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INFORMATION

Integration of energy and emissions reduction policy: Final report

The Australian Energy Market Commission has today provided a final report in response to a request for advice on the integration of mechanisms used to achieve energy and emissions reduction policy objectives. The advice describes the characteristics of alternative mechanisms for achieving the electricity sector's share of Australia's Paris Agreement emissions reduction targets. The objective of this report is to equip Australian governments to assess the emissions reduction mechanism that is most capable of integrating with the National Electricity Market.

The Report analyses the characteristics and impacts on the energy market of three emissions reduction policy mechanisms. The Report also includes analysis, undertaken by the Australian Energy Market Operator, of the power system security implications of these three emissions reduction policy mechanisms.

The request for advice

At the December 2015 COAG Energy Council meeting, Energy Ministers tasked officials with preparing advice to allow the Energy Council to better understand the potential impacts of climate change policies on the National Electricity Market (NEM). The Australian Energy Market Commission (AEMC), along with the Australian Energy Market Operator (AEMO), were asked to assist officials with this work.

As per the terms of reference for the advice, the Energy Council considered the AEMC's Interim Report on the integration of energy and emissions reduction policy at the August 2016 meeting. The Interim Report developed the following emissions reduction mechanisms in response to the request from officials to meet a target of 28 per cent emissions reduction on 2005 levels by 2030. Each of the policy mechanisms have been designed so that they are expected to achieve this policy objective.

- **Market-based:** The establishment of a declining Emissions Intensity Target for the electricity sector, where generators with an emissions intensity above the target would need to buy credits and those with an emissions intensity below the target create and sell credits.
- **Technology subsidy:** Extension of the existing Large-scale Renewable Energy Target (LRET). Based on 2015 forecasts of demand, the current LRET would need to increase from 33,000 GWh in 2020 to 86,000 GWh in 2030 to meet the 28 per cent emissions reduction target.
- **Government regulation:** Based on current forecasts of demand, a regulatory policy mechanism is implemented by government to close the number of fossil-fuelled generators required to meet the emissions reduction target.

The certainty with which each of the policy mechanisms will actually achieve the emissions reduction policy objective varies due to the nature of the mechanisms themselves.

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At the August 2016 Energy Council meeting, Energy Ministers agreed to expand the scope of the advice to include consideration of the economic and operational impacts of existing jurisdictional renewable energy target schemes, to the extent details of those schemes had been finalised. Given that the ACT, Queensland and Victorian schemes would, if implemented, lead to a broadly equivalent renewable generation investment outcomes as under the Extended LRET scenario, the AEMC has been able to draw qualitative inferences about the impacts of those schemes by reference to outcomes under the Extended LRET scenario. Energy Council officials may request further modelling once details of the Queensland and Victorian schemes are finalised.

Findings and analysis

Emissions reduction mechanisms

The **Emissions Intensity Target** (EIT) has the lowest impact on prices relative to the business-as-usual (BAU) scenario and the other emissions reduction policy mechanisms. EIT also has the lowest cost of abatement compared to the other emissions reduction mechanisms. The EIT is technologically-neutral and therefore encourages the least-cost form of abatement to be adopted by market participants. It self-corrects when future demand, technology costs and other factors inevitably turn out to be different to what is expected today. Under EIT, risks are allocated to those best placed to manage them, this includes maintaining access to risk management tools, such as hedging contracts. It can also accommodate changes in the emissions reduction target over time. These characteristics are important to maintenance of confidence in the mechanism resulting in stability of the policy mechanism over time.

Extended LRET has the highest cost of abatement. This is because the mechanism only allows a limited number of technology options to meet the emissions constraint. It does not reward switching from high emissions fuels to those with lower emissions. Under this policy mechanism, brown coal remains in the market for longer, while higher cost – but lower emissions – black coal and gas is crowded out. The Extended LRET also has the highest resource costs owing to the large amount of new generation investment needed to meet demand while achieving the required emissions reduction. This implies that under the Extended LRET, more resources are diverted from other areas of the economy to allow such investment in the electricity sector to occur.

Regulatory Closure results in the largest increase in prices paid by consumers. The cost to the economy of abatement is higher than EIT, but less than the Extended LRET. It should be noted that the relatively benign cost of abatement outcome under this policy is a function of administrative decisions regarding the level of capacity and timing of closure that are presumed to be optimal for the anticipated conditions. To the extent administrative closure decisions diverge from modelled optimal decisions, or variables such as future electricity demand, technology costs and fuel costs depart from expectations, the cost of abatement would be higher. As a result, this policy results in an allocation of risk between consumers and generators in the NEM that is incompatible with a workably competitive market.

