



Australian Government
Productivity Commission

Electricity Network Regulatory Frameworks

Productivity Commission
Inquiry Report
Overview and recommendations

No. 62, 9 April 2013

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Publications Inquiries:

Media and Publications
Productivity Commission
Locked Bag 2 Collins Street East
Melbourne VIC 8003

Tel: (03) 9653 2244
Fax: (03) 9653 2303
Email: maps@pc.gov.au

General Inquiries:

Tel: (03) 9653 2100 or (02) 6240 3200

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Australian Government
Productivity Commission

Canberra Office

Level 2, 15 Moore Street
Canberra City ACT 2600

GPO Box 1428
Canberra City ACT 2601

Telephone 02 6240 3200
Facsimile 02 6240 3399

Melbourne Office

Telephone 03 9653 2100

www.pc.gov.au

9 April 2013

The Hon David Bradbury MP
Assistant Treasurer
Parliament House
CANBERRA ACT 2600

Dear Assistant Treasurer

In accordance with Section 11 of the *Productivity Commission Act 1998*, we have pleasure in submitting to you the Commission's final report into Electricity Network Regulatory Frameworks.

Yours sincerely

Philip Weickhardt
Presiding Commissioner

Wendy Craik AM
Commissioner

Terms of reference

I, Wayne Swan, Deputy Prime Minister and Treasurer, pursuant to Parts 2 and 3 of the Productivity Commission Act 1998, hereby request that the Productivity Commission undertake an inquiry into electricity network frameworks, focussing on benchmarking arrangements and the effectiveness of the application by network businesses of the current regulatory regime for the evaluation and development of interregional network capacity in the National Electricity Market (NEM).

Background

Australia's electricity sector is facing a number of challenges over the coming years. This includes a large investment requirement for networks to replace ageing assets, meet growing levels of peak demand, reliability requirements and to facilitate the transition towards Australia's clean energy future.

Recent increases in network expenditure, and the resultant flow on to increases in electricity prices for end users, have highlighted the need to ensure networks continue to deliver efficient outcomes for consumers. Network regulation is a complex task requiring difficult and technical judgements. This inquiry will inform the Australian Government about whether there are any practical or empirical constraints on the use of benchmarking of network businesses and then provide advice on how benchmarking could deliver efficient outcomes, consistent with the National Electricity Objective (NEO). In addition, a second stream of this inquiry will examine if efficient levels of transmission interconnectors are being delivered, to inform the Australian Government about whether the regulatory regime is delivering efficient levels of interconnection to support the market.

Scope of the Inquiry

The Commission is requested to assess the use of benchmarking as a means of achieving the efficient delivery of network services and electricity infrastructure to meet the long term interests of consumers, consistent with the NEO. In addition, the Commission is requested to assess whether the current regulatory regime, as applied to interconnectors, is delivering efficient levels of network and generation investment across the NEM.

In undertaking the review, the Commission should:

- examine the use of benchmarking under the regulatory framework, incorporating any amendments introduced in the review period, in the National Electricity Rules and provide advice on how different benchmarking methodologies could be used to enhance efficient outcomes; and
- examine whether the regulatory regime, with respect to the delivery of interconnector investment in the NEM, is delivering economically efficient outcomes.

In undertaking the inquiry, the Commission should consider and take into account the work that is currently being progressed through the Standing Council on Energy and Resources, the Australian Energy Market Commission (AEMC) and the Australian Energy Regulator (AER). The Commission should have particular regard for the AEMC reviews into transmission frameworks, power of choice (demand side participation) and the suite of rule changes relating to network regulation currently under consideration by the AEMC in accordance with its statutory obligations.

The Commission should engage with the AEMC, the AER and the Australian Energy Market Operator in undertaking the review. In addition, the Commission should consult with Australian Government agencies, state and territory government agencies and other key stakeholders in undertaking the review.

The Commission will report within 15 months of receipt of this reference and will hold hearings for the purpose of this inquiry. The Commission is to provide both a draft and a final report, and the reports will be published. The Government will consider the Commission's recommendations, and its response will be announced as soon as possible after the receipt of the Commission's final report.

WAYNE SWAN

9 January 2012

Disclosure of interests

The *Productivity Commission Act 1998* specifies that where Commissioners have or acquire interests, pecuniary or otherwise, that could conflict with the proper performance of their functions during an inquiry they must disclose the interests.

Dr Craik has advised the Commission that she is the beneficiary of subsidised solar PV panels.

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The full report is available at www.pc.gov.au

Acknowledgments

The Commission engaged the services of Dr John Tamblyn, a well-known expert on the National Electricity Market (who has recently been involved in two other independent reviews of aspects of the electricity industry) to review some chapters and the overview for the draft of this report. Dr Tamblyn provided valuable feedback to the Commission, for which we are most grateful. However, the views and judgements in this report are those of the Commission alone, and should not be attributed to Dr Tamblyn or any other participant, except where clearly stated.

OVERVIEW

Overview

The main messages

- Average electricity prices have risen by 70 per cent in real terms from June 2007 to December 2012. Spiralling network costs in most states are the main contributor to these increases, partly driven by inefficiencies in the industry and flaws in the regulatory environment.
- These flaws require a fundamental nationally and consumer-focused package of reforms that removes the interlinked regulatory barriers to the efficiency of electricity networks. Reforms made in late 2012, including improvements to the regulatory rules, better resourcing of the regulator and greater representation of consumers, have only partly addressed these flaws.
- Resolving benchmarking and interconnector problems will be a worthwhile addition to these recent reforms. But there remains a need for further significant policy changes to make a substantive difference to future electricity network prices, and to produce better outcomes for consumers — the latter being the primary objective of the regulatory arrangements. The changes needed include:
 - modified reliability requirements to promote efficiency
 - improved demand management
 - more efficient planning of large transmission investments
 - changes to state regulatory arrangements and network business ownership
 - adding some urgency to the existing tardy reform process. The Standing Council on Energy and Resources needs to accelerate reforms — particularly for reliability and planning — which have been bogged down by successive reviews. Delays to reform cost consumers across the National Electricity Market (NEM) hundreds of millions of dollars.
- The gains from a package of reforms are significant. Indicative estimates suggest:
 - in New South Wales alone, \$1.1 billion in distribution network capital expenditure could be deferred until the next five year regulatory period by adopting a reliability framework that takes into account consumers' preferences for reliability. The actual savings are likely to be larger
 - adopting a different reliability framework for the transmission network could generate large efficiency gains in the order of \$2.2 billion to \$3.8 billion over 30 years
 - if carefully implemented, critical peak pricing and the rollout of smart meters could produce average savings of around \$100–\$200 per household each year in regions with impending capacity constraints (after accounting for the costs of smart meters).
- Reliability is critical to electricity networks, but some consumers are forced to pay for higher reliability than they value.
 - Reliability decisions should be based on trading off the costs of achieving them against what customers are willing to pay, rather than by prescriptive (sometimes politically influenced) standards.

