Australian Energy Market Commission

APPROACH PAPER

Electricity Network Economic Regulatory Framework Review

1 December 2016

REVIEW

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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.

Contents

1 Introduction

In August 2016, the COAG Energy Council tasked the Australian Energy Market Commission (AEMC) to monitor developments in the energy market, including the increased uptake of decentralised energy, and provide advice on whether the economic regulatory framework for electricity transmission and distribution networks is sufficiently robust and flexible to "continue to achieve" the national electricity objective (NEO) in light of these developments. The AEMC is required to publish its findings on 1 July annually.[1] The first annual monitoring report will be due on 1 July 2017 (2017 report).

The tasking follows previous advice from officials that identified potential risks to the economic regulatory framework's ability to achieve the NEO in future scenarios where there is an increased uptake of decentralised energy. Officials recommended that the AEMC be tasked to monitor market developments and provide advice to the COAG Energy Council to inform future policy decisions regarding potential changes to the economic regulatory framework.

The annual monitoring report is to be conducted under a standing terms of reference. This is available on the project page on the AEMC's website.[2]

1.1 Purpose of this approach paper

As the 2017 report is the first annual monitoring report, this approach paper has been prepared to set out how we intend to conduct the task, our proposed information sources and our preliminary view on the priority areas that we will be focus on for the 2017 report.

We are also using this document to seek stakeholder views on our approach and our preliminary views on priority areas. Information on how to make a submission is provided in section 1.4.

1 The COAG Energy Council provided the AEMC with terms of reference under s. 41 of the NEL.

2 www.aemc.gov.au/Markets-Reviews-Advice/Electricity-Network-Economic-Regulatory-Framework.

1.2 Process for this review

Table 1.1 below provides key milestones for the 2017 report.

Table 1.1 Key milestones for the 2017 report

Key Milestones	Date
Terms of reference received	31 August 2016
Approach paper published	1 December 2016
Consultation period on approach paper ends	2 February 2017
Publication of final report	1 July 2017

Although this approach paper is the only document available for public comment, we will continue to work closely with stakeholders throughout the process and welcome feedback. Informal consultation with stakeholders will continue to play an important part for the 2017 report as well as future reports.

We will provide a copy of the final report to the COAG Energy Council 10 days prior to the publication of the final report.[3]

1.3 Outline of this paper

The remainder of this paper is structured as follows:

- Chapter 2 outlines the background and rationale to the annual monitoring and reporting task;
- Chapter 3 details our proposed approach;
- Chapter 4 outlines what we anticipate as the main issues and the priority areas we propose to focus on in our final report our proposed approach; and
- Chapter 5 outlines the process for stakeholder submissions.

1.4 Submissions

Stakeholders are invited to make a submission by 2 February 2017.

In providing submissions to the approach paper, stakeholders are encouraged to give evidence, data and any other information (such as case studies) to support issues

3 This is a requirement specified in the terms of reference.

raised. All information will be treated in accordance with the AEMC's submissions guideline which can be viewed at www.aemc.gov.au.

Submissions should refer to AEMC project number "EPR0050" and be sent electronically through the AEMC's online lodgement facility at www.aemc.gov.au. All submissions received during the course of the review will be published on the AEMC's website.

2 Context of the review

2.1 The changing environment

The production and consumption of electricity in Australia has changed significantly in recent years. For example, the past decade has seen significant consumer uptake of renewable generation such as roof top solar panels and the corresponding decline in the cost of their installation. At the same time, consumers have become more sophisticated and aware of their usage. Technology has also enabled consumers to have more control over how they generate and consume electricity.

Traditionally the role of transmission and distribution networks was to transport electricity in one direction, from large centralised power stations to consumers. However changes in technology and consumer preferences, innovative business models and new financing arrangements mean that networks are needing to adapt and change their role to facilitate two way flows of energy to and from consumers while integrating a range of new decentralised energy resources. It is likely that this trend will continue to gain momentum in future years.

As penetration levels of decentralised energy increase, the aggregate technical impact of distributed energy resources on distribution networks also increases. Therefore, greater coordination of the installation and use of distributed energy resources may be required to manage these technical impacts and the more dynamic nature of distribution networks. As the evolution to a decentralised market for electricity services at the distribution level may occur different distribution market models may be needed. This is outlined further in section 4.4 of this paper, and in the approach paper for the Distribution Market Model project also published on 1 December 2016.

