



REVIEW

Australian Energy Market Commission

STATEMENT OF APPROACH

Reporting on drivers of change that impact
transmission frameworks

18 July 2016

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Reference: EPR0039

Citation

AEMC 2016, Reporting on drivers of change that impact transmission frameworks, Statement of Approach, 18 July 2016, Sydney

About the AEMC

The AEMC reports to the Council of Australian Governments (COAG) through the COAG Energy Council. We have two functions. We make and amend the national electricity, gas and energy retail rules and conduct independent reviews for the COAG Energy Council.

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1 The request for advice

The COAG Energy Council (Energy Council) has requested that the Australian Energy Market Commission (AEMC or Commission) implement a biennial reporting regime on a set of drivers that could impact on future transmission and generation investment, in accordance with the terms of reference attached.¹ This work should assist governments and industry participants to consider when future conditions might arise where net benefits would be derived from adopting a transmission framework which would provide for better co-ordination of investment between the transmission and generation sectors.

1.1 Purpose of this paper

This Statement of Approach sets out the Commission's proposed methodology and approach to consultation that we will adopt in conducting this biennial reporting.

1.2 Terms of reference

On 29 February 2016, the Energy Council wrote to the AEMC stating that it supported the AEMC's recommendation in the final report for the Optional Firm Access, Design and Testing review (OFA review) to implement a biennial regime to report on a set of drivers that could impact on future transmission and generation investment.

The Energy Council therefore directed the AEMC to implement a biennial reporting regime in accordance with the terms of reference attached, and under section 41 of the National Electricity Law (NEL).

The terms of reference set out that the AEMC will undertake a two-stage approach to the reporting of conditions that influence transmission and generation investment:

- Stage 1 - In the first stage, analysis will be undertaken on a set of drivers that influence the co-ordination of transmission and generation investment. This will determine whether there is a substantial change in a factor(s) such that it suggests that there is an environment of major transmission and generation investment, where this investment is uncertain in its technology and location. If there is, there is a trigger to move to the second stage of the process. The first stage may include stakeholder consultation as the AEMC sees fit.
- Stage 2 - In the second stage, there would be a more in-depth assessment of whether the factors identified in Stage 1 have changed materially to suggest investment of an uncertain nature is likely. The second stage would also have an assessment as to whether the optional firm access model (OFA) would still be "fit for purpose", and if so, whether implementation of OFA would meet the

¹ See: www.aemc.gov.au

National Electricity Objective (NEO). The second stage must include stakeholder consultation.

At each stage, the AEMC will report to the Energy Council on its findings.

1.3 Background to the request for advice

Under the current framework, decisions about investment in electricity generation and transmission infrastructure occur through different processes:

- Decisions to invest in generation assets is market-driven and businesses consider, amongst other things, expectations of future demand and price, the location of the energy source, access to land and water and proximity to transmission. The result is that risks associated with generation investment rest with those businesses.
- Decisions to investment in transmission assets are undertaken by centralised transmission network businesses in each state.² Transmission businesses are subject to incentive-based economic regulation of their revenues for the provision of transmission services, as well as various other obligations relating to reliability and investment decision making processes. The result is that consumers largely bear the risks associated with transmission investment.

These differences in generation and transmission investment processes have the potential to result in development paths that do not minimise the total system costs faced by consumers. A key issue is the degree to which the allocation of risks between owners of the businesses and consumers are aligned in these processes.

The way the transmission and generation investment decision making processes interact and, in particular their operational consequences, have been subject of ongoing debate since the establishment of the National Electricity Market (NEM) in 1998. In particular, debates typically focus around:

- Congestion management - an issue with electricity market design is how scarcity of transmission capacity is managed and how transmission investment decisions are made. In the NEM, although all generators in a region receive the same energy price ("spot" price),³ if transmission capacity is limited some generators may not be able to receive that price. This is because constraints on the network lead to "congestion", preventing them from being able to generate as much as they would wish to at that price.