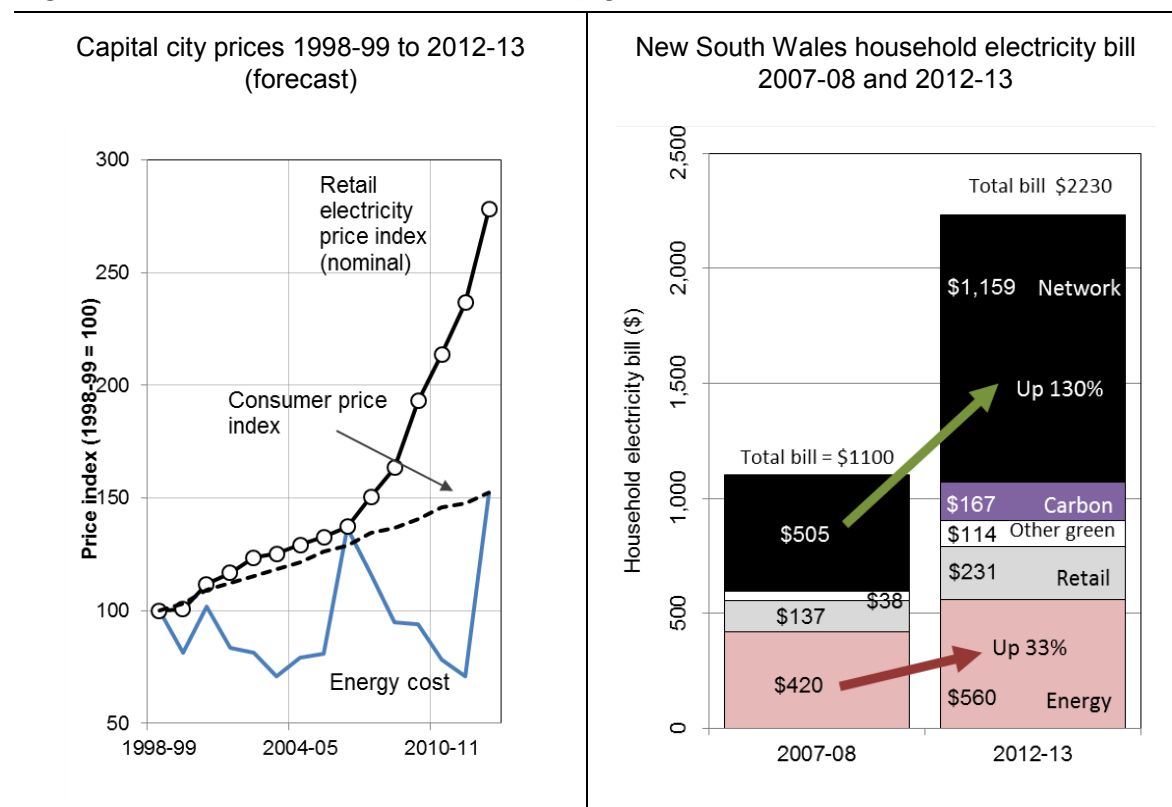
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- A large share (in New South Wales, some 25 per cent) of retail electricity bills is required to meet a few (around 40) hours of very high ('critical peak') demand each year. Avoiding this requires a phased and coordinated suite of reforms, including consumer consultation, the removal of retail price regulation, and the staged introduction of smart meters, accompanied by time-based pricing for critical peak periods.
 - This would defer costly investment, ease price pressures on customers, and reduce the large hidden cross-subsidies effectively paid by (often lower-income) people who do not heavily use power in peak times, to those who do.
 - Rolling out smart meters would also produce major savings in network operating costs — such as through remote meter reading and fault detection.
 - The Commission is proposing a process that learns from the experience of the Victorian smart meter rollout, and that will genuinely benefit consumers.
 - State-owned network businesses have conflicting objectives, which reduce their efficiency and undermine the effectiveness of incentive regulation. Their privately-owned counterparts are better at efficiently meeting the long-term interests of their customers.
 - State-owned network businesses should be privatised.
 - The efficiency and effectiveness of recently announced reforms could be enhanced.
 - Given their overlapping roles, the three fully-funded consumer advocacy bodies in the NEM should be ultimately amalgamated into a single statutory body that would act on behalf of all consumers. It should be fully funded through an industry levy, and have the required expertise to play a leading, but not exclusive, role in representing customers in all regulatory processes. Partial funding — on a contestable basis — should continue for individual advocacy groups.
 - A review of the Australian Energy Regulator is proposed for 2014. The Australian Energy Market Commission, the Australian Energy Market Operator and the new consumer representative body should also be reviewed by 2018 so that the scope for improvement in all of the main NEM institutions will have been assessed.
 - At this stage, benchmarking — which compares the relative performance of businesses — is too unreliable to set regulated revenue allowances. Nevertheless, greater and more effective use of benchmarking could better inform the regulator's decisions.
 - There is no evidence of insufficient capacity in the interconnectors carrying power between jurisdictions, as is sometimes alleged. In fact, they are sometimes underutilised because of perverse incentives and design flaws created by the regulatory regime. Changes to the National Electricity Rules should address these problems.
 - In considering the benefits for consumers, it is important not to blame network businesses for the current inefficiencies. Mostly, they are responding to regulatory incentives and structures that impede their efficiency.

Why should we care about electricity networks?

The fundamental objective of the National Electricity Market (NEM) — the need for efficient investment in, and operation of, electricity networks in the long-term interests of consumers — has been frustrated by flaws in its (ever more) complex regulatory and institutional arrangements. Indeed, at times, policy developments have been inimical to consumers' interests, resulting in price rises that cannot be justified.

Nationwide, retail electricity price increases accelerated after June 2007, rising by more than 70 per cent in real terms by December 2012 (though this varies by jurisdiction). The rising costs of the electricity network — the wires, poles and other infrastructure used to transport power from generators to consumers — have been a major driver of these prices. Network costs are around 40-50 per cent of an average household's electricity bill, so any cost pressures on the network have a major impact on people (figure 1).

Figure 1 Prices have risen steeply



Given that networks are a natural monopoly, economic regulation (and its varying supporting institutions) will need to play a continuing role in networks. This is why it is imperative to improve the arrangements. This inquiry focuses on the NEM,

which enables the trading of power throughout Australia, excepting Western Australia and the Northern Territory. Its major institutions include the:

- Standing Council on Energy and Resources (SCER), which replaces the previous Ministerial Council for Energy, and has representatives from the Australian Government, all states and territories, and New Zealand. It is responsible for broad policy and the legislative framework for the NEM (though only ministers in participating jurisdictions can change the National Electricity Law)
- Australian Energy Market Operator (AEMO), which, among other roles, manages the transmission network and operates the spot market that determines wholesale energy prices
- Australian Energy Market Commission (AEMC), which undertakes energy market reviews, provides policy advice to SCER, and sets the National Electricity Rules (the ‘Rules’)
- Australian Energy Regulator (AER), which is the economic regulator for electricity and gas markets in the NEM.

The Commission’s task is a broad one

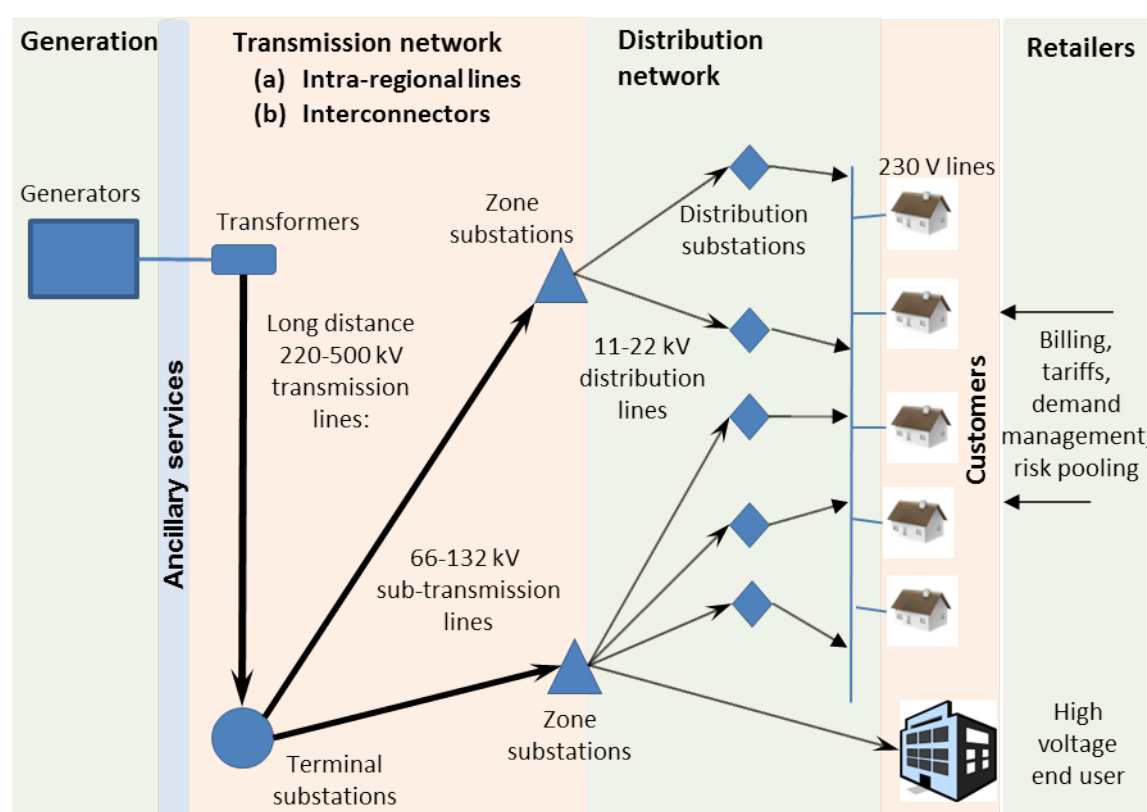
Concerns about the adequacy of the existing regulatory arrangements triggered this inquiry. The Australian Government requested that the Commission consider the problems besetting these arrangements through two lenses:

- the use of benchmarking as a means of achieving the efficient delivery of network services and electricity infrastructure. Benchmarking typically measures the costs or revenues of an efficient network business, with the regulator using the results as the standard for assessing whether any given network business’s expenditure proposals are efficient and prudent. (An alternative benchmarking approach is to reduce each network business’s allowable annual revenue by the productivity growth rate of an efficient firm — an approach already considered by the AEMC.) The relevant network services comprise:
 - distribution networks, the lower voltage capillaries that deliver power at the local level (figure 2). The distribution networks account for the bulk of total network costs
 - the intra-regional transmission network, which comprises the high voltage components of the network that carry power over long distances within states
- the effectiveness of regulatory arrangements for ‘interconnectors’ (the inter-regional high voltage transmission network) given that some stakeholders identify future problems in the NEM arising from shortcomings in the regulatory arrangements for ‘interconnectors’. The concern is that there is underinvestment

in interconnectors, weakening the capacity for trading power across the network. Underinvestment could put more pressure on prices and undermine the efficient use of renewable energy generators.