2.2 Previous policy advice by officials

In light of the changes in the energy market, the COAG Energy Council directed officials to conduct a stress test of the electricity network economic framework to assess its ability to deliver the NEO under possible future scenarios (2015 policy advice).

The stress test was completed in 2015 and identified four scenarios, two of which that could present potentially material risks:

- New consumer choices driving an evolution. This scenario sees strong growth in new innovative alternative services such as off-grid and smart technologies. Such services are primarily provided by third party service providers, that is, a person other than a traditional electricity retailer or distributor.

- Energy generation is moving from centralised to localised. This scenario sees strong growth in decentralised distribution supported by reliable storage displacing the traditional centralised supply model. Under this scenario, a significant proportion of customers could change to 'off-grid'.

The most critical risk identified by officials was the potential for an increased uptake of decentralised electricity supply options to lead to asset under-utilisation and/or stranding if network businesses do not take appropriate action to respond to these changes. Under the current economic regulatory framework this scenario could lead to material increases in the price of electricity services for customers that remain connected to the grid.

While no major weaknesses in the current regulatory framework were identified, officials considered it important to monitor and assess early signs of the above scenarios eventuating and the regulatory framework not appropriately managing the issues.

The COAG Energy Council therefore tasked the AEMC to monitor market developments and provide advice to inform future policy decisions regarding potential changes to the economic regulatory framework.

It is worth noting that since the 2015 policy advice, several important rule changes have been made and some network businesses have taken proactive steps to respond to the market changes. As discussed in section 4.2, the implementation of AEMC's distribution pricing rule change and the development of cost reflective network prices will address some of the main risks identified by officials in 2015. Industry bodies such as the Energy Networks Association, through initiatives such as the Electricity Network Transformation Roadmap, are also proactively exploring options on how electricity networks can transform to respond to the changes.

3 Approach

This chapter sets out our view on the focus of the annual monitoring task and our proposed approach in preparing the report.

3.1 Overall approach

In considering our approach, we developed the question below, to serve as a useful guide to assist us in conducting the annual monitoring task.

Does the economic regulatory framework allow and incentivise networks to adapt to the extent necessary to changes in the market, including increased decentralised supply?

Consumer choices will continue to shape the future development of the electricity market. It is not possible to know whether certain scenarios will prevail and we do not believe our role in conducting this review is to predict exactly how the market is likely to develop in the future. To achieve the purpose of the annual monitoring task the final report should focus on the key features the regulatory framework requires to enable it to meet future challenges, whatever they may be.

A holistic approach will be adopted in preparing the annual monitoring report so that it examines the economic regulatory framework for electricity networks as a whole. Where appropriate, the annual report will draw on and refer to work or reforms already underway and assess whether the regulatory framework is capable of continuing to promote the NEO.

For each year, we intend to identify emerging themes or potential challenges that may be faced by the regulatory framework in the near to medium term. The themes and challenges will be informed by our monitoring of indicators and market developments as well as consultation with key stakeholders. The identified challenges may be priority areas for the COAG Energy Council to focus on for future reforms.

3.2 The 2017 report

The following three areas will be the focus for the 2017 report:

- a review of the current state of the market;
- an overview of the economic regulatory framework and assessment of whether it is sufficiently flexible and robust in light of recent market changes; and
- identify three key priority areas for future reforms.

Each is discussed in turn below.

3.3 A review of the current state of the market

As the 2017 report is the first annual monitoring report, it will be useful to conduct a review of the current state of the electricity market. An analysis of the changes in the market in the last five to 10 years, emergence of new technology and business models and how network businesses have adapted to the changing environment will provide a good basis and background for the first monitoring report.

