The case for reforming the economic regulation of distribution networks in Australia in a high DER world

Ensuring distribution networks support rapid decarbonisation at efficient cost

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The Australian Energy Regulator (AER) uses a 'building block' approach to assess a network service provider's revenue needs. Specifically, it forecasts how much revenue the service provider will need to cover:

- A commercial return to investors that fund its assets and operations.
- Efficient operating and maintenance costs.
- Asset depreciation costs.
- Taxation costs.

The AER also makes revenue adjustments for over- or under-recovery of revenue made in the past and for rewards or penalties earned through any applicable incentive schemes.

While network service providers are entitled to earn revenue to cover their efficient costs each year, this revenue does not include the full cost of investment in new assets made throughout the year. Network assets have a long life and investment costs are recovered over the economic life of the assets, which may run to several decades. The amount recovered each year is called 'depreciation', and it reflects the lost value of network assets each year through wear and tear and technical obsolescence (Figure 4.4).

The regulatory asset base (RAB) includes the total remaining economic value of assets in a network, to be recovered through depreciation over time. All things being equal, a higher RAB would increase both the return on capital and depreciation (return of capital) components of the maximum allowed revenue calculation.

Revenue adjustments from incentive schemes encourage network service providers to efficiently manage their operating and capital expenditure, improve services provision to customers and adopt demand management schemes that avoid or delay unnecessary investment.

Source: AER.
Ten issues with the economic regulation of distribution networks

1. Core issue
   Are distribution networks still a monopoly?

2. Capex bias

3. Risk of over-investment

4. Supernormal profits

5. Emissions reductions and resilience

6. Lack of innovation support

OTHER ISSUES
7. Lack of genuine cost-reflective network pricing
8. Only reputational and bespoke incentives for DER
9. Differences in RAB by public vs private ownership
10. Regulatory burden
1.a Regional, remote and last mile contestability – applies to much of Australia

WA’s future energy mix

- Microgrid
- Stand-alone power system
- Mesh network
- Autonomous network

Source: Western Power
1. Core issue: Contestability

1.b Coordinated DER can defer or substitute for capex – augmentation/replacement

2017 Imperial/Carbon Trust research:
Flexibility markets to save UK grid up to £40bn by 2050

These are usually imports or exports on demand to assist with constraints, but also includes restoration support

Example of flexibility services requirements from Electricity Northwest:

<table>
<thead>
<tr>
<th>Service parameters</th>
<th>SUSTAIN</th>
<th>SECURE</th>
<th>DYNAMIC</th>
<th>RESTORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum declarable capacity</td>
<td>50kW</td>
<td>50kW</td>
<td>50kW</td>
<td>50kW</td>
</tr>
<tr>
<td>Minimum utilisation</td>
<td>30 mins</td>
<td>30 mins</td>
<td>30 mins</td>
<td>30 mins</td>
</tr>
<tr>
<td>Utilisation notification period</td>
<td>Scheduled in advance</td>
<td>1 week in advance</td>
<td>Real time</td>
<td>Real time</td>
</tr>
<tr>
<td>Maximum ramping period</td>
<td>N/A</td>
<td>&lt;15 mins</td>
<td>&lt;2 mins</td>
<td>&lt;2 mins</td>
</tr>
<tr>
<td>Availability agreement period</td>
<td>N/A</td>
<td>Contract stage</td>
<td>Contract stage</td>
<td>Contract stage</td>
</tr>
<tr>
<td>When required?</td>
<td>Scheduled forecast overload</td>
<td>Pre-fault / peak shaving</td>
<td>Network abnormality / planned outage</td>
<td>Network abnormality</td>
</tr>
<tr>
<td>Risk to network</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Utilisation certainty</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Frequency of use</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

* Contracted/Tendered to date, more expected over the remainder of 2023
# Reporting cycle moved from calendar year to regulatory year

Source: ENA (UK)

www.ieefa.org
Consumers may be able to earn more revenue from their DER

In Great Britain, about 20% of the country is in a constraint zone and local network flexibility is procured individually by each of the six distribution networks, and providers can earn up to £33/kW/yr in some locations.

<table>
<thead>
<tr>
<th>Asset</th>
<th>Rated Power</th>
<th>Flexible Power</th>
<th>Annual Revenue @ £33/kW/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV charging</td>
<td>7</td>
<td>2.2</td>
<td>£73</td>
</tr>
<tr>
<td>Home battery</td>
<td>5</td>
<td>5</td>
<td>£166</td>
</tr>
<tr>
<td>Home battery</td>
<td>10</td>
<td>10</td>
<td>£331</td>
</tr>
<tr>
<td>Electric heating</td>
<td>3</td>
<td>2</td>
<td>£88</td>
</tr>
</tbody>
</table>

According to flexibility software platform provider Axle, ‘smaller flexible distributed assets like EV charging, batteries, and electric heating are best suited to participate. EV charging constitutes the bulk of existing DNO [Distribution Network Operator] flex supply’.
1. Two use cases for contestability

Remote and last mile contestability

Defer or substitute for capex – augmentation/replacement

**WA’s future energy mix**

- Microgrid
- Stand-alone power system
- Mesh network
- Autonomous network

Source: Western Power

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**Are distribution networks still monopoly infrastructure?**

*Contracted/Tendered to date, more expected over the remainder of 2023
# Reporting cycle moved from calendar year to regulatory year*
2. Capex bias

Issues include:

- Differences in certainty of cost recovery of capex and opex (where AER can re-assess every 5 years)
- Capex returns based on RAB (cumulative) cf opex current basis
- Lack of DMIS expenditure ($3.2m out of $1b avail. 2017-2022)
Distribution network RABs vs utilisation

1. Overinvestment led to a **60% increase** in the RAB per consumer in 2006-15 which hasn't been corrected

2. Meanwhile network utilisation has **fallen 15%** in real terms

The result of these two factors is that consumers are paying more than they did in 2006 for infrastructure that they use less

Source: IEEFA using AER data
3. The risk of repeating the 2007-2014 over-investment

Consultant Matt Rennie:
‘The next 15 years will rival the N-1 period between 2004 and 2012 in terms of required network investment to handle household EVs and DER and retrofitted batteries in the zone and poletop transformer ecosystem, and the large scale network strength to handle the serious MW required for inset C&I charging.’

Queensland and SA DNSPs submitted 2025-30 revenue proposals to the AER in Jan 2024. All have over 45% of households with rooftop solar – and a growing number with batteries:

- SA Power Networks: **21%** increase in capex (incl. $506m network augmentation)
- Ergon: **20%** increase in capex
- Energex: **22%** increase in capex (all cf 2020-25 granted revenue)
Future costs depend on economic regulation

There is an urgent need to review economic regulation of distribution networks to avoid overinvestment and support decarbonisation.

There is a high risk that this will happen again as three networks are currently asking for 20%+ increases in capex for 2025-2030.

Instead, the use of DER for network services, as well as smart integration of DER could reduce the need for network upgrades and decrease costs for consumers.
Few network constraints currently

Scanning these maps for the NEM, only the only regions with multiple orange or red zones, that is, more than 10MVA of constrained capacity are parts of Adelaide, Melbourne and regional Victoria.
IEEFA prior analysis:
from FY14-FY22, $11 billion of supernormal profit was extracted in total across all networks (transmission and distribution), on top of the allowed profit of $16 billion or 11% of total cost.

- Issue about the implementation of the existing regulation
- Nevertheless, it provides a red flag that the system is not currently working in consumers’ interests and preventing future supernormal profits should be a goal of any regulatory reform.
While the AEMC and AER have issued guidance on amended National Energy Objectives, they have not considered changing the economic regulation of electricity networks as a result.

IEEFA would suggest that given there is a legislated national emissions target of 42% by 2030 and a national policy of 82% renewables by 2030 as core to achieving that target, the economic regulation needs to be reviewed to ensure it supports the meeting of these targets.

While reviewing for emissions reduction, it would also be appropriate to assess the ability of the regulation to support appropriate resilience expenditure by networks.
2017 KPMG Review, factors that could inhibit innovation and transformation included:

- the fact that the current framework has been designed for a steady state, compared with the current uncertain and dynamic rate of change,
- the long (5 year) regulatory period,
- the staggered timing of regulatory reviews,
- the propose-respond model and its limitations on the regulator’s role,
- the lack of flexibility of the regulatory framework, and
- the lack of incentive to innovate.

2017 KPMG Review, common characteristics to encourage flexibility and innovation:

1. A range of approaches are required – incentive schemes alone cannot address the innovation challenge
2. A clear vision of the role of network service providers in the new energy system
3. Additional, temporary incentives may be necessary to facilitate transformation
4. Incentives should straightforward - not be too complicated or administratively burdensome
5. Consumers should have an increased say, and
6. Greater flexibility is likely to be required for both the regulator and the business given the pace of change.
Other issues discussed in less detail in this report are:

7. a lack of genuine cost-reflective network pricing.

8. reputational and bespoke incentives for DER exports are insufficient to address the DER integration challenges

9. differences in RABs and revenues between government-owned and privatised distributors, and

10. a high practical and cost burden of the regulation.

And international trends:

• totex regulation
• flexibility procurement (DER providing network services)
• performance incentives
Baringa warns that changes are needed soon:

“because after certain expenditure on network upgrades are incurred, or after certain solar PV is curtailed in a particular year, these impacts cannot be reversed even if they were avoidable if reforms to more efficiently integrate DER had taken place earlier.”

DNSP Regulatory Resets

<table>
<thead>
<tr>
<th>FY25-FY30</th>
<th>FY26-FY31</th>
<th>FY27-FY32</th>
</tr>
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We recommend the review look to develop a form of economic regulation of distribution networks to achieve the following outcomes:

1. The best outcomes for consumers in terms of the lowest possible prices
2. Economically efficient outcomes for our economy, including the end of the bias to spend capex
3. Fast decarbonisation, including electrification to achieve Australia’s legislated emissions reduction goal which is now part of the National Electricity Objective (NEO) under the National Electricity Law
4. Creating a level-playing field between infrastructure and DER-provided network services, and
5. Improved climate resilience.
1. What is the nature of contestability in distribution network services?
2. What outcomes should distribution networks be remunerated to provide?
3. How can and should distribution networks be rewarded for accelerating decarbonisation?
4. How can and should distribution networks be rewarded for innovation? Including within and outside economic regulation.
5. What processes can be used to efficiently determine network revenue in what timeframe given the fast-paced nature of the energy transition?
6. How can supernormal profits be avoided?
7. Should performance monitoring of network regulation and the regulator be introduced and if so, what form should this take?
Thank you!

IEEFA Guest Contributor
Dr Gabrielle Kuiper

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