This report includes extensive analysis of issues directly related to benchmarking and interconnectors. However, the Commission has found that it is not possible or desirable to look at those issues separately from the complex and interrelated regulatory system in which they sit. There is, in effect, no point in simply fixing a punctured tyre if the car has no engine.

Figure 2 The electricity system



Accordingly, the Commission has adopted a broader perspective, reflecting that outcomes in the NEM involve complex interactions between multiple influences: the National Electricity Rules; the behaviour of the regulator; the governance and culture of each of the regulated network businesses; and the impacts of many other (multi-jurisdictional) regulations and policies (figure 3). The Commission has considered the evidence, analysis and policy outcomes from various reviews during the course of the inquiry — most particularly various reports issued by the AEMC, and a suite of reforms announced by the Council of Australian Governments (COAG) and SCER in late 2012.

There are many problems in current arrangements, but beyond the Commission's consideration of benchmarking and interconnectors, there are several critical priority issues arising from this inquiry.

- The governance arrangements for the NEM — in which SCER, the AER, the AEMC and all state and territory governments play a major role — are neither efficient nor effective in achieving good outcomes for consumers.
 - SCER's processes for reform are too slow (and involve the AEMC duplicating much of their work in reviews and subsequent Rule change processes).
 - The AER has faced resourcing constraints and some have expressed concerns about its processes and effectiveness.
 - Consumers have had a weak voice in most regulatory processes, notwithstanding that their interests are ostensibly the essential plank on which regulation of the NEM is based.
 - The 'National' in the NEM is progressing too slowly, especially given that a Special Premier's Conference decided to establish a national grid in July 1991. State and territory governments, and their regulators, still play too large a role in setting reliability standards and in regulating retailing, and they also mandate other licence conditions for network businesses. Additionally, they have various renewable energy policies that affect network businesses' options for efficiently addressing emerging bottlenecks in their systems. They are the owners of network services in Queensland, New South Wales, Tasmania and, in part, the ACT and some governments still have a significant stake in generators (figure 4). They have mostly relinquished their ownership in retailing.
- Quite apart from the unwarranted variation in regulations across what is intended to be a national market, the actual regulatory settings for network reliability and for transmission planning are far from optimal.
- Flaws in the national regulatory regime have contributed to recent price increases.
 - The Rules led to inflated costs of capital and created incentives for inefficient investment.
 - There are significant deficiencies in regulatory arrangements for demand management.

Figure 3 **Benchmarking is one (small) piece of a complex regulatory jigsaw**

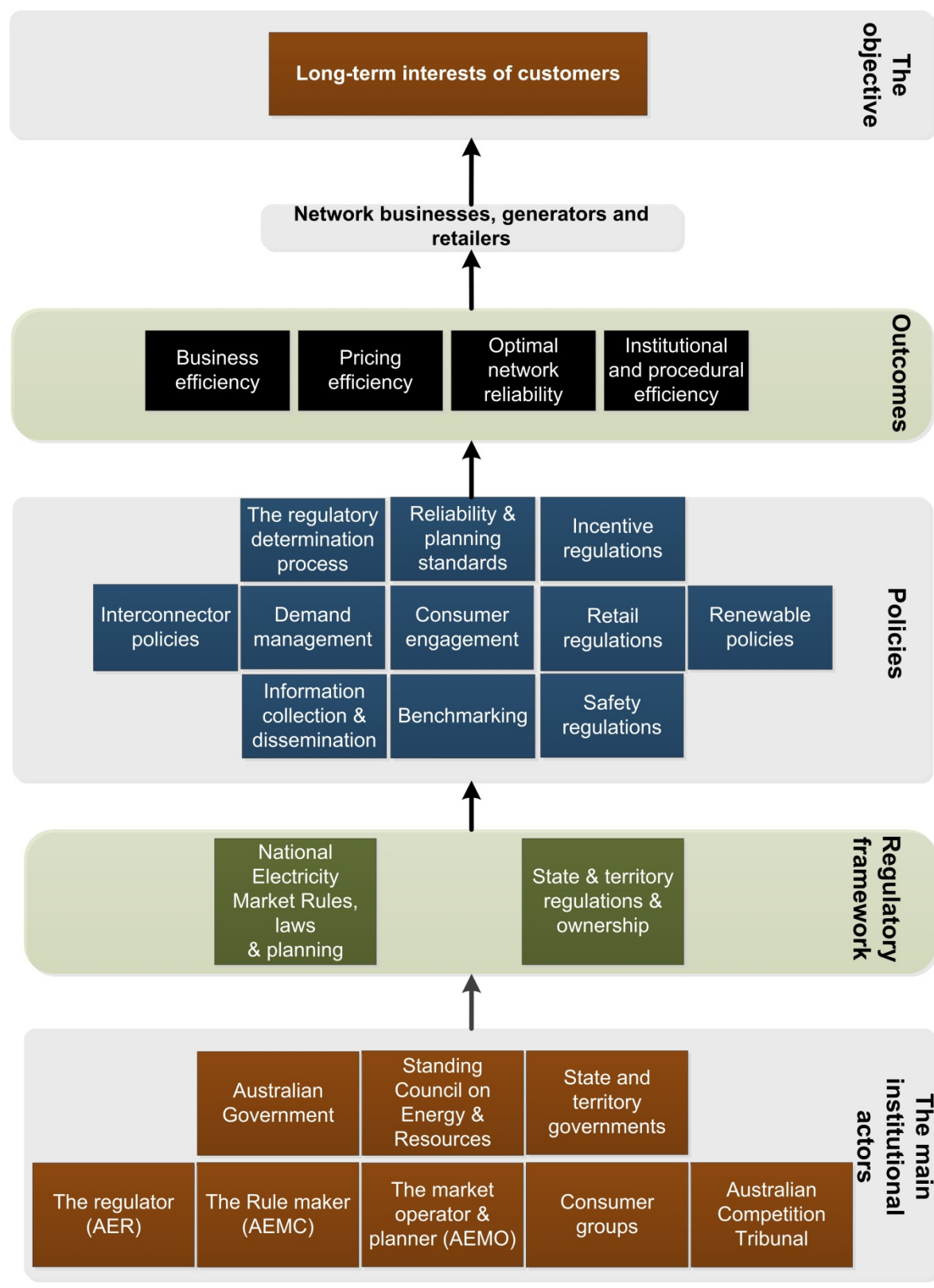
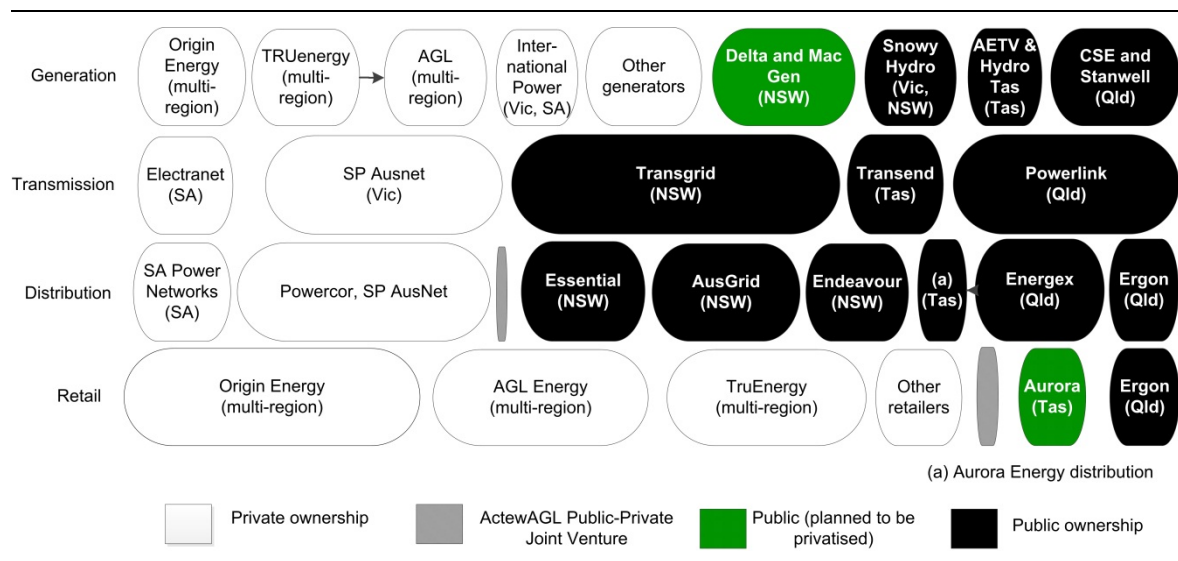


Figure 4 Participants in the National Electricity Market
By ownership and market share



Data source: Queensland Commission of Audit (2013, figure 2, p. 13).

