Australian Government
Clean Energy Regulator

CLEAN ENERGY REGULATOR

Supplementary submission to the Senate Select Committee on Wind Turbines

Scope of this submission

A number of the published submissions that comment on the performance of the Clean Energy Regulator [for example Sub350_Williamson, Sub32_Cumming, Sub06_Ryan and Sub15_Kay] appear to be based on a misapprehension about the design of the Renewable Energy Target (RET) scheme and the Regulator's role in administering it.

This submission is intended to assist the Select Committee by clarifying what appear to be the main points of misapprehension. It explains

1) That the Regulator is neither required, nor has the power, to vary the number of Large-scale Generation Certificates (LGCs) issued according to emissions reductions achieved.
2) That the Regulator has no role under the *Renewable Energy (Electricity) Act 2000* to determine the overall effectiveness of the Renewable Energy Target in reducing greenhouse gas emissions.
3) That although the Regulator does not undertake such modelling, historic data on both emissions and electricity supply provides a sound information base for modelling the avoided emissions attributable to renewable electricity.
4) The role of spinning reserve in the electricity system and how it might affect emissions.

Large-scale generation certificates based on electricity generation not emissions avoidance.

Under the Large-scale Renewable Energy Target, the LGC eligibility formula (shown below) is used to determine the eligible electricity generated by an accredited power station. The formula is based on the total amount of electricity generated by the power station (TLEG) minus any ineligible electricity generation (FSL) such as fossil-fuels and auxiliary losses (AUX). The formula also accounts for a marginal loss factor (MLF) that may be applied to the net eligible electricity (DLEG) that is exported from the power station. Each whole megawatt hour of eligible electricity generated above the power station's baseline is entitled to one LGC.

$$\text{Eligible electricity} = TLEG - [(FSL + AUX) + DLEG \times (1 - MLF)]$$

To ensure that the Regulator can determine that LGCs are validly created, all accredited power stations must prepare and submit the correct documentation to support LGC creations. This includes generation data (recorded by electricity meters) which accurately measures the amount of electricity generation by the power station (ideally recorded in half-hour intervals from the revenue meter), multiple fuel source details (if applicable), and any other documentation that may assist to calculate and verify the amount of eligible and ineligible electricity generated and auxiliary losses incurred by the power station. A power station that is in the national electricity market (NEM) must use NEM standard metering. A power station that is not in the NEM must use metering that enables the Regulator to determine the amount of electricity generated by the power station.

The eligibility formula makes no reference to the amount or emissions intensity of fossil-fuel generated electricity that is displaced by the renewable generated electricity. Therefore, the Regulator is neither required, nor has the power, to vary the number of LGCs issued according to emissions reductions achieved.

As a matter of practicality this would be exceedingly difficult to determine on a case by case basis because of the pooled nature of the electricity market. Generators offer to supply the electricity market with specific amounts of electricity at particular prices. Dispatch prices are determined every five minutes (aggregated to a 30 minute trading interval) and it would be difficult to establish what would have been dispatched in the absence of the renewable electricity and hence what emissions were avoided at the time.

From this observation, it would be correct to conclude that the ratio of emissions avoided to renewable electricity generated may vary over time and between regions. It is also correct to conclude that avoided emissions attributable to the RET as a whole cannot be directly measured but must instead be modelled. What happened must be compared with what would have happened in the absence of the RET. Exactly the same point could be made about quantifying the impact of almost any policy instrument. However this does not imply that a modelled estimate of the impact is misleading or cannot be relied upon to assess the effectiveness of the instrument.

The Regulator has no role under the *Renewable Energy (Electricity) Act 2000* to determine the overall effectiveness of the Renewable Energy Target in reducing greenhouse gas emissions. For this reason the Regulator does not itself undertake such modelling. The Committee would be aware of the modelling undertaken by ACIL Allen for the Renewable Energy Target Scheme Report of the Expert Panel amongst others. The Regulator cannot comment on the design of these models or the parameters that they take into account. However we do note that accurate data on actual emissions from electricity generators and the actual dispatch of electricity are available from our own National Greenhouse and Energy Reporting scheme and from the electricity market operators such as Australian Energy Market Operator (AEMO). These data taken together provide a sound information base for modelling the emissions intensity of total electricity supply under different scenarios and hence the emissions displaced by renewable electricity.

Spinning reserve

The fact of spinning reserve is occasionally cited as a reason to doubt the quantity of emissions reductions that are achieved by renewable electricity generation. As explained above, the Clean Energy Regulator is not required to take this into account in its decision-making. We offer the following explanation of the term spinning reserve simply for clarification.

Spinning reserve is the generation capacity that is on-line but not providing electrical energy that can respond to compensate for sudden generation or transmission outages. Spinning reserves are the first type used when dispatch shortfalls occur, which helps keep the grid operating in a stable manner. Because the level of electricity demand varies with time, enough spinning reserve in the system is required to maintain system stability.

Spinning reserve is required whether or not there are renewables in the power system. As the percentage share of renewables increases, the volume of spinning reserve may be increased to maintain power system stability. AEMO noted this in their publication[1]:

When wind generation displaces conventional generation without forcing conventional generation to desynchronise, the power system's spinning reserve increases, which has a positive effect on power system security. (AEMO, p20)

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[1] AEMO, *Power System Adequacy for the National Electricity Market,* 2011

As spinning reserve is required to maintain system stability, one MWh of renewable generation may indeed not displace of the exact amount of fossil-fuel generation required for the same one MWh of electricity. On the other hand, it should not be assumed that fossil-fuel generators continue to burn fuel and hence generate emissions at the same rate regardless of the amount of renewable generation (mostly wind) that is dispatched. Overall, it is more likely that the extra emissions from increased spinning reserve are a small proportion of the emissions reductions from displacement of fossil-fuel generation.

All new large wind farm developments that AEMO is aware of are proposing to use either type 3 or type 4 wind turbines. The newer turbine technologies offer improved ability to meet NEM grid connection standards.[2]

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[2] AEMO, *Wind Turbine Plant Capabilities Report 2013 Wind Integration Studies*, 2013