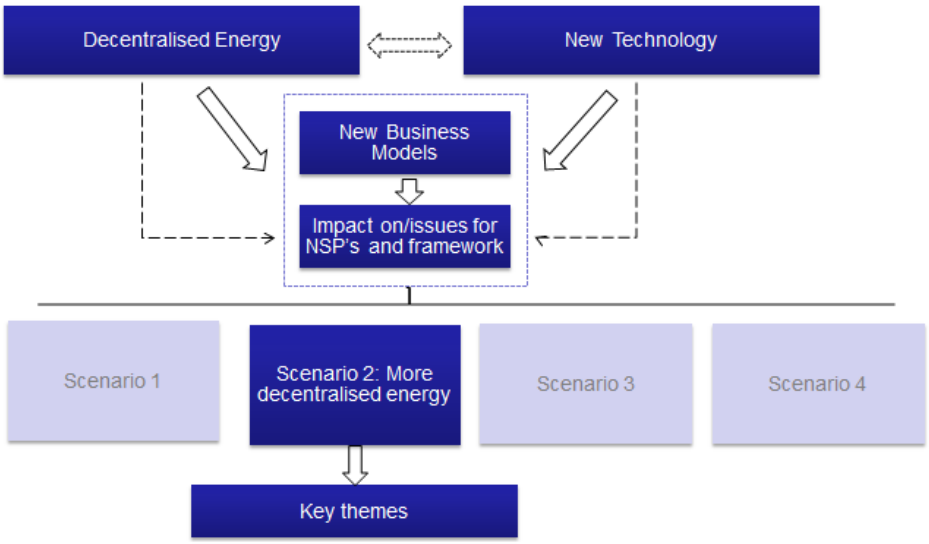
3.3.1 Market evolution

The NEM is undergoing a significant transition. It is moving from predominantly large-scale synchronous generation to greater amounts of smaller, distributed and intermittent non-synchronous generation. These may be located in either transmission or distribution networks. In the past, intermittent generators (such as wind and solar) accounted for only a small fraction of total electricity supply. Now they are a key part of the power system, and their contribution is continuing to grow.

Decentralised energy and technology development are closely interlinked. The increased uptake of decentralised energy is largely as a result of new technologies becoming available in recent years, as well as prices in technology such as solar PV and batteries falling significantly. On the other hand, the increase in decentralised energy has also opened up opportunities for new technologies to maximise the benefits of decentralised energy, while minimising the negative impacts that decentralised energy can cause for the networks.

This increase in decentralised energy, as well as the new technologies that have become available, have had impacts on the networks and led to new business models evolving. This in turn means that the economic regulatory framework has needed to adapt to facilitate these changes while still continuing to promote the NEO.

Figure 3.1 Market interactions between decentralised energy, new technology and the economic regulatory framework



Source: AEMC.

As required by the terms of reference, the report will focus on decentralised energy. However, there are a number of possible future scenarios for the NEM, and increased decentralised energy is just one possible outcome. Figure 3.1 shows in diagrammatic form the market interactions.

As discussed previously, we do not intend to predict how the market will develop in the future. However, it is important to monitor changes and emerging trends in the market to inform our monitoring task. Through consultation with stakeholders, the AEMC will examine:

- areas where the regulatory framework is likely to continue to be sufficiently flexible and robust;
- changes in the market, that if realised, may lead to areas in which the economic regulatory framework may not promote the NEO; and
- areas which may need additional focus in the future.

3.3.2 Information sources

In conducting this review the AEMC will draw on information from a wide range of sources in order to form an evidence base to explain and assess the changes in the electricity market that are likely to have the largest impacts on the electricity networks. We do not propose to undertake new research, but rather to collate relevant data into a succinct report that gives an overview of the status of the market. Information will be sourced from published papers on relevant topics, stakeholder consultation, as well as industry data already available. There will be some quantitative data reported on

annually in the form of indicators to inform the review's conclusions. However, the report will focus on more qualitative information and case studies.

To enable continual annual monitoring the majority of indicators will be from sources that are published at least annually. The indicators individually will not show us what is happening within the market, but together should provide an overview of the market. The indicators will include:

- uptake of new technologies including solar PV, batteries and electric vehicles;
- networks use of non- network solutions (measured through non-network operating expenditure, network support payments, avoided transmission use of systems charges, use of demand management incentive scheme/demand management innovation allowance and regulatory investment tests);
- number of embedded generator connections;
- number of distribution feeders with constraints or reverse power flows;
- levels of augmentation and replacement capital expenditure; and
- number of off-grid consumers and embedded networks.