In late 2012, major reforms to the Rules, the announcement of improved advocacy arrangements for consumers and better resourcing and governance of the AER have started to address some of these flaws. (These reforms were broadly in line with those recommended in the Commission’s draft report.)

However, the benefits of those reforms will not be felt until the current set of regulatory determinations run their course (which will occur between 2013 and 2017 depending on the service and jurisdiction). Moreover, the AER must develop guidelines to give effect to the Rule changes, and the details of those can make a difference to their benefits. More broadly, there remain major weaknesses in regulatory arrangements for demand management, reliability and transmission planning, the ownership of networks by governments, and governance.

Reform needs to be wide-ranging and timely

The Commission has proposed a suite of coordinated reforms that aim to take account of the many inter-relationships in what amounts to a complex economic ‘machine’. However, reforms will require careful implementation. A detailed summary of the reforms proposed by the Commission and their implementation timetable is in tables 1 and 2 at the back of this overview.

Moreover, the NEM has too often proved to be a graveyard for reform proposals, which then remain as inert words in dead documents. A graphic example, discussed later in this overview, is the fact that needed reforms to transmission planning and

reliability were first set out in 2002, but using the current processes will not be fully in place until 2022. Even that timing presumes that SCER agrees with the recommendations of another inquiry that it has just initiated.

A key prerequisite for reform is more timely action by SCER. Improved governance and implementation processes are discussed later in this overview. But the essential point is that SCER should reform its processes and decision making so that critical policy reviews of the NEM, the corresponding changes to the Rules, and their implementation occur much more quickly.

Consumers need a clear voice in the regulatory regime

While the objective of the National Electricity Law is to meet the long-term interests of consumers, the involvement of consumers in the processes of the NEM has been partial and intermittent.

Consumer groups have generally represented either major energy users or disadvantaged people. They have traditionally had some involvement in the AER's regulatory processes — primarily in attempting to decrease network charges or to develop better arrangements for disadvantaged consumers. They have proposed changes to the Rules, submitted to AER network determinations and participated in some Australian Competition Tribunal hearings of appeals to AER determinations. However, the smaller advocacy groups do not have many resources to do this, and do not believe that the Tribunal has given much weight to their views (the panel evaluating the limited merits review regime suggested that they are treated as 'inconvenient guests'). In general, network businesses have not sufficiently engaged with consumers, even in matters where they have aligned interests (such as addressing reliability problems or introducing smart meters and the smart grid). The AER has also not engaged well with consumer groups — an observation emphasised by the inquiry into the limited merits review regime.

There are strong grounds for improving information flows to consumers — such as through the public availability of benchmarking results, and information on the various cost drivers of electricity bills.

Equally, there is value in strengthening the institutional capacity for consumers to have a voice in regulatory and merits review proceedings. Any such arrangement should ensure that:

- consumer representation is sufficient and reliably funded. A small ongoing levy on market participants would be the most effective way of securing stable and adequate funding

-
- the consumer voice in the process is informed by expertise in the economic regulation of energy markets and, accordingly, the capacity to understand some of the complexities of the NEM and its investment and cost drivers
 - all consumers are represented, consistent with the objective of the National Electricity Law to promote the long-term interests of consumers (and with a governance structure for any arrangements that ensures that this occurs)
 - arrangements give consumers a formal capacity to engage with NEM institutions in their processes and with the scope to participate in the negotiation of regulatory determinations with network service providers, a model that has apparently worked well in the United Kingdom and the United States.

In late 2012, Australian governments recognised the need for more formalised involvement of consumers in the regulatory process. They have announced the creation of the National Energy Consumer Advocacy Body, which would perform many of the functions above. The Australian Government has also announced a Consumer Challenge Panel (to be established by the AER by 1 July 2013), which would have similar functions to the new advocacy body in regulatory determinations and would represent the same groups. The Consumer Challenge Panel could act as an effective voice for consumers in the short run, until the establishment of the national advocacy body. However, given their strongly overlapping roles, the risk of confused representation by the same consumer constituencies, and the desirability that the AER be seen as a neutral player, there are compelling grounds for the Panel to be absorbed into a single, independent statutory consumer body in the medium term.

Rolling the existing small Consumer Advocacy Panel (a grant giving body for advocacy and research) into the national advocacy body would also reduce overheads and draw on the expertise of the larger body. None of these arrangements would threaten the continued need for a voice for specific consumer groups.

- Partial funding, on a contestable basis, should still be available for such groups.
- They could provide (non-binding) advice to the statutory body through an advisory group.
- Where they felt the need, they could also continue to interact directly with the regulator and other NEM governing institutions.

Network expenditures are inefficient

The efficiency of some network businesses could be improved. The Commission's analysis of several metrics suggests that there are significant differences in the performance of the various businesses — and particularly large gaps between the performance of state-owned corporations and privately operated businesses. Differences between businesses should not be surprising. This is true for almost any industry. The distinction, however, is that the usual competitive processes that weed out less efficient businesses are non-existent for regulated natural monopolies.

Some factors are (at least partly) outside the control of the businesses — which is why benchmarking of all relevant policy influences (including non-regulatory ones) from all government levels should play an ongoing role in monitoring the performance of network businesses.

Reliability standards are mostly too high

Ensuring reliable networks requires significant ongoing investment — which ultimately customers must finance. However, there is a growing concern that some network reliability standards are too high — which some claim have reflected political responses to isolated major blackouts, rather than systemic problems — with costs that exceed consumers' willingness to pay.

The benefits of re-aligning standards to meet consumer preferences appear to be large. Some benefits could be realised soon after jurisdictions agree to a new framework. For example, AEMO cited a proposed investment in New South Wales to meet a 'deterministic' standard that implied that customers valued their electricity at around \$9 million per MWh (an estimated 150 times more than consumers would be willing to pay).

There are two principal sources of difficulty with reliability standards.

- Parochialism — there is no national framework for standards. Jurisdictions impose different reliability requirements (mostly uninformed by customer preferences), and measure reliability in different ways. Network businesses and particularly transmission businesses often appear to rely too heavily on intra-state network solutions and ignore more efficient inter-state options — a reliance reinforced by history, organisational culture, an understandable desire to control outcomes, and a greater familiarity with local rather than national requirements.
- The price–quality tradeoff is invisible to most consumers — most are unaware of the high price they pay in their electricity bills for the excessive reliability

resulting from overly stringent standards. (Equally, *were* a lower than optimal standard to be set, consumers would not know how much they would need to pay to improve it.)

The way forward must take account of the fact that the reliability issues for distribution and transmission networks are different.

Distribution networks

Given the greater and more timely observability of reliability problems in distribution, it should be possible to relinquish current jurisdictionally prescribed input standards. Instead, the regulator should impose appropriate penalties (rewards) for businesses failing (exceeding) a reliability performance target, basing the incentives on clear evidence of customers' willingness to pay for reliability. This approach would aim to replicate the signals that customers in competitive markets send to suppliers about the tradeoffs between quality and price, allowing distribution businesses to take a commercial approach to their investments in reliability. This would lead to reliability outcomes at the local level that reflected local consumer preferences rather than prescriptive standards, and that would encourage efficient expenditure (including for non-network solutions).

The new incentive regime would build on the AER's existing Service Target Performance Incentive Scheme (STPIS), which penalises/rewards businesses for their reliability performance. As well as applying all components of the Scheme to distribution businesses throughout the NEM, the Commission proposes that incentives for performance be based on an up-to-date assessment of the value that the relevant mix of customers place on reliability. Bolstering the reporting requirements under the Scheme would also increase transparency and facilitate benchmarking. An amended STPIS would remove the need for jurisdictionally-based reliability requirements for distribution businesses.

Reliability in transmission networks has proven to be a complex and controversial issue

Unlike distribution networks, transmission networks rarely experience major problems. Problems in transmission can lie latent until major loads and coincident failures in generation or network equipment overstretch the system. The resulting extreme power outages can then affect large populations and entail high costs. For example, in an international context, a major blackout in North America in 2003 led to power loss for up to two days for 50 million people, costing around \$6 billion at that time and contributing to 11 deaths.

Accordingly, the prospects of relying exclusively on an incentive scheme similar to the STPIS are weak because of the rarity of such events, the lack of good leading reliability indicators (and the potential financial inability of a network business to adequately compensate consumers for the large damages experienced).

Another characteristic of transmission networks is that power inputs into the network at any one point (say North Queensland) can affect transmission networks thousands of kilometres away. Interruptions or changes can have adverse impacts on other networks in the NEM, including major blackouts, if the system becomes unstable. As the NEM becomes more interconnected, network effects are likely to increase. Reliability standards and investment plans that are specific to a jurisdiction (or a network) do not consider these inter-jurisdictional network effects, although this is somewhat different in Victoria. Accordingly, current requirements that encourage transmission businesses to optimise only their own networks do not provide an efficient level of reliability for the NEM as a whole.

