Australian Government
Department of the Environment and Energy

COVER SHEET FOR SUBMISSIONS

Independent Review into the Future Security of the National Electricity Market

Overview

Please include this cover sheet with your submission on the Preliminary Report of the Independent Review into the Future Security of the National Electricity Market.

Background

The Preliminary Report outlines the Panel's observations about the current state of the NEM and offers questions on the major issues the Panel has identified. The questions are designed to elicit suggestions or answers that may help form the Panel's final recommendations.

The Preliminary Report serves as an issues paper for broad public consultation. As such, the questions and views will be subject to further consideration and discussion, in anticipation of the final blueprint being produced in 2017.

Stakeholders are encouraged to keep their submissions as succinct as possible, and include a one-page executive summary.

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Submission Instructions

The submission period will be open until close of business on Tuesday **21 February 2017**.

All submissions should be emailed to the NEM Security Review at the mailbox: NEMSecurityReview@environment.gov.au

Submission to Independent Review into the Future Security of the National Electricity Market

Addressed to:
NEMSecurityReview@environment.gov.au

21 February 2017

Contributors

This submission was prepared by Tom Geiser on behalf of the Science Party NSW.

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Confidentiality

This submission does not need to be kept confidential and may be made public.

The Science Party welcomes the opportunity to respond to this independent review.

Summary of Recommendations

The Science Party NSW has several main recommendations with regards to reducing carbon emissions from electricity production and ensuring consumers get value for money.

1. Procure clean energy through reverse auctions. Such a policy should be technology neutral and projects should be selected based on their net present value to consumers.

2. Implement an Emissions Intensity Standard for generators. The standard should gradually reduce emissions intensity over a long period. The emissions intensity should be measured per MW to encourage generation during peak demand.

3. Cost-reflective tariffs for consumers to incentivise cooperative behaviour and to reward personal investment that benefits the community. Fixed (i.e. daily) connection costs should be minimised to discourage grid defection and protect vulnerable consumers.

4. Government must scrutinise gas export contracts to ensure reliable domestic supply. Surplus gas may be exported, but the export market should not deplete domestic gas supplies.

1. Technology

1.1 How do we anticipate the impacts, influences and limitations of new technologies on system operations, and address these ahead of time?

Network studies on technology penetration can indicate where issues may arise. Similar studies can be done to see the impact on wholesale prices. Cost curves can be used to predict growth rates, although these results tend to be conservative.

1.2 How can innovation in electricity generation, distribution and consumption improve services and reduce costs?

Innovation in consumption drives value across the whole chain. Lower peak demand reduces the need for distribution asset expenditure, and reduces generation redundancy requirements. Higher minimum demand increases utilisation rates, lowering the overall capital costs for services. Encouraging some consumers to reduce load during peak demand and others to increase demand during minimum demand would therefore be beneficial. Currently tariffs and contract structures insulate consumers from the value created by demand management.

In distribution – delaying capital expenditure with new technology increases value for customers.

Innovation in generation currently only means reduction in levelised cost of electricity (LCOE). Further potential lies in increasing the flexibility in legacy technologies.

1.3 What other electricity innovations are you aware of that may impact the market in the future?

Peer-to-peer trading has had limited success under current tariff structures; strata buildings with shared infrastructure can realise value earlier with regards to self-consumption of solar energy and peak demand reduction.

Australia is going to be an early leader in home batteries due to the high cost of distribution and low cost of rooftop solar. Poor management and oversight of consumer batteries could be of detriment to desired market outcomes; conversely, defining the correct incentives for battery owners would benefit all customers. For example, fast battery ramp rates as time-of-use (TOU) tariffs change state would create price spikes in the wholesale market. Ideally these batteries should be helping during peak demand and receiving appropriate payment or avoiding costs for the customer.

Load management benefits are mentioned above. Energy intensive or flexible loads would be ideal for this; e.g. smelters and water pumping.

Electric cars are becoming increasingly popular and affordable. As with batteries, poor planning with regards to charging could result in increased system costs.

2. Consumers

2.1 How do we ensure that consumers retain choice and control through the transition?

Allowing customers to opt out of changes, or avoiding abrupt changes, usually results in higher costs for consumers. Such methods should only be used to make people feel comfortable through the transition.

2.2 How do we best meet the needs of vulnerable and hardship consumers?

Minimise fixed charges (connection charges). These are impossible to avoid and punish frugal users. High fixed charges also encourage grid defection further increasing the burden for the remaining vulnerable consumers.