In addition to the annual indicators, there will also be indicators that may not be readily available annually, but may still be useful to monitor. These indicators will be monitored on an ad hoc basis.

An assessment of each key area cannot be made using a single indicator. Multiple indicators will be required to form a more complete and meaningful picture of the rate of change in decentralised energy. The indicators, when looked at in aggregate, should provide an overview of the status of the current market and highlight any significant and meaningful recent developments.

3.3.3 Stakeholder consultation and case studies

Stakeholder consultation will form a large part of the review process. As well as consulting with the AER, AEMO, network businesses, retailers and relevant agencies, the AEMC will also be seeking to consult with start-ups and new technology companies to assess the economic regulatory framework for electricity networks.

Feedback from stakeholders will give us an up to date view of the issues faced by those in the industry. It will also provide information on emerging technologies which may become popular in the next few years. These emerging technologies may bring along issues of their own which will need monitoring and may have impacts on the economic regulatory framework.

In order to make the report as relevant as possible the AEMC aims to use case studies to show areas in which the networks are incentivised to achieve the most efficient outcome, including non-network solutions, through the current regulatory framework.

In addition case studies may highlight some areas where market participants think that the NEO is not being promoted under the current framework.

3.4 Economic regulatory framework

The purpose of the economic regulatory framework is to promote the NEO. The AEMC must have regard to the NEO when exercising its functions and powers under the NEL and NER (that is, when making rules and conducting reviews). The AER is also required to have regard to the NEO when exercising its economic regulatory functions and powers under the NEL (for example, when making transmission and distribution determinations).

The NEO is:[4]

"to promote efficient investment in, and efficient operation and use of, electricity services for the long term interest of consumers of electricity with respect to:

- price, quality, safety reliability, and security of supply of electricity; and
- the reliability, safety and security of the national electricity system."

3.4.1 Defining the economic regulatory framework

For the purpose of this monitoring report, the AEMC will be focusing on those aspects of the economic regulatory framework set out in chapters 6 and 6A of the NER and relevant jurisdictional instruments such as reliability standards. The report may also explore other aspects of the NER (such as the connection and planning framework in Chapter 5 of the NER) or the NEL, which may be relevant to the matters raised in the report.

4 Section 7 of the NEL.

3.4.2 Assessing the framework's flexibility and robustness

The consumer-driven transformation has already had a significant impact on the energy market and it is likely that it will continue to do so. Given the rapidly changing environment, it is important that the economic regulatory framework is sufficiently flexible for an uncertain future. The AEMC will assess whether the framework is sufficiently flexible and robust to promote the NEO through the following assessment criteria:

Criteria	Assessment approach
Incentives	Does the framework provide the correct incentives for participants to: • make efficient planning, investment and pricing decisions; • sufficiently adapt business models; and • use non-network solutions?
Flexibility	Does the AER have appropriate and sufficient tools, and flexibility over how to use them, for a changing environment?

Recent rule changes and regulatory mechanisms

As part of our assessment, we will consider relevant rule changes that the AEMC has made that will affect the ability of the economic regulatory framework to meet the above objectives. We will also review the operation of these rule changes in practice. It is worth noting however, that some of these rule changes may not have enough time to fully take effect for the 2017 report.

Substantial reforms to network regulation have, and continue to be made arising out of the AEMC's Power of Choice review. This review focused on putting consumers at the centre of the regulatory system by giving them the information they need to choose the products and services they want at the prices they are willing to pay. It focussed on improving consumer engagement in the market and facilitating more active consumer participation. The COAG Energy Council submitted a number of rule change requests in response to that review such as:

- customer access to information about their electricity consumption (Final determination published 6 November 2014);
- distribution network pricing arrangements(Final determination published 27 November 2014);
- improving demand side participation information provided to AEMO by registered participants (Final determination published 26 March 2015);

- demand management incentive schemes (Final determination published 30 August 2015);
- expanding competition in metering and related services (Final determination published 26 November 2015);
- embedded networks (Final determination published 17 December 2015.); and
- updating the electricity B2B framework (Final determination published 30 June 2016).

In addition, the COAG Energy Council submitted the transmission connection and planning arrangements rule change request in late 2015. A draft rule determination was published on 24 November 2016.