It should be emphasised that there are no easy solutions for ensuring efficient transmission reliability and planning in the NEM (and indeed this is the experience internationally). All arrangements will involve ‘big brother’ in one form or another, whether it be governments, a confederation of network businesses, or a single body. Compromises and judgments must be made. A combination of transparency, accountability, consultation, specialist knowledge, decision-making independent of the transmission businesses and giving pre-eminence to consumer preferences are the essential components of a workable arrangement.

Most stakeholders — all governments, the AEMC, AEMO and transmission businesses — agree that the current prescriptive reliability arrangements are flawed. There are many commonalities in the various solutions proposed. The Commission has drawn on the different proposals by the AEMC, AEMO, Grid Australia, and feedback following the Commission’s draft report, in crafting a model that takes account of the various tradeoffs.

- There would be a single NEM-wide reliability framework for transmission, moving away from the current state-based arrangements. This would make network planning more coherent and avoid some of the biases towards intra-regional transmission infrastructure compared with interconnectors or other solutions.
- AEMO would set planning standards at the connection point level using a ‘probabilistic approach’. Under this approach, the costs of an improvement in reliability are set against the assessed value to consumers of this improved reliability at the jurisdictional, or even more local level. This is simply a cost–benefit test. The new model (based on Australian Bureau of Statistics surveys)

would better cater for customer preferences than the current mechanistically set reliability standards. AEMO would also use this modelling to develop its National Transmission Network Development Plan to assist transmission businesses in their investment decisions.

- Transmission businesses would distinguish between ‘small’ (less than \$38 million) and ‘large’ transmission investment projects needed to meet the standards set by AEMO. The former would be included as just one of the many expenditure items that comprise the ex ante proposals by transmission businesses for revenue allowances under incentive regulations. In the ensuing regulatory period, the businesses could freely choose the timing and type of expenditure needed to meet the standard (including opex and demand management). They would not be obliged to proceed with the specific investments flagged in their ex ante bid.
- In contrast, large projects (above \$38 million) would be subject to stringent and transparent cost–benefit analysis undertaken by the transmission business using updated information closer to the time of project commencement. In assessing whether the timing, scale or the type of expenditure was efficient, the AER would take advice from AEMO. The cost–benefit test would be based on a strengthened Regulatory Investment Test for Transmission, the RIT-T. (Currently, the words ‘regulatory’ and ‘test’ are flimsy limbs to the title — since there is no independent assessment of costs and benefits, and no real regulatory consequences following an inadequate ‘test’.) The revenue to fund large projects would be provided by the AER outside the general revenue determination process and only if the project passed a cost–benefit test. A business would be able to keep a proportion of any cost-savings it made in undertaking the project, but could not decide to shelve an approved project (since to do so would undermine the goal of efficiently resolving significant impending system reliability problems).

This approach does not involve significant uncertainty since it blends a model already in existence in Victoria with an alternative model that transmission businesses generally find acceptable.

The danger of preserving parochialism is one of the largest risks to any new coherent transmission reliability framework. Some envisage an arrangement in which states would appoint their own regional planners to undertake the probabilistic analysis above. This would significantly add to costs; invite whimsical methodological differences; fail to capture national learning; would address NEM-wide effects in, at best, a clumsy, inefficient and incomplete way; and most problematically, allow the potential intrusion of political factors into what is fundamentally a technical issue. It would be bizarre if regulatory customs that were

reasonable enough when electricity networks were isolated within state boundaries persisted when the wires spanned the borders.

Implementation of the new recommended framework would occur over an extended period, even if the current excessively slow decision-making processes were overhauled and accelerated (as discussed later). State and territory governments would still have an extended period to plan. Thus, the proposed reform will not be a disruptive and sudden shock to existing planning arrangements in any jurisdiction, and therefore there should be few transition costs.

This is likely to be particularly pertinent to Victoria, which already has a more advanced reliability and planning framework than other jurisdictions, and which might be reluctant to shift given the tradeoff between the smaller benefits of reform for that state and any transitional costs. However, the degree of regulatory change for Victoria is much less than other jurisdictions and, given the timing of regulatory determinations, the Victorian transmission business would not be one of the first to be covered by the new regulatory regime. This means that the transition costs for that state would be particularly low. Given this, the Commission considers that Victorian consumers would still derive net benefits from reform.

Reluctance by *any* state to move to a unified national scheme will likely endanger the move of other states, thus threatening the delivery of the very large national savings that are available. An efficient transmission reliability framework could produce savings in the realm of \$2.2 billion to \$3.8 billion over 30 years.

Demand management is weak

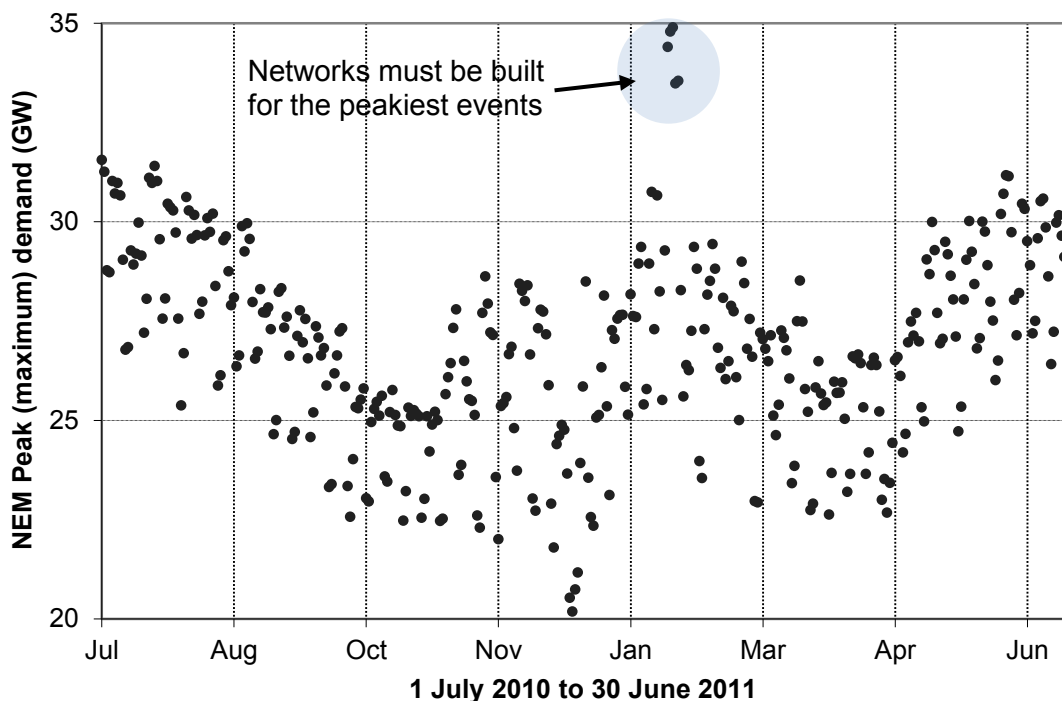
Network and generation capacity is based on meeting peak, not average, demand (figure 5). Peak demand growth has been a key driver of investment in generation and network capacity in the last five years. For example, in New South Wales, peak demand events occurring for less than 40 hours per year (or less than 1 per cent of the time) account for around 25 per cent of retail electricity bills.

The growth in household air conditioning is the major contributor to this pattern. More generally, the costs of meeting peak demand through investment in generation and network augmentation are not fully borne by those using power at peak times. Their costs are generally spread across all consumers, with the exception of some large industrial and commercial users, which do face cost-reflective prices.

Critical peak pricing is already occurring for large energy-intensive users

While they contribute less to peak demand than households, large industrial and commercial end users tend to be relatively responsive to critical peak prices, and therefore can make a useful contribution to reducing network constraints at peak times. Most of these customers have the required metering, and some are already exposed to critical peak pricing. A first step would be to extend such pricing to the bulk of the remaining businesses in this group. This could provide a relatively low cost and more rapidly achieved source of critical peak load reduction, especially for transmission assets.

Figure 5 **Networks must be built for the peakiest events**



Currently, networks (or parties acting on their behalf) pay some large industrial and commercial users to curtail their demand to relieve network constraints in peak demand periods. These arrangements could be extended to more businesses. As proposed in the AEMC's Power of Choice Review, a complementary change would be to allow reductions in load to be combined and offered by 'aggregators' to the NEM spot market, though this would involve some complexities in implementation.