² Decisions to augment the transmission network are made by the Australian Energy Market Operator (AEMO) in Victoria, Powerlink in Queensland, TransGrid in NSW, Electranet in SA and TasNetworks in Tasmania.

³ Although we note, that in practice, generators are paid an amount which is equivalent to the spot price adjusted by the transmission and (if relevant) distribution loss factors.

- Generator access - another issue with electricity market design is how generators "access" the wholesale market in order to receive revenue. In the NEM, the wholesale market provides access to generators by allowing them to be dispatched and so sell their output at the regional reference price. During periods of intra-regional congestion, a generator's level of access is uncertain.

Both of these issues are inter-related, and have been debated and considered numerous times. Specifically, since 1997 there have been twelve major reports and reviews dealing with various aspects of these two issues.

1.3.1 Transmission Frameworks Review

One of the more recent reviews, was the Commission's Transmission Frameworks Review (TFR), which concluded in April 2013. The TFR identified a number of concerns with the efficiency of the co-ordination between transmission and generation in the NEM. As part of that review, the Commission developed the optional firm access (OFA) model, which was designed to be an all-encompassing solution to the concerns.

Under OFA, a generator could choose to pay for a specified level of access to the transmission network, and in return would be compensated should congestion occur such that the generator was not dispatched. TNSPs would be required to provide the specified level of access to the generator, primarily through investment in the network. OFA would transform the way generators would access the market during times of congestion and the way transmission investment decisions are made:

- Generators would have the option of buying firm access rights to transmission networks to manage congestion risk. These financial rights would take the form of compensation payments funded by generators without such rights, and would be underpinned by the provision of transmission capacity.
- Generators, rather than planners, would drive some part of the decision-making about future transmission development. In choosing to acquire firm access, generators would fund and guide the development of new transmission to underpin their access rights. The development of interconnectors between different regions would be predominantly driven by generators' and retailers' purchases of inter-regional access.

At the time of the TFR, the Commission recognised that while the model had potential to deliver long-term benefits to the NEM, there were likely to be costs and risks associated with its introduction. As a result, further work on the OFA model was undertaken as part of the OFA, Design and Testing Review, where the AEMC was required to analyse whether the implementation of OFA was likely to contribute to the achievement of the NEO.

1.3.2 Optional Firm Access, Design and Testing Review

The Optional Firm Access, Design and Testing Review (OFA Review) followed shortly after the TFR, concluding in June 2015. In the Final Report, the Commission set out that

while the OFA model would enable better trade-offs to be made between the cost of transmission and the cost of generation, in the environment existing at the time, this would not contribute to the NEO since investment and demand patterns were relatively predictable and investment was low.

However, the Commission noted that the OFA model could be beneficial in a future environment where there is significant investment, but that the patterns of that investment are uncertain. This is since the trade-offs between the cost of transmission and the cost of generation become of greater importance when established patterns of demand and generation are changing. The model would align more of the risk of investment decisions with those who make them, and away from consumers.

The Commission considers that it is important to be prepared for the future, but not introduce significant changes unless, and until, they are needed.

As a consequence, the Commission recommended that, given the possibility of changes to the investment environment, and the scale of potential benefits, there should be regular reporting of drivers for transmission and generation investment in the NEM, with a view to being able to advise on whether OFA should be implemented and remains fit for purpose at such time.

1.4 Structure of the paper

Given this broader context, the Energy Council has tasked the AEMC with a biennial reporting regime. The remainder of this paper sets out how the AEMC will approach this reporting, specifically:

- chapter 2 discusses the Commission's proposed approach to conducting Stage 1 of the reporting; and
- chapter 3 discusses the Commission's proposed approach to conducting Stage 2 of the reporting.

2 Stage 1: Scoping analysis

2.1 Purpose of Stage 1

In Stage 1, the AEMC must undertake a high-level analysis of whether drivers of transmission and generation investment in the NEM have changed substantially, such that a more detailed examination of the conditions is warranted.