Noting that the NER forms only part of the economic regulatory framework, we will also consider the existing relevant schemes and guidelines such as:

- efficiency benefit sharing scheme (EBSS);
- capital efficiency sharing scheme (CESS);
- regulatory investment test for transmission and distribution (RIT-T and RIT-D); and
- distribution ring-fencing guidelines.

AER discretion

In addition to the rules, schemes and guidelines, it is also important to note that the AER has significant discretion within the current economic regulatory framework to adapt how it regulates in light of any changes in the market. This discretion includes determining the following aspects of a network business's revenue determination:

- control mechanism;
- service classification;
- cost allocation; and
- shared assets.

4 Priority issues

4.1 Introduction

As outlined in section 3.4.2, significant changes have been made to the economic regulatory framework in recent years to enable it to cope with the changing market. No major issues have been identified as yet with the economic regulatory framework in the current conditions, indicating it is currently effectively promoting the NEO. However, it is important that the framework continues to be flexible and robust enough to promote the NEO given any future changes.

Therefore, for each year, the AEMC will identify key risk factors and emerging themes for potential challenges that may be faced by the regulatory framework in the near to medium term. The identified themes could be used as priority areas for the COAG Energy Council to focus on for future reforms.

For the 2017 report, the three preliminary priorities will be:

- continued implementation of network pricing reform;
- the ability of networks to utilise increasingly diverse grid supply and network support options; and
- different network operating models (for example, the distribution market model).

These priorities were selected based on consultation conducted to date as well as feedback received during consultations on other AEMC reviews or rule change requests. Each is discussed further in the sections below. Stakeholder feedback on our preliminary priorities is welcomed.

4.2 Network pricing reform

Despite average consumption of network-supplied electricity decreasing, there has been growth in peak network demand which has led to significant increases in network costs over the last 10 years. A significant driver of this need for network investment was the rapid uptake of air conditioners. Network tariffs that promote efficiency and create the right pricing signals could avoid similar situations arising in the future. Cost-reflective network tariffs can result in significant savings for consumers and enable consumers to make more informed choices about what technologies they invest in. Essentially any future changes to network maximum demands, which drive future network expenditure, should be the result of users making decisions with knowledge of the network costs that they cause by their usage decisions.

In November 2014, the AEMC made a new rule to require network businesses to set prices that reflect the efficient cost of providing network services to individual consumers. This will allow consumers to compare the value they place on using the

network against the costs caused by their use of it. Consumers who choose to respond to network prices by reducing their consumption in higher cost periods will be rewarded through lower network charges. Over time all consumers will benefit through lower network costs and lower average network charges.

The rule set out four new pricing principles that the network businesses must comply with:

- Each network tariff must be based on the long run marginal cost of providing the service. If consumers choose to take actions that will reduce future network costs, such as by reducing peak demand, then they will be rewarded with lower network charges.

- The revenue to be recovered from each network tariff must recover the network business' total efficient costs of providing services in a way that minimises distortions to price signals that encourage efficient use of the network by consumers.

- Tariffs are to be developed in line with a new consumer impact principle that requires network businesses to consider the impact on consumers of changes in network prices and develop price structures that are able to be understood by consumers. Consumers are more likely to be able to respond to the price signals that network prices are designed to send if they can relate their usage decisions to network price structures and sudden price changes are avoided. Network businesses can gradually phase-in new price structures.

- Network tariffs must comply with any jurisdictional pricing obligations imposed by state or territory governments. But if network businesses need to depart from the above principles to meet jurisdictional pricing obligations, they must do so transparently and only to the minimum extent necessary.

In addition, the rule also contained new processes and timeframes for setting network prices and requires distribution network businesses to consult with consumers and retailers to develop a tariff structure statement (TSS) that outlines the price structures that they will apply for the regulatory period. The businesses must also publish annually an indicative pricing schedule to provide consumers and retailers with the most up to date information on likely price levels throughout the regulatory control period.

The network prices based on the new pricing objective and pricing principles will be gradually phased in from 2017. For the first TSS period from 2017 to 2019, network businesses have introduced demand based or time-of-use tariffs that better reflect the cost of the networks, albeit generally on an 'opt-in' basis. This is an important first step towards cost-reflective pricing, but it is important that network businesses build upon their current work in the second TSS period starting in 2019.The implementation of cost reflective pricing will create the essential foundation for future reforms, including more advanced pricing options in the future.