2.3 How do we ensure the needs of large-scale industrial consumers are met?

Consult with large customers about load management. Some large customers may find it profitable to reduce load during extreme price events. Others may find opportunities in consuming more electricity during low prices.

Where industry is competing internationally they may need to be insulated from the cost of transitioning to low emission electricity.

2.4 How can price structures be made more equitable when consumers are making different demands on the grid according to their electricity use and their investments behind the meter?

Cost reflective tariffs (with regards to peak kW, connection, kWh and power factor) foster equity and discourage waste.

2.5 How do we ensure data sharing benefits and privacy are appropriately balanced?

The focus on privacy is good but currently it is difficult for customers to share data and few customer benefits from smart meters are being realised. More effort should be put into making data sharing easier for customers, but on an opt in basis so those concerned with privacy are fully protected.

3. Transition to Low Emissions

3.1 What role should the electricity sector play in meeting Australia's greenhouse gas reduction targets?

A major one. Electricity generation is one of our largest sources of greenhouse gas emissions and is by far the easiest to improve with technology. Clean electricity is also critical for reducing emissions associated with industry and transportation.

3.2 What is the role for natural gas in reducing greenhouse gas emissions in the electricity sector?

Natural gas plays a role in peak generation capacity. Bulk energy should not be sourced from gas as emissions reductions are more cheaply available from renewable energy than from closed-cycle gas turbines (CCGTs).

3.3 What are the barriers to investment in the electricity sector?

Uncertainty. Partisan politics has undermined energy and climate policy to the point that investors either leave or demand high profits in return for risking capital.

Politicians at the state and federal level must compromise their ideologies and commit to policy that lasts longer than an election cycle.

3.4 What are the key elements of an emissions reduction policy to support investor confidence and a transition to a low emissions system?

Certainty upon financial close. The renewable energy target (RET) market creates no such certainty because the price is not known and the policy changes every two years. Investments made under policy arrangements should have a long term view such that investors and financiers can lower their target returns thanks to lower risk. Such a policy could itself be volatile and uncertain (i.e. through iteration) as long as changes are not retroactive. In contrast, reverse auctions with fixed terms and a long tenure have delivered excellent results overseas.

Another key element is technology neutrality. Technology changes faster than policy makers can review their work. Establishing a robust policy which focuses on results rather than favourites will be self-correcting to a degree.

An emissions intensity standard for generators would be an effective way to penalise the worst polluters without affecting the majority of generators. Ideally such a scheme should have a long term trajectory. It should also be based on emissions per MW to encourage capacity to remain available for peak demand.

3.5 What is the role for low emissions coal technologies, such as ultra-supercritical combustion?

Likely none, as ultra-supercritical plants are still more polluting than CCGTs. If carbon capture was affordable then a more efficient plant would be advantageous.

4. Integration of VRE

4.1 What immediate actions could be taken to reduce the emerging risks around grid security and reliability with respect to frequency control, reduced system strength, or distributed energy resources?

- Create new markets or contract for services.
- Create testbeds for potential new technologies such as fast frequency response from batteries and inertia from synchronous condensers and wind farms.
- Revise the FCAS Regulation market so it is harmonised with the energy market similar to the Contingency markets.

4.2 Should the level of variable renewable electricity generation be curtailed in each region until new measures to ensure grid security are implemented?

This measure is not necessary. The focus should be on establishing the right incentives for grid services, allowing VRE generators respond to the cost of these services by providing them or paying for them. Where all services are in harmony, generator curtailment should reflect a state of operation that is secure and lowest cost.

4.3 Is there a need to introduce new planning and technical frameworks to complement current market operations?

AEMO and the transmission network service providers (TNSPs) already provide this.

4.3.1 Should there be new rules for generator connection and disconnections?

No. Increasing fault ride through settings may be damaging to generators without a discernible increase in stability. Requiring inertial response or primary frequency regulation may disadvantage existing generators (not just VRE). These generators pay for these services in any case.

4.3.2 Should all generators be required to provide system security services or should such services continue to be procured separately by the power system operator?

It is in the interest of all generators to provide 'best effort' in regards to system security. Forcing all generators to provide these services will create more supply than is needed (at additional cost borne by customers). It will also push older generators into retirement more rapidly than they can be replaced.

Dynamic market procurement is more complicated and volatile but obtains services at lower cost.

4.4 What role can new technologies located on consumers' premises have in improving energy security and reliability outcomes?