Through Stage 1, the AEMC will determine:

- whether there is sufficient change in the drivers versus those at the time of the OFA Review (or versus the time of the most recent stage 2 reporting) to warrant a more detailed examination of whether OFA, or an equivalent model (ie, one which promotes better co-ordination of transmission and generation investment), should be implemented;
- the broad nature of any actual or forecast changes in those drivers relevant to the decision as to whether OFA should be implemented;
- whether those actual or forecast changes forestall or advance the likely need for OFA; and
- its opinion of the continued requirement or otherwise of the reporting process, given the likely future benefits from implementing OFA.

2.2 Approach to Stage 1 analysis

The NEO provides overall direction for the work we do as part of this reporting. The NEO is set out under section 7 of the National Electricity Law (NEL), and states that:

“the objective of this Law is to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:

- (A) price, quality, safety, reliability, and security of supply of electricity;
and
- (B) the reliability, safety and security of the national electricity system.”

In undertaking Stage 1, the AEMC will undertake a qualitative assessment of how the drivers of transmission and generation have changed since the time of the OFA Review, or the most recent Stage 2 reporting that has been undertaken.

Section 2.3 discusses the drivers of investment that the AEMC will consider through this process.

In order to consider whether or not the drivers have changed over time, the AEMC will:

- **Establish the "base case"** - We will set out what we consider the market conditions were for each driver in the relevant comparison period, ie, the set of market conditions that existed at the time of the OFA review, or when the last Stage 2 analysis was undertaken. These conditions will be documented in the Stage 1 report.
- **Establish the "counterfactual"** - This will have two components:
 - First, we will set out what the *current* market conditions are for each driver. Assessment of the current market conditions will be based, amongst other things, on the legislation and regulations existing at the time we undertake the Stage 1 work.
 - Second, any change to the current framework will require a lead time for implementation. Therefore, we will also assess how these conditions might change in the future (over the subsequent 5-10 years), based on a literature review of relevant, publicly available, reports on these matters. We consider that energy market arrangements need to be flexible and resilient enough to respond to change. Energy policy and the associated regulatory framework must be able to adapt to these changes to allow a dynamic market response. In undertaking this review, we will therefore consider market participant's views and work on these matters, and consideration of different scenarios.

The *qualitative* analysis will seek to determine whether there may be a substantial change in the set of drivers to suggest that there may be indicators of an environment of major investment, where this investment is uncertain in its location and type.

We will then undertake a qualitative assessment as to whether the changes in these drivers could materially change the assessment of OFA that was undertaken in the OFA final report. We will also set out the potential magnitude of any changes to the analysis that could occur.

In the Stage 1 reporting, we will solely focus on these drivers and whether they have changed in a substantial manner. We will not consider what model, if any, would be pursued if the drivers were found to have changed materially. This will be considered in Stage 2.

2.3 Drivers to be considered in Stage 1

As set out in chapter 1, there was limited evidence at the time of the OFA review that the current arrangements have caused significant co-ordination issues.

However, the Commission is of the view that where patterns of generation and demand become relatively more unstable and unpredictable, this is an indication that

the future is less certain and greater flexibility may be required to facilitate efficient co-ordination of generation and transmission investment.

The drivers of transmission and generation investment will change the patterns of generation and demand. For example, there may be significant changes in the types and location of electricity generation in the future, depending on policy settings, technology development and patterns of demand.

Importantly, changes to drivers that cause increased uncertainty concerning the development path may warrant changes to the frameworks. It is these changes we are hoping to reveal by examining changes to drivers.

Below we set out the drivers that the AEMC will consider in this analysis. These drivers are variables that could influence the *amount* of transmission and generation investment, as well as its location and technology.

2.3.1 Technological developments

Technological developments have the potential to change the nature of transmission and generation investment in the NEM. It is worth noting that an underlying principle of energy market regulation in Australia is technology neutrality, ie, the rules have been designed to encourage efficient, market-based outcomes and so not act as a barrier to the use of whatever technology delivers the most cost-effective service.