4.3 Increasingly diverse grid supply and network support options

The emergence of new technologies and business models means that network businesses may no longer need to rely on building capital assets to meet changing consumption patterns.

Increasingly, network businesses could use alternatives to capital assets such as batteries, embedded generation and demand response to solve network related problems. While there are benefits the networks can harness, it does mean increased analysis for the network businesses and the trade-off between operational expenditure and capital expenditure will become increasingly relevant as network businesses have to make decisions about whether or not to invest in non-network solutions. In other words, the network businesses will now have to weigh up the costs and benefits of having poles and wires as opposed to other supply options.

In addition, supply options for consumers have increased significantly in recent years, with an increasing number of households investing in generating their own electricity through roof top solar PV systems. In addition, batteries are now becoming accessible at the consumer level. These new technologies mean that consumers now have access to more diverse options of electricity supply and do not necessarily need to source their entire electricity needs through the grid. The reduction in cost for solar PV and batteries as well as their increased efficiency means that is becoming more affordable and is likely to accelerate their uptake.

This reduction in costs for new technologies also has impacts on the network businesses as it may mean that some edge of grid customers can be supplied more economically by standalone power systems rather than grid connection through kilometres of poles and wires. This however raises issues for network businesses choosing the most economically efficient option while still maintaining reliability, safety and security. The rapid evolution of supply options in the market, leads not only to greater choice and potential benefits, but could potentially create issues if not managed correctly. The issue that needs to be considered for the purpose of this report is whether the current economic regulatory framework is providing the right incentives for network businesses to choose the most economically efficient option while maintaining reliability, security and appropriate consumer protections.

4.4 Different operating models

Decentralised energy supply has the potential to change the energy markets. Specifically, distribution network businesses may need to adapt to accommodate an increased amount of decentralised energy supply and the various ways in which new technologies can be used.

However, decentralised energy supply presents some challenges to the management of distribution networks. As penetration levels increase, the aggregate technical impact of decentralised energy supply on distribution networks also increases, for example by causing reverse power flow and voltage instability. Greater coordination of the

installation and use of decentralised energy supply may be required to manage these technical impacts and the more dynamic nature of distribution networks.

Given the opportunities and challenges being presented by decentralised energy supply, regulatory frameworks need to be flexible and resilient enough to respond to any changes that may occur, in a way that is technology neutral and facilitates consumer choice.

Separate to this annual monitoring and reporting task, we are also undertaking the distribution market model project as part of our Technology Work Programme to explore how the evolution to a decentralised market for electricity services at the distribution level may occur.[5]

The distribution market model project is intended to inform the AEMC's analysis of existing and anticipated rule changes and reviews. It is not intended to be a pathway of reform, but rather an exploration of the possible options that may be available to address technical and regulatory challenges as they arise. Specifically, the project will explore the various drivers of change at the distribution level to identify:

- what the technical opportunities and challenges of distributed energy resources are;
- what is required for the optimisation of distribution-level transactions;
- whether new roles, price signals and market platforms are required;
- how the role of distribution network businesses may need to adapt to facilitate this transition; and
- whether, and if so, how, the existing regulatory framework may need to change to accommodate this.

The 2017 annual monitoring report will draw on findings of the distribution market model report. The distribution market model project's first report was published for consultation on 1 December 2016. Further information on the project can be found on the AEMC website.

5 In order to assist governments with policy development, and in anticipation of rule change requests on similar matters, the AEMC needs to have a strong understanding of new market dynamics, including their likely impacts on consumer costs and behaviours as well as the incentives and business models of market participants. This is the objective of the AEMC's technology work program. See: http://www.aemc.gov.au/Major-Pages/Technology-impacts.

Abbreviations and definitions

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
CESS	capital efficiency sharing scheme
COAG	Council of Australian Governments
EBSS	efficiency benefit sharing scheme
NEL	National Electricity Law
NEM	national electricity market
NEO	national electricity objective
NER	National Electricity Rules
RIT	regulatory investment test
TSS	tariff structure statement