

# MAJOR ELECTRICITY USERS' GROUP

5 May 2010

Hon Dr Nick Smith  
Minister Responsible for Climate Change Issues

By email to [n.smith@ministers.govt.nz](mailto:n.smith@ministers.govt.nz)

Dear Minister

## Concerns with determining an Electricity Allocation Factor

1. You will be aware from the volume of correspondence that you have received from the Major Electricity Users' Group (MEUG) that we are seriously concerned at your decisions relating to the "proposed emissions allocation factor" (EAF). MEUG has received from you (on the 8<sup>th</sup> of April 2010) a number of emails relating to our request for information under the Official Information Act (OIA).
2. MEUG wishes to lodge with you its strong objection to aspects of the process, unsatisfactory consultation, unwillingness to correct arithmetic errors and an apparent over-reliance by officials that defects or shortcomings with the policy can be overcome when a review takes place in 2011.
3. MEUG endorses the overall policy objective of attempting to minimize "economic regret" while making progress on reducing emissions. However it appears that your officials and advisers have become unduly preoccupied with defending the 0.52 emissions allocation factor which emerged from the Stationary Energy and Industrial Processes Technical Advisory Group (SEIP TAG). MEUG is concerned that Concept's proposal document (which was accepted by MfE) has indications of a predisposition to a low EAF, since it includes the following sentence:  

*"The extent to which the \$0.52 tCO<sub>2</sub>e/MWh emissions factor may be a significant over-estimate for the type of baseload electricity demand that characterises many large electricity users."*
4. MEUG also has a concern that a precedent established by a flawed process may have long term impacts on the energy intensive sector. This concern is exacerbated when the "flaw" relates to the lack of competitiveness within the wholesale electricity market. The potential for this flawed EAF to not only be used during 2010 to 2012, but to also be used from 2013 onwards will create serious investment uncertainty.
5. MEUG has undertaken a review of all material (in the public arena) relating to the electricity emissions factor debate. Starting with the original Government Policy Initiatives in 2003; and including the first Concept Consulting Group report on an appropriate emissions electricity factor in 2003 and Concept's updated report in August 2004. It is noted that in the context of a different policy umbrella Concept concluded that the EAF of .60 in 2003 should be increased to 0.64/0.65 in 2004.
6. The issue of the EAF appeared to be largely resolved at 0.64 until the Stationary Energy and Industrial Processes Technical Advisory Group tabled its new EAF of 0.52 early in 2009. The SEIP TAG process began in December 2007.

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7. MEUG has re-examined the Minutes of all meetings, the preliminary and final reports plus the specific papers presented to the Electricity Price Impact Sub-Group which considered the EAF. The papers studied include the Report entitled "Calculating electricity emission factors for SEIP TAG dated October 2008 by Mark Dean of the Ministry for Economic Development", "SDDP Modeling of Carbon Dioxide Emissions from Electricity Generation dated November 2008 by Dr Tom Halliburton of Energy Modeling Consultants Ltd", and a two page Addendum to the Final Report of SEIP TAG lodged by the Electricity Price Impact Sub Group also dated November 2008.
8. The major users of electricity were somewhat surprised to find that the Electricity Price Impact Sub Group and SEIP TAG had concluded that on the basis of joint GEM and SDDP modeling it had derived an EAF which fairly determined "an electricity price impact on participants of the introduction of the NZETS". Furthermore that as a result of this modeling "a reasonable methodology for allocation has been derived".
9. MEUG has carefully analyzed the SDDP modeling by Dr Tom Halliburton and the caveats that he attached to his conclusions. It is noted that Dr Halliburton defined an EAF in the following terms:

*"An emissions factor has been defined to assist in determining the quantity of emission credits required to compensate an electricity consumer for the price effects of carbon costs on electricity prices. The following definition is used:*

$$\text{Emissions Factor} = \frac{\text{SRMC with carbon cost} - \text{SRMC without carbon cost}}{\text{Carbon cost}}$$

*Where SRMC = Short Run Marginal Cost"*

10. MEUG believes that the emissions factor needs to reflect the increase in wholesale electricity price, which may be different from SRMC, but notes that Dr Halliburton has also identified this point in his conclusions:

*"Interpretation of these results must be within the context of the SDDP least cost dispatch methodology. The results of this model can be expected to differ from actual market outcomes. The causes of this difference include the following:*

1. *SRMC calculated by SDDP will generally provide a lower bound on those observed in the market. Because an overall system wide optimum strategy is calculated by SDDP, other strategies will result in either the same or higher costs*
2. *SDDP is risk neutral – it seeks to minimise expected system costs without regard to the volatility of revenues or prices. Generation companies are not risk neutral, and so expected costs are likely to be increased.*
3. *Marketing strategies will increase market prices above SRMC. This is due to the ability of generation companies to achieve prices above the SRMC of their plant, depending on market conditions."*

11. MEUG agrees with these three caveats which emphasize that the least cost dispatch methodology explicit in SDDP does not recognize imperfect competition or the utilization of market power. It is noted that since the SEIP TAG process filed its report the Part 2 Inquiry by the Commerce Commission and the study undertaken by Professor Wolak has been published. The caveats stated by Dr Halliburton are consistent with the conclusions of Wolak and the Commission, namely that participants in the New Zealand Wholesale Electricity Market have, from time to time, the ability and the incentive to use their market power to increase prices in the spot market above system SRMC. The Commission found that such action was not per se in breach of the Commerce Act.
12. Nevertheless in MEUG's view it is essential that any modeling which is to be used to determine the quantum of compensation for the price effects of carbon costs on electricity prices must take into account the imperfect competition which exists in the NZ Wholesale Electricity Market.

