NPV over twenty years would be approximately \$15m. While difficult to predict what the outcome might be, the generator's incentives to maintain the stock pile at the same level will be weaker. To the extent that lower stock levels are maintained, this will have adverse implications for thermal generation flexibility in a dry year (or other security of supply contingencies).
10. Generator commercial incentives to increase thermal fuel stocks to cover rare security of supply restrictions (for example a prolonged failure of one of Contact Energy's combined cycle gas turbines or the HVDC link between the North and South Islands) would also be less.
11. The Commission also notes that the introduction of the carbon tax is intended to stimulate increased investment in renewable electricity supply options, such as wind farms and geothermal power stations. These supply options are inflexible and with flexibility in gas supply contracts expected to decrease as smaller new developments are bought on line, the role of fuel stocks in providing thermal power station flexibility can be expected to increase.

⁵ The current level of stock held by Genesis Energy at Huntly.

⁶ Assuming a finance rate of around 8% pa and a discount rate of 10% pa.