The adoption of cost-reflective pricing for households and small businesses is in its infancy

Most households and smaller businesses are not exposed to time-based, cost-reflective network pricing. Thus, such users are not encouraged to shift consumption away from peak demand periods, leading to hidden subsidies between peaky and non-peaky consumers, and over-investment in peak-specific investments. Currently, a low-income household without an air conditioner is effectively writing cheques to high-income users who run air conditioners during peaky periods. For example, a household running a 2 kilowatt (electrical input) reverse cycle air conditioner, and using it during peak times, receives an implicit subsidy equivalent of around \$350 per year from other consumers who don't do this.

Accordingly, reliance on supply side investment to meet growth in peak demand is inefficient, is inequitable in some cases, and drives network prices higher than they need to be. Many major players have supported a change in principle, including the NEM Rule maker (the AEMC) and most peak industry bodies representing the supply chain (the Electricity Network Association, the Energy Retailers Association of Australia, and the Energy Supply Association of Australia). Various consumer groups acknowledge the benefits, but are concerned about the risks for low-income consumers.

Removing such buried cross-subsidies and reducing the required investment in the network (and peaking generators) could not realistically be achieved quickly. The implementation of critical peak pricing across the entire NEM would require the universal rollout of smart meters. This would entail high upfront costs, but would produce limited savings in the many areas where there are no immediate network constraints. Such a 'big-bang' approach would be likely to fail a cost-benefit test and lead to significant consumer resistance, as occurred in Victoria. In contrast, a carefully managed and staged approach has the potential to reduce price pressures significantly.

It is worth mapping out the desired end point — some years away — and then ensuring there is an orderly transition. In the long run, appropriate network pricing requires several complementary policy changes.

Cost-reflective pricing of network charges

Time-based pricing of network charges that reflect the underlying network costs is an uncontroversial principle for many. The AER would ensure that the business's network pricing proposals conformed with cost-reflective pricing, tightening the existing Rules in this area.

The Commission has recommended the use of a revenue cap as the basis for controlling the revenue collected from customers. The alternative control mechanism — the weighted average price cap — does not appear, in practice, to have achieved its theoretically greater potential for efficient pricing. It has other disadvantages, such as the risk of significant over-recovery of revenue. Given the tightening of the pricing Rules, a revenue cap will not constrain efficient pricing.

Time-based pricing would ultimately have to particularly apply to around 40 critical peak hours per year (whenever they occur). The network businesses would pass these charges onto retailers. To provide the right signals, retailers would need to reflect these charges in their tariff offerings to consumers.

There is a need to signal critical peak prices to consumers in advance

People need the opportunity to shift the time of their power use (hot days are predictable). In some cases, people may request that their distribution business or retailer control their key power-using appliances — mainly air-conditioning — during these peak hours ('peak load control'). For example, they may agree to have their air conditioner remotely controlled to cap power to the compressor during the critical peak period, thus maintaining reasonable comfort levels, while cutting costs.

Smart meters and other technologies are needed to achieve efficient pricing

Realistically, consumers cannot be charged time-based prices unless they, (along with network businesses and retailers), receive real-time information about usage patterns. Smart meters enable the measurement of electricity consumption over time and can achieve other (sizeable) operational efficiencies in networks, such as remote meter reading and fault detection.

The Commission's preferred approach is that, like other expenditure, distribution businesses would be able to include smart meter rollouts as part of their regulatory proposals to the AER (subject to the usual oversight by the AER of the claimed need for, and efficiency of, the expenditures proposed by network businesses). Currently, the Rules effectively preclude this. As for other expenditure under incentive regulation, in the ensuing regulatory period, the businesses would be free to determine the number, timing and location of smart meters. However, under the Regulatory Investment Test for Distribution, network businesses undertaking any significant rollout (or other large-scale investment) would have to produce a report that substantiated whether the investments passed a cost-benefit test. Incentive arrangements intended to address the wider efficiency gains of demand

management in other parts of the energy supply chain would need to be strengthened.

Smart meters should be subject to an appropriate, preferably international, minimum standard that allows interoperability with add-on technologies. All relevant parties would be able to access data, subject to privacy laws. Retailers and third parties (given prior customer agreement) would also be able to install smart meters, make modular additions to existing smart meters, and develop complementary technologies (such as in-home displays and software apps) that help reduce people's bills, while also relieving pressure on the network and generation at peak times. Retailers and third parties may choose to do this to differentiate their business proposition from competitors and make it more appealing to consumers.

Retail price regulation should be removed by 2015

Continued regulation would otherwise frustrate time-based charging and stifle retail competition and innovation. In particular, with the implementation of time-based network charges, any retailers that failed to adapt their business model and continued to embed significant cross-subsidies in their tariff offers would risk losing market share (including to new-entrant retailers).

The pathway to reform is crucial

While specifying the long run is relatively straightforward, the pathway involves tricks and traps. Any transition would require:

- the engagement of network businesses, retailers and especially consumers in the process, comprising provision of information, consultation, and a transition that takes into account the costs of change. (The process should take account of the lessons from the Victorian smart meter rollout, which experienced several major problems, and has made some consumers wary of imposed technological change in this area.)
- coordination by distribution businesses of the gradual and localised rollout of smart meters to maximise their net benefits. The advantage of the Commission's approach is that — by incorporating the decision-making into the incentive regulation regime — distribution businesses would have the right incentives (and information) to deploy meters when and where it was efficient to do so. For example, they would be most likely to roll out meters in areas subject to impending network bottlenecks, using critical peak pricing to lower peak demand, and thereby defer costly network extensions. In contrast, a NEM-wide rollout at a given time would be costly, and in many uncongested regions make

no difference to the required network investments, thereby reducing benefits. One of the further benefits of the Commission's staged approach is that it can take account of policy decisions, learning from experiences elsewhere, and technological changes that might affect the payoff from demand management over time

- sensible transitional network charges (and accompanying changes to time-based charging by retailers). The transitional arrangements might include the initial use of poorly targeted 'time-of-use' tariffs, which only have simple broad peak, off-peak and shoulder rates. While AusGrid's experiences in New South Wales show these do not achieve major network efficiencies, they might at least raise consumer awareness that costs vary over time and may ease the adjustment path. However, financial analysis suggests that the transition to critical peak pricing should not be too slow because the rewards from critical peak pricing are the major network savings. If the transition is too slow, then the Commission's quantitative assessment is that it would be better not to rollout smart meters in the medium term at all
- endorsement of reform and a commitment by governments to achieve it in a given time frame.

Given the importance of the transition and its relative complexity, the Commission proposes that the Council of Australia Governments, through the Standing Council of Energy and Resources, should oversee the process. However, it should avoid prescriptive approaches that do not take into account the cost-benefit framework described above, and should proceed without further reviews or other processes that would unnecessarily delay reform.

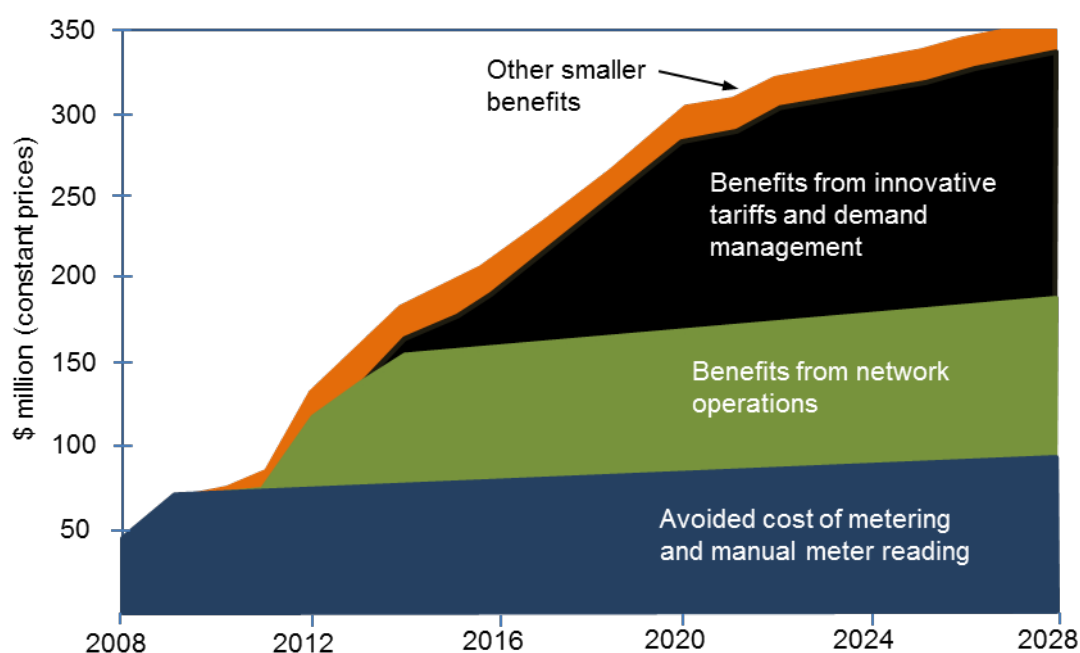
If carefully implemented, critical peak pricing and the other benefits from rolling out smart meters could produce average savings of around \$100–\$200 per household each year in regions with impending capacity constraints (after accounting for the costs of smart meters). Even in Victoria, where the rollout process has been flawed, it now appears that some significant gains will ultimately be realised (figure 6). The Commission's recommended approach to smart meters would mean that in other jurisdictions, the benefits from innovative tariffs and demand management would be realised sooner after any rollout, because the investments would not be driven by a mandate, but by their value to consumers. In some areas, the benefits could be realised reasonably soon after the critical reforms have been completed.