Technological developments comprise a number of areas:

- New types of technology - New and different types of technology becoming prevalent in the NEM have the potential to change investment patterns, but also create new and unpredictable flows across the network, which may make transmission planning more difficult. When considering this driver, the Commission will consider advances in, prevalence of, and changing costs of new technologies.
- Changes in fuel costs - The Commission will also consider changes to the relevant capital and operating costs of generation and network technologies (eg, changes to transmission augmentation costs, water values for hydro generation, gas prices). Such changes may not be solely attributable to technological developments, for example, we will consider the change in gas prices, and the use of gas as an alternative to electricity. These could lead to changes in:
 - predominant generation technology;
 - the influence that the fuel source (ie, transportation costs) has on generation investments and their location;
 - the types and locations of augmentations that are undertaken;

- Operating the power system - Technological developments may bring about new opportunities and challenges for effectively operating the power system. For example, challenges associated with operating a power system where conventional generating plant is being displaced by generating technology with different technical characteristics and where more generation is connected to the distribution network. Storage also has implications for the operation of the power system. There is a large amount of work being done at the moment on the challenges of integrating renewables into the NEM from a technical point of view. Potentially, the outcomes from these pieces of work could impact on future transmission and generation investment. For example, an increased frequency of bi-directional flows along the interconnectors may have implications for FCAS prices.

2.3.2 Establishment and penetration of new business models

The establishment and penetration of new business models also impacts on patterns of transmission and generation investment. New business models could potentially be driven by technological developments, but, could also be driven by new or changed rules and regulation in the NEM.

New business models could change the investment and demand patterns in the NEM, which would have flow on consequences for transmission investment and operation, as well as the types of generation that use the transmission network.

2.3.3 Level of distributed generation

Changing levels of distributed generation (eg, rooftop solar PV) may create new, and different, flows across the network. These will again impact on how the transmission network is planned and operated, as well as how generation investment is undertaken.

In considering this driver, the Commission will consider the levels of congestion in the NEM. In particular, an increased frequency and/or magnitude of transmission congestion.

2.3.4 Level of variances in forecasts

A key indicator of increased uncertainty is the level of variances of forecasts – forecasts covering generation investment, demand, network flows etc. As noted above changes that increase the uncertainty, may mean that a model where there are more commercial drivers may be beneficial in the NEM.

If there is a substantial variance in actual demand compared to what was projected, then this could be a sign that transmission and generation investment is becoming harder to “predict”.

We recognise that this driver has to be interpreted with care. The future is not known, and any projections about what the future will be, and what outcomes may eventuate, may be wrong, as viewed in hindsight. However, what can be analysed is the level of *variance* in the forecasts – forecasts that change substantially from one period to another (eg, year to year) without justification,⁴ can be an indicator that things are becoming more uncertain and harder to predict.

2.3.5 NEM Rule and regulation changes

It will be important to monitor other developments in the NEM, such as rule and regulation changes. Rule changes to either the wholesale market, or the transmission arrangements can impact on how, when and where generation locates, and the linkages with transmission.

2.3.6 Government policies and regulations and international agreements

Government policies, regulations and international agreements can all influence the amount, technology and location of generation and transmission investment. For example, any climate change policy implemented by the Government aims to reduce Australia's carbon dioxide equivalent (CO₂e) emissions, at least cost, over time. The electricity sector is a large contributor to national emissions and so, any policy that is designed to reduce CO₂e will impact on investment in the electricity sector, and, potentially require a transformation of the generator capital stock. Such policies may also change fuel costs between different generation technologies.

The Commission will consider the government policies, regulations and international agreements that exist at the time of the Stage 1 analysis, as well as their implications.

2.4 Stage 1 stakeholder consultation

Anytime the Commission undertakes a Stage 1 analysis, we will publish a draft report of the analysis for stakeholder consultation. We will also undertake targeted consultation with the AER and AEMO as required.

The draft report will have a minimum 4 weeks consultation period.