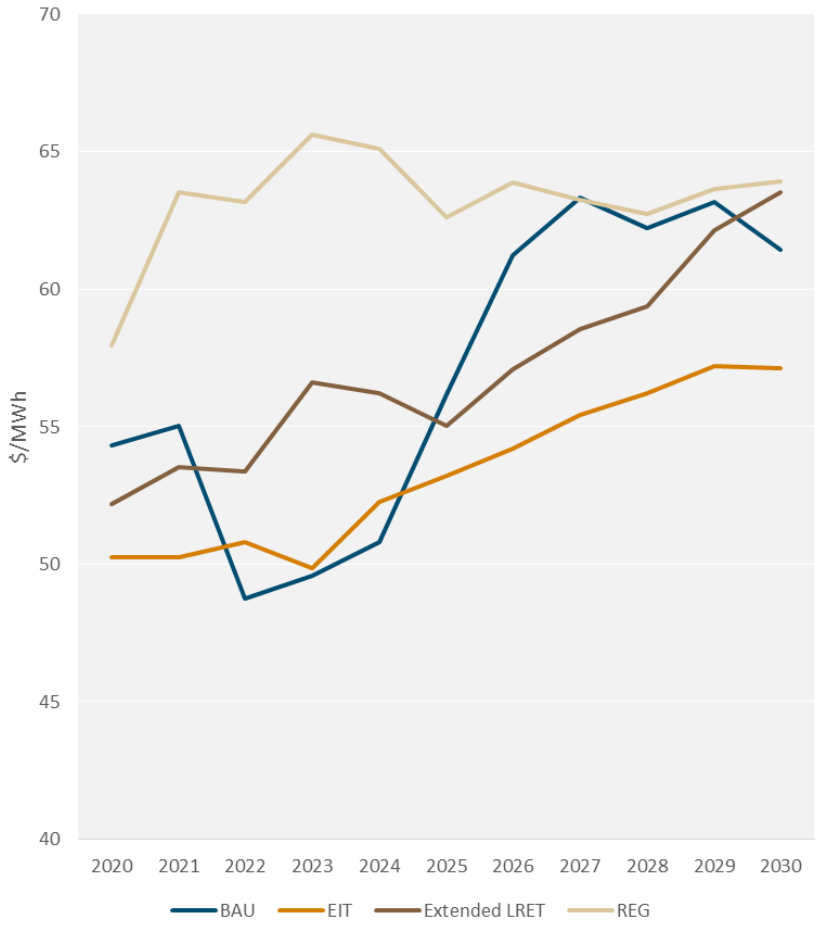
Average cost of abatement estimates for the mechanisms are shown in the table below:

Emissions reduction mechanisms	Average cost of abatement (2016$, 2020-2030)	
	Emissions, discounted	Emissions, not discounted
Emissions Intensity Target	$30.4/t	$17.5/t
Regulatory Closure	$34.2/t	$19.5/t
Extended LRET	$75.7/t	$42/t

Jurisdictional renewable schemes are likely to result in similar overall outcomes, such as the aggregate amount of installed capacity, as the Extended LRET, but potentially with a higher cost of abatement than Extended LRET. This is particularly the case if the policy requires that new investment in renewables locates within a specific jurisdiction. A policy which specifies the location of investment will typically result in higher resource costs relative to a geographically-neutral mechanism such as the LRET.

The wholesale prices (including LGC levy) under each of the three policy mechanisms and business-as-usual are shown in the chart below.

Figure 1: National weighted average wholesale prices – including LGC levy ($/WMh)



Distributional impacts

Distributional impacts refer to how each emissions reduction mechanism affects the generators' and consumers' respective financial positions.

By minimising increases in wholesale prices relative to the BAU, the EIT offers the best outcome for consumers. The cost of the EIT is borne mostly by high-emissions generators who must pay a penalty, based on their output. This penalty is paid to low-emissions generators, which receive credits. Hence the increase in costs of some generators is offset by a decrease in others. In this way, financial transfers under an EIT are confined to within the supply side of the electricity sector and largely do not affect consumers.

Regulated closure results in the worst outcomes for consumers. The removal of generation capacity as a result of closures leads to an increase in the wholesale price, which is passed on to consumers. Generators that remain in the market benefit from the increased wholesale price in the form of increased revenue.

Under the Extended LRET, consumers and existing non-renewable generators bear the cost of the scheme. Renewable generators receive subsidy which brings about new-entrant renewable generators. The increase in generation capacity depresses the wholesale price in the short to medium term due to the increase in total supply. This reduction in wholesale prices leads to higher cost, but lower emissions, generation (black coal and gas) exiting the market, while lower cost, but high emissions brown coal remains for longer. Consumers also bear the cost of the policy mechanism in the long-term when demand and supply come back into balance this reverses prior falls in wholesale prices and causes retail bills to increase.

Adaptability and sustainability

The results of the quantitative analysis are based on a wide range of assumptions regarding futures outcomes, including demand, fuel prices, technology costs and a range of other factors. A policy mechanism that can simultaneously achieve a chosen emissions reduction target while minimising abatement costs and price impacts under a wide range of conditions is likely to be sustainable over the long term.

Given the inherent uncertainty about the future, the report assesses the robustness of the policy mechanisms to a number of alternative assumptions about the future. This analysis of the robustness of policies was developed with input from Officials.

The results show that of the three emissions reduction mechanisms, the EIT can self-correct to a greater extent than the other mechanisms, which enables it to better accommodate changes to a number of variables. The EIT is therefore expected to be the most sustainable, meaning that once it is in place there will be greater confidence that the mechanism will remain and still be effective in achieving the emissions reduction target, no matter what the future may bring. Confidence in the stability of a policy mechanism is an important foundation for a workably competitive market.

The Emissions Intensity Target has self-correcting features, which enable it to better accommodate changes to a number of variables, including changes in the emissions reduction target.

System security impacts

AEMO has undertaken an analysis of the potential impacts of each of the three emissions reduction mechanisms on key elements of power system security, such as frequency control. AEMO's work is included as an appendix to the AEMC Final Report.

The system security analysis shows that of the three emissions reduction mechanisms, the NEM-wide system-security related issues are smallest under EIT and greatest under Extended LRET. This is because the Extended LRET results in the highest share of non-synchronous generators in the generation mix.

It should be noted that, in the case of South Australia, the AEMO analysis shows that to a material extent, the system security related issues expected to affect the region by 2030 are present in the region today. Hence the System Security Review currently being undertaken by the Commission, with the assistance of AEMO, and the related rule change proposals are needed irrespective of the mechanism chosen to achieve the emissions reduction target.

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