A further critical issue is whether retail price deregulation and the capacity for cost-reflective prices would result in exposure by consumers to the large fluctuations in *wholesale* energy prices that sometimes (albeit rarely) occur for short periods.

However, even if permitted to adopt cost-reflective prices for wholesale energy variations, it is unlikely that retailers would change their current practice of hedging, or contracting with generators (thus smoothing price volatility in the wholesale energy market) for residential customers. This is because such events are not predictable — but can arise from generator failure, strategic behaviour by generators and transmission failures at any time. Consequently, it would be hard to pre-notify consumers of such pricing events.

Nor is it clear that where the pricing events result from such unpredictable events (compared with the predictably high costs associated with network capacity built for the hottest days) that it would be efficient to pass on these volatile unhedged wholesale prices to consumers. Consumers value insurance for such unpredictable events. A retailer that failed to provide such a service would be unlikely to retain customers. Large energy users fall into a different category — and will sometimes agree (with the possible involvement of an intermediary) to voluntary load shedding in return for a fee during high price events, thus lowering their overall costs. Such firms or their intermediaries have the facility to continuously monitor five-minute interval wholesale electricity prices and have the ability to take very rapid action to curtail consumption. Households are unlikely (even with the aid of an intermediary) to ever be able to respond in this sort of manner.

Figure 6 Victoria: smart meters can produce large benefits over the longer run



Data source: Deloitte (2011a).

Distributed generation

Distributed generation — which produces power close to the point of consumption — could potentially perform a similar role to demand management. It may sometimes help to relieve network congestion, meet peak demand or improve system reliability, thereby avoiding or deferring network investment.

However, the current policy environment sends opposing signals to distribution networks and consumers about the economic value of distributed generation. On the one hand, the capacity for local generation to substitute for network investment is frustrated by regulatory obstacles, although many of these — such as a lack of information about network constraints and uncertainty about connection charges — have been, or are soon to be, substantially resolved.

On the other hand, various subsidies to certain types of distributed generation — particularly rooftop photovoltaic units — have led to unbalanced incentives and inefficiencies (though again some recent policy reforms have reduced these). The take-up of rooftop photovoltaic units has, to date, produced minimal, if any, network savings, as existing time-invariant tariffs do not encourage householders to orient units to the west to maximise generation in periods of peak demand late in the summer afternoon. Moreover, the effective use of distributed generation to produce network savings needs to ensure that take-up is maximised in those parts of the system subject to the greatest constraints, which again has not yet happened.

The remaining subsidies to particular forms of distributed generators have few benefits for the network and, in the face of carbon pricing, play a redundant (and inefficient) role as a measure for reducing emissions. Governments should therefore phase out as quickly as practicable subsidies for rooftop photovoltaic units and other forms of distributed generation delivered via premium feed-in tariffs and the small-scale component of the Renewable Energy Target Scheme.

State and territory governments should change the feed-in tariffs for any uncontracted small-scale distributed generators exporting power into the grid, so that their tariffs reflect the market wholesale prices at the time of energy production, and the (net) value to network businesses from reducing loads on their equipment at critical peak periods.

State-owned enterprises

Transmission and distribution businesses in Tasmania, New South Wales and Queensland remain state-owned (and partly state-owned in the ACT), whereas network businesses in Victoria and South Australia are privately owned or operated.

While governments have a legitimate role in owning and operating many services in Australia, the rationale for state-ownership of electricity network businesses no longer holds. This reflects the development of sophisticated incentive regulations that function best when the regulated businesses have strong cost-minimising and profit motives.

State governments often impose multiple constraints on state-owned corporations that are incompatible with maximising returns to their shareholders. These constraints can include:

- social and environmental obligations
- requirements to procure locally
- a lack of coherence of governments in their dealings with the businesses over time. Governments may make decisions to reduce dividends when price increases are politically sensitive, limit capital spending when governments are concerned about debt levels, or encourage capital expenditure if there are pressures for greater reliability
- employee benefits and job security for employees that are out of kilter with those associated with most businesses
- poor governance, including appointment of board members on a non-merit basis.

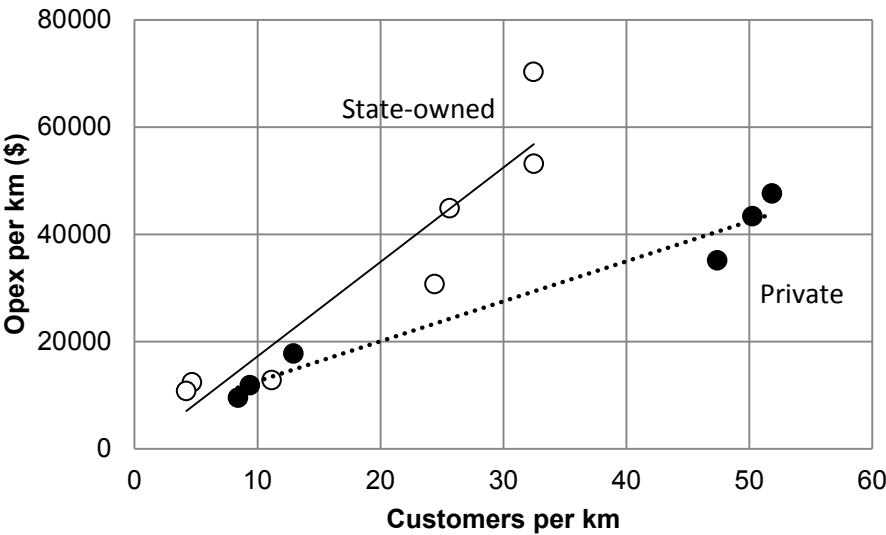
For example, in New South Wales, the Acts governing the state-owned corporations include non-commercial goals, which, where appropriately justified, would be better met through explicit government regulation or budgetary measures. At a minimum, the objectives should be prioritised. For example, in New South Wales, s. 8 of the *State Owned Corporations Act 1989*, requires state-owned corporations to give equal weight to commercial success, social responsibility, ecological sustainability, and a sense of responsibility towards regional development and decentralisation.

State ownership can involve employee protection arrangements that would not be typical in most private businesses. For instance, in New South Wales, Ausgrid is required to provide a five-year employment guarantee to award staff and is subject to requirements to procure locally in some cases, a hidden cost that electricity consumers bear.

While analysis of relative efficiency is difficult given the number of other differences between network businesses, the empirical evidence suggests that, although some perform relatively well, as a group, the aggregate productivity outcomes of state-owned businesses are poorer than their private peers (figure 7). This is likely to reflect the mixed incentives they face. Some participants in this

inquiry claim that a risk-averse focus on ‘building things for the future’ still permeates some of these businesses.

Figure 7 Operating expenses for state-owned and private businesses
\$ per kilometre of line



There are strong arguments for privatisation of these businesses. There is no evidence that the productivity, reliability, quality or cost performance of private sector electricity network businesses is worse than their public sector equivalents. To the contrary, the evidence in Australia and internationally suggests that such private sector enterprises are more efficient. It should also be emphasised that privatisation is not de-regulation. In fact, there is a symbiosis between regulation and privatisation. Strong regulation is needed to achieve the private provision of secure, reliable and appropriately priced electricity network services. And privatisation strengthens the effectiveness of incentive regulation.

Privatisation is not a radical move. There have been few problems in Victoria or South Australia.

In the event that privatisation does not occur, there are strong grounds for different governance arrangements, with the goal of re-invigorating the original purpose of corporatisation of the old state-owned businesses. Among others, this includes merit-based appointment of all board members, public disclosure of ministerial directions, and the removal of non-commercial objectives and obligations (such as procurement and employment policies).

The critical role of the Australian Energy Regulator

The NEM involves multiple interested parties and institutions with clearly defined roles. Ensuring these institutions work well is critical to effective regulation and, in the context of this inquiry, to the degree of discretion that they may wield in using benchmarking, determining new rules and planning the network.

Governments and stakeholders have expressed concerns about the governance of the AER, including its accountability, capability, communication with stakeholders, independence from the Australian Competition and Consumer Commission, and transparency. Many of these perceptions are not backed by solid evidence and may reflect the usual tensions between an economic regulator and the parties it regulates. Others have more foundation, but can be remedied.