Controllable loads can engage or disengage during contingencies. Batteries can provide frequency services and increase reliability during distribution outages. Batteries are an affordable way to increase reliability for customers at the edge of the grid.

4.4.1 How can the regulatory framework best enable and incentivise the efficient orchestration of distributed energy resources?

Start by requiring a small percentage of new installations to have desirable features; e.g. the ability to be aggregated for control, and communication for central oversight. As the benefits of these features grow and as control services are created, more customers will opt in to having these features.

4.5 What other non-market focus areas, such as cybersecurity, are priorities for power system security?

4.6 How could high speed communications and sensor technology be deployed to better detect and mitigate grid problems?

Phasor measurement can help increase the accuracy of control and detect problems early. More sensors on transmission and distribution assets would allow for dynamic rating and thus better utilisation or faster identification of stressed assets.

4.7 Should the rules for AEMO to elevate a situation from non-credible to credible be revised?

With caution. In the SA blackout example given, AEMO identified that upgrading to credible would place additional strain on the system. Also, AEMO could not have known that transmission pylons would topple.

SA has long operated in a state where a non-credible contingency on Heywood would likely lead to load shedding. Upgrading these situations to credible would dramatically reduce flow between SA and VIC.

5. Market Design

5.1 Are the reliability settings in the NEM adequate?

Yes.

5.2 Is liquidity in the forward contract market for electricity adequate for the needs of commercial and industrial consumers and, if not, what can be done?

Liquidity is very low outside of NSW, QLD, and VIC.

5.3 Are commercial and industrial users experiencing difficulties in obtaining quotes for supply?

5.4 What impact will an increasing level of renewable generation have on the forward contract market and what new products might be required?

Increasing renewable generation creates new options for pricing and for sharing risk between parties. The current forward contracts are priced in a way that includes the cost of backing up a non-perfect asset and this isn't going to change.

Customers willing to take the volume risk of a power purchase agreement (PPA) may be able to receive low prices for such a contract. These arrangements have been popular with large users in the US.

5.5 Rule changes are in process to make the bid interval and the settlement interval the same, both equal to 5 minutes. Are there reasons to set them to a longer or shorter duration?

No. Any shorter and it's too fast for traders to respond. The current trading interval that averages over 30 minutes creates risks for spot exposed customers and rewards gaming with last dispatch interval rebids.

5.6 What additional system security services such as inertia, as is currently being considered by the AEMC, should be procured through a market mechanism?

AEMO has been investigating the possibility of fast frequency response (FFR); something like a 1-second market similar to the contingency FCAS markets. Such a service would assist with limiting the rate of change of frequency after a contingency event. FFR would help arrest frequency deviation as inertia loses effectiveness and contingency services have not yet responded.

5.6.1 How can system security services be used as 'bankable' revenue over a sufficient period of time to allow project finance to be forthcoming?

Long term contracts for these services may be necessary to get the ball rolling in new markets.

5.6.2 How will generators and retailers mitigate price risk in such a market?

Buy contracts or upgrade their assets.

6. Prices

6.1 What additional mechanisms, if any, could be implemented to improve the supply of natural gas for electricity generation?

The issue is not so much supply, but rather that export facilities are locked into contract volumes that are too high. Even a slight reduction in this demand would give some slack to the domestic gas

market, which is only a quarter of East coast gas demand.

Governments should be aware of the amount of contracted exports and their effect on the balance of supply and demand.

6.2 What are the alternatives to building network infrastructure to service peak demand?

Demand management, thermal storage, battery storage, cost reflective tariffs.

6.3 What are the benefits of cost reflective prices, and could the benefits be achieved by other means?

The main benefit is pricing peak load similar to how large customers are charged. This would encourage customers not to use all appliances at once as soon as they get home. As batteries become more affordable peak loads may be managed automatically.

Other tariff structures such as TOU have had little impact on peak load.

Note that instantaneous maximum demand is not relevant, as customers' loads will be smoothed in their area. Maximum 30-minute demand during peak hours is more appropriate. Alternatively using 95th percentile load would reduce the variability of this cost for the customer.

6.4 How can we ensure that competitive retail markets are working?

Publish consumer reports comparing different suppliers and declaring how many customers switched providers. For examples, see Germany's reporting for consumer goods and services.

6.4.1 What outcomes of competition should we monitor?

Affordable and stable prices, and low barriers for new entry.

7. Governance

The Science Party has no comments for this section.