13. The major users of electricity have also been frustrated that not only is imperfect competition in the electricity market ignored by your officials, but the modeling results of Dr Halliburton as reflected in Table 1 of his report have been incorrectly used.

\$/tCO <sub>2</sub>	20	40	60	80
2010	0.53	0.52	0.48	0.47
2011	0.64	0.53	0.54	0.49
2012	0.46	0.53	0.52	0.50
2013	0.49	0.53	0.55	0.53
2014	0.30	0.44	0.48	0.47
2015	0.23	0.43	0.46	0.46
2016	0.28	0.38	0.44	0.46
2017	0.23	0.38	0.40	0.42
2018	0.28	0.37	0.41	0.42
2019	0.04	0.26	0.31	0.36
2020	0.04	0.29	0.32	0.34
2021	0.06	0.28	0.32	0.34
2022	0.56	0.52	0.38	0.42
2023	0.48	0.27	0.30	0.35
2024	0.00	0.30	0.24	0.31
2025	0.39	0.53	0.31	0.30
2026	0.45	0.37	0.26	0.30
2027	0.45	0.22	0.19	0.32
2028	0.36	0.40	0.31	0.34
2029	0.26	0.34	0.29	0.34
2030	0.28	0.35	0.27	0.33
2031	0.26	0.42	0.32	0.30
2032	0.28	0.37	0.32	0.32

14. The SEIP TAG assumed that the carbon price would trade at \$40/t CO<sub>2</sub>e from July 2010 to December 2012. It has been pointed out (by Norske Skog and MEUG) that over this period the carbon price has been effectively capped at \$12.50/t CO<sub>2</sub>e and this would lead to a different value of EAF. Your officials agreed that the use of 0.52 was incorrect but that:

*"... the differences are likely to be relatively small, and the existence of the 2:1 surrender obligation throughout the transitional period will significantly mitigate the impact on electricity users".*

15. In fact the difference amounts to 0.04 tCO<sub>2</sub>e/MWh. At a price of \$12.50/tCO<sub>2</sub>e this equals \$0.50/MWh, and amounts to approximately \$6.5 million each year for major users.
16. MEUG understands that the intention of the government is to compensate trade exposed firms for increased costs arising from the ETS. Since the government has imposed a 2:1 surrender obligation, the level of compensation required is half what it would have been with a 1:1 obligation. If there was no allocation to industry then your officials would be correct in saying that a 2:1 obligation would reduce costs incurred by electricity consumers. However it is clear that the government will provide an allocation to trade exposed firms. It is this allocation of free units to industry that will mitigate the impact of increased electricity prices, not the 2:1 obligation.
17. On the 11<sup>th</sup> February 2010 MEUG lodged a submission with the MfE to comment on inconsistencies in the Industrial Allocation regulations published on the 11<sup>th</sup> December 2009.
18. This MEUG submission was apparently ignored. The papers released as a result of the MEUG request under the OIA tend to suggest that MEUG's submission was evaluated by officials as a

simple plea for a higher EAF which potentially could lead to windfall compensation to large users of electricity and was offset by the submission of the Commissioner for the Environment who wanted an EAF of less than 0.52.

19. This is disappointing because MEUG also submitted on the 11<sup>th</sup> of February a paper by Stochastic Optimization Limited (SOL) authored by Dr Andy Philpott and Tony Downward entitled "Estimating a New Zealand Electricity Emissions Factor". A key element of this paper was the inclusion of "the effects of market power", i.e. the issue that the SDDP model used by Halliburton was unable to take into account. The paper by SOL used Cournot equilibrium models to study the increase in wholesale electricity prices that would arise in the NZEM under a CO<sub>2</sub> charge, assuming strategic behaviour by large generators. The SOL analysis addressed the shortcomings of the modeling by Halliburton including the three caveats that his paper contained, but it also appears to have been dismissed. The EAF determined by SOL was in the range of 0.61 to 0.69.
20. MEUG anticipated that an appropriate response by the officials involved would have been an attempt to reconcile the approaches of EMC and SOL and to establish whether the additional work on the existence and use of market power was useful to determine a fair and realistic EAF. It is not clear from the papers released to date that any analysis of this approach has been undertaken.
21. Instead MfE has reviewed the SOL report, and dismissed it on the basis of several points, some of which misinterpret SOL's analysis. The MfE based some of its conclusions on advice received from Concept Consulting. We shall refute the misinterpretations of SOL's report and some of the advice from Concept to which we disagree in turn.