Given that Stage 1 only considers the drivers, we will not consider any stakeholder comments on potential models that could be adopted in order to better facilitate co-ordination of investment in transmission and generation.

Following the closure of submissions on the draft report, the Commission will publish, and provide to the Energy Council, a final report on Stage 1.

⁴ For example, variances in forecasts due to a change in modelling methodology would not be an indicator that things are becoming more uncertain and harder to predict.

3 Stage 2: Detailed analysis

3.1 Purpose of Stage 2

The purpose of Stage 2 is for the AEMC to undertake a more detailed analysis, in order to determine whether the environment for transmission and generation investment has changed such that a model that introduces more commercial drivers into transmission and generation investment may be warranted.

Through Stage 2, the AEMC will determine:

- whether the drivers identified in stage 1 have changed materially to suggest investment of an uncertain nature is likely;
- if so, whether OFA (the full model, as well as its individual elements) is still fit for purpose;
- if so, whether implementation of OFA would meet the NEO; and
- if not OFA, whether any other improvements to the current regime could be undertaken.

3.2 Approach to Stage 2

In undertaking Stage 2, the AEMC will first publish an Approach Paper, which will:

- outline its findings from Stage 1;
- outline its proposed assessment methodology;
- outline its proposed analysis to be undertaken in Stage 2; and
- invite written submissions from stakeholders on whether the conditions of the NEM have changed, and preliminary views on whether OFA is fit for purpose or what other models should be considered.

We therefore will set out a more fulsome approach to Stage 2 at the time of any Stage 2 advice being conducted. Importantly, as with Stage 1, the NEO provides overall direction for the work we will do in Stage 2.

Analysis conducted in Stage 2

Stage 2 will include quantitative analysis. We will attempt to quantify the drivers, and their changes - but we recognise in some cases that this may not be possible, and so a more detailed qualitative assessment will be done. Further, even where some quantification is possible, such quantification may exhibit a large range of uncertainty. Also, in some instances (particularly those related to the risk allocation and sharing) the qualitative issues may be more important than the quantitative issues.

When undertaking the quantitative analysis we will assess the impacts across a range of scenarios, which include considering different future views of the NEM (for example, different levels of congestion in the network, different types of generation that connect to the network, or, indeed, whether generation becomes more off-grid). This will help to assess changes across a range of scenarios. Any changes to the transmission framework should be robust in the face of future changes: any changed arrangements should be able to cope with a range of circumstances that might eventuate.

Assessment of models

Stage 2 will also consider whether the OFA model is still fit for purpose. In the final report for the OFA review, the Commission set out that from a functional perspective, OFA could be implemented in the NEM. It also noted that it had not been able to develop an alternative to OFA that better meets the NEO than OFA itself.

Addressing individual elements of the transmission frameworks in a piecemeal manner, would likely still require considerable regulatory overhaul of the frameworks. However, it would also have a high risk of inefficient outcomes, since the more isolated approach would not address the frameworks holistically.

Having said that, the Commission recognises that market conditions and frameworks evolve. It will therefore adopt the following approach when considering models:

- set out the key elements of the OFA model as set out in the OFA Final Report;
- review these elements in the market arrangements that exist at the time to see if these are still fit for purpose;
- if so, undertake an assessment (similar to that undertaken in the OFA Final Report) as to whether OFA would meet the NEO, as well as any other models considered and developed at the time;
- if not, undertake an assessment on other models considered and developed at the time to see if they would meet the NEO.

3.3 Stage 2 stakeholder consultation

There will be multiple opportunities for stakeholders to engage in any Stage 2 assessment that the Commission undertakes:

- as noted above an approach paper would be published for consultation;
- following consideration of submissions to the approach paper and the Commission's analysis, a draft report would be published for consultation;
- in addition, we will engage with jurisdictions and key stakeholders - including market participants, TNSPs, AER, AEMO, consumer representatives and the Energy Council on a more informal basis. This may include holding workshops, as well as bilateral meetings.