#### **SOL's results are not a back cast of 2008**

22. SOL used a selection of wet, dry and uncertain trading periods in 2008 as a source of typical market behaviour over different market conditions. Note that whilst the average price in 2008 was high, this was due to a hydro shortage in the winter months. Hydro inflows and storage was abundant in spring and summer of 2008. It is quite wrong and misleading for MfE to say that SOL's analysis leads to a high estimate because they chose a dry year. In fact SOL chose the most recent data that was available in the Electricity Commission's Centralised Data Set, which happened to be 2008. After computing EAF's for the different types of trading periods, SOL then weighted them by an estimate of their frequency in subsequent years based on historical observations.
23. SOL's model can be used to predict EAF for any year with the same generators as 2008, as long as similar behaviour at any period in this candidate year was observed at some time during 2008. Predictions far into the future require assumptions about new plant. SOL has not undertaken modeling work to make predictions for these later periods, since this is not necessary at this time.

#### **SOL's assumptions about imperfect competition are reasonable**

24. The MfE correctly observes that the market is likely to "exhibit elements of competitive and imperfectly competitive behaviour". Therefore it explicitly agrees that the SEIP-TAG model developed by EMC, which assumes perfect competition, is not perfectly suited to predicting EAF, a fact that was clearly stated in EMC's report on that model. The only attempt that has been made to quantify the extent of market power in the NZ electricity market was by Professor Frank Wolak. Given the conclusions of his report, an assumption of imperfect competition seems reasonable over the next two and a half years.

#### **Concept Claim that an EAF reflecting SRMC may be too high**

25. It is critical to the private sector that advice to Ministers can be debated robustly. Concept Consulting's report to the MfE contained some arguments but no analysis to support their assertion that the EAF might be lower than that indicated by a SRMC mark-up.
26. Underpinning Concept's arguments is the assertion that contract prices would increase by less than spot prices under a CO<sub>2</sub> charge. In most academic papers (assuming risk neutrality and no arbitrage) contract prices are assumed to equal expected spot prices. Market power and risk aversion may change this story, but these factors are not mentioned anywhere in the Concept

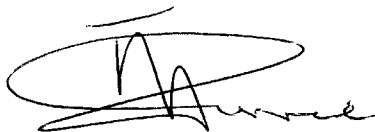
report. Concept implies that contract prices have been strongly linked to the cost of new entry, but they provide no references or empirical evidence for this assertion.

27. Concept argues that a high CO<sub>2</sub> price will cause investment in renewable generation technology ahead of investment in fossil fuel generation, and conclude that this will decrease the EAF. Even if we agreed with Concept's conclusion (which we don't) their arguments are irrelevant. It is only the short term (July 2010 to Dec 2012) that is of interest in this round of consultation. The amount of new investment expected in this period is insufficient to alter the merit order of generation. Furthermore the capping of carbon price at \$12.50 per tonne is too low to influence the merit order for existing plant.
28. Even in the long term, when carbon prices may rise to much higher levels and would therefore have significant influence over new entrant generation technologies Concept's arguments only tell part of the story. The correct benchmark for comparison is not the LRMC of fossil fuel versus the LRMC of renewable generation, as suggested by Concept. Rather it is the electricity price in the absence of a charge for carbon, compared with the electricity price with a charge. If the electricity price increases due to capital intensive renewable generation being built then the EAF needs to reflect this. If the electricity price increases due to fossil fuel plants being built and incurring a carbon charge then the EAF needs to reflect this. Thus for the next round of consultation, dealing with allocations beyond 2012, it will be necessary to predict likely new entrant generators in order to forecast future electricity prices, and make comparisons with electricity prices that would arise in the absence of a carbon charge. But this is not necessary now.
29. Concept makes the assertion that "clearly fossil-fuelled plants have much higher SRMCs than renewable plants, and thus are always going to be at the margin in an operational context". In the absence of any evidence, we dispute this claim by Concept. Operators of thermal plants try to avoid oscillating set-points to minimise maintenance costs. Unit commitments and take or pay fuel contracts dictate that thermal plant offer a significant amount of volume at a must-run price. Hydro players are likely to increase their offers due to a carbon charge, as indicated by water value models. Electricity generating companies tend to ensure that their contract positions are covered. SOL (and to some extent EMC) have included these observations in their modeling assumptions.

#### **Concluding comments and requested actions**

30. MEUG recognizes that the determination of an acceptable level of compensation for increases in electricity prices as a result of carbon charges was never going to be an easy task. All parties agree that the EAF should represent the best estimate of the impact that carbon charges of \$12.50/tCO<sub>2</sub> will have on wholesale electricity prices.
31. All parties agree the NZ Wholesale Electricity Market will exhibit elements of competitive and imperfect competitive behaviour.
32. All parties agree that the objective of determining an appropriate EAF is to minimize economic regrets while neither under nor over compensating users of electricity.
33. MEUG requests:
  - a) an urgent meeting with you so that MEUG and its advisors can discuss in person our concerns with determining an EAF; and
  - b) that the use of an EAF of 0.52 in any current negotiations re allocation of emission units be suspended.

Yours sincerely



Terrence Currie  
Chair