While the AER appears to be strongly independent from industry and government influence, there are perceptions that it is unduly influenced by its close links with the ACCC and lacks transparency. Such concerns would be ameliorated by giving the AER more control over its budget and resources, and making it more accountable for how it manages those resources. Concerns about resourcing, capability and accountability should largely be addressed by additional funding announced by the Australian Government in late 2012 and agreement for governance changes to the AER. In that light, further reforms, such as removing the AER from the ACCC and establishing it as a separate entity are not justified at this stage. With modest but important modifications, the AER can improve its reputation and can then take on further responsibilities from state and territory regulators, thereby becoming, as originally intended, the single national energy economic regulator.

Nevertheless, an independent review of the AER — which has also been agreed by COAG — should also assist in addressing any remaining limitations in its operations, and would address any ill-founded perceptions about the organisation. More broadly, all the major institutions of the NEM should be subject to review by 2018 (and every 10 years after that), recognising that institutional arrangements and the NEM have changed and likely will continue to evolve. Most recently, the merits review process has been reviewed, leaving AEMO, the AEMC and any new consumer representative bodies as the remaining institutions that should be assessed for their scope to improve.

The recent assessment of the merits review process proposed a significant institutional change, creating a new merits review body, locating it within the AEMC, and establishing routine consultations between the two bodies. Too close a link between these two institutions is not, in the Commission's view, a desirable

change. The AEMC, while notionally a body that converts broad government policy into precise Rules, in many ways also acts as a policymaker, or at the very least, an influential policy shaper. For obvious reasons, merits review bodies are best the cold and distant relatives to the policy process.

Incentive regulation is a ‘work in progress’ inextricably linked to the effectiveness of benchmarking

Under incentive regulations, the regulator forecasts efficient aggregate costs over the upcoming regulatory period (of usually five years), which it uses to set a revenue allowance for that period. The business makes higher profits if it reduces costs below those forecast by the regulator. In doing so, the business reveals the efficient costs of delivering the service, which would then influence the regulator’s determination in the next period. Accordingly, incentive regulation encourages efficiency while reducing the risks that networks use their monopoly positions to set unreasonably high prices. Benchmarking — which measures a network supplier’s efficiency against a reference performance — is just one way of assessing whether any given business’s expenditure proposals are efficient.

The theory is simple. Its practical realisation is not. The regulatory arrangements underpinning incentive regulation are protracted and costly. The Rules that stipulate many of the requirements for proposals are lengthy and subject to regular changes — currently around 1500 pages, and by early 2013 up to the 55th version in just seven years. (The sections of the Rules most relevant to this inquiry are around 200 pages in length.) Proposals and the regulator’s determinations have also become increasingly detailed over time. The decision documents for Victorian electricity distributors were around 450 pages in 2000, around 1000 pages in 2005 and 1800 pages in 2010 — reflecting the complexity of the proposals and the large network revenues involved (now around \$13 billion annually in 2011 prices across the NEM). The AER has felt obliged by the Rules to engage in the detailed consideration of business’s proposals in reaching final revenue determinations. For example, there have been debates about the efficient number of locks and keys, the length of insulated conductors and appropriate pole treatment processes. In this context, it is not surprising that the approximate administrative costs for the regulator and the businesses of the last complete cycle of revenue determinations were around \$330 million (which excludes merits review costs).

This focus on detail is counter to the conceptual underpinnings of incentive regulation. The intention of the framework is to limit monopoly pricing (through regulated weighted average price or revenue caps), while leaving it to *businesses*, not the regulator, to work out the minutiae of input and output decision-making in

any given regulatory period. However, to date the AER's ex ante revenue allowances have been based on examining and then summing, item by item, the detailed forward cost projections proposed by businesses, even if, ex post, the businesses choose an entirely different set of inputs. Some forms of benchmarking aim to:

- ex ante estimate the *aggregate* efficient capex and opex of any business (based on the unique characteristics of its customers and network, and assessing efficiency using the performance of other network businesses)
- if possible, avoid engaging in the summation of a large set of what may turn out to be irrelevant costs.

If this were feasible, it might reduce the paper, time and hence financial burdens of the current processes and lead to a greater focus on the National Electricity Objective.

In late 2012, the AEMC made changes in the incentive regulation regime that provide a more promising environment for benchmarking:

- in making regulatory decisions, the AER could, but would not be obliged to, dissect, bit by bit, a business's revenue proposal. Accordingly, it would be free to use benchmarking (and other techniques) to make judgments about a reasonable revenue allowance
- it eliminated flaws in the Rules that permitted (some) businesses to exceed the forecast level of capital spending, which flowed directly into higher network prices without review by the regulator. (The Commission proposed similar reforms as part of its draft report.) This strengthens the role of benchmarking, as networks that spend more than the efficient benchmark will be exposed to closer scrutiny and may lose revenue related to such over-expenditure
- it allowed the AER to introduce a scheme that provides more consistent incentives to reduce inefficient capital and operating expenditure (the 'Efficiency Benefit Sharing Scheme')
- it removed excessively prescriptive arrangements for calculating the weighted average cost of capital (WACC) and clarified that any merits review of the AER's WACC determinations should take account of the interdependencies in its constituent elements. The AER is developing guidelines in this area. The Commission has largely not addressed the detailed aspects of estimating the WACC in this report, but proposes that the AER consider using a long-term trailing average to estimate the debt risk premium and the risk-free rate. Averages taken over a longer period are more stable predictors of market conditions and are more likely to represent the actual borrowing patterns of the

firms involved, as no firm would normally roll over its entire debt portfolio in a two-week period every five years. The Commission also recognises that state ownership of network businesses may confer certain financing advantages on businesses. The remedy is not to develop a WACC that depends on ownership, but to ensure that state-owned network service providers obtain financing (both debt and equity) at rates that reflect the risk of the investment. Privatisation would provide one solution, but so too would genuine competitive neutrality.

What is the practical role of benchmarking?

Given the difficulties outlined in box 1, benchmarking is not *yet* sufficiently reliable and robust to directly set regulated revenue allowances. A particular concern is that it is difficult to distinguish between inefficiency and errors arising from model misspecification, poor data, different regulatory settings and varying operating environments.

Such difficulties are less severe if the purpose of benchmarking is to identify broad efficiency concerns about network businesses. However, in setting regulatory allowances, badly configured benchmarks could lead to under-remuneration of businesses, with risks for efficient investments and business solvency.

In the immediate future, benchmarking would be most useful:

- as a diagnostic tool to help assess the reasonableness of bottom-up detailed proposals. Operating expenses, such as the costs of vegetation clearance around poles and wires, are more generally amenable to benchmarking than capital expenditure. Such specific benchmarking may be reasonably reliable because there are fewer confounding variables. It may also be possible to expand the number of comparisons by analysing performance outcomes from the many regions of any given network business. The AER has already made some use of such benchmarking, as have the network businesses themselves for commercial purposes, underlining that it is sufficiently robust to be useful. The implication of this role for benchmarking is that it is unlikely to reduce to any degree the page counts of regulatory proposals and counterproposals, though it should improve the quality of the outcomes
- in providing information to consumers and others, thereby providing pressure for improved performance by network businesses. The 2012 Rule change requiring the AER to produce annual benchmarking reports about the performance of network business should assist (so long as the benchmarking measures are meaningful and appropriately explained).

Box 1 The difficulties with benchmarking

While benchmarking methods are often sophisticated, there are many problems in applying them and uncertainties about the accuracy and robustness of the results:

(a) There are many different methods for estimating ‘efficient’ costs. They revolve around the assumption that unexplained differences in the performance of firms reflect managerial inefficiency. Different approaches can result in divergent measures of efficiency — which may not be a sound basis for regulating future revenue or prices.

(b) Incentive regulations require a reward for the vigorous (and risky) pursuit of cost efficiency. Setting the benchmark to that of the highest performer dulls those incentives since no one would have an incentive to be the leader. However, setting the benchmark at the lower end of performance takes pressure off inefficient businesses. The decision about where to set the line is difficult and involves judgment.

(c) Quality must not be overlooked. A business subject to incentive regulation may appear to be performing efficiently in cost terms, but may lower its quality. This is why, regardless of the regime used to set revenue allowances, complementary regulation or incentive schemes specifically related to reliability and safety, are also necessary. This is much more difficult in transmission where there are few good leading output measures of likely future reliability performance.

(d) Different reporting systems produce measurement errors.

(e) Any comparisons between businesses must take into account differences in their operational circumstances (such as topography, customer density, and differences between jurisdictions about which assets lie within transmission or distribution networks) and policy constraints (such as higher or differently defined reliability standards or statutory requirements for non-commercial goals for state-owned corporations). Much of the international academic literature on benchmarking uses too few variables to draw strong inferences about the efficiency of specific firms.

(f) There are only 13 distribution businesses, five regional transmission businesses and three separate DC interconnectors in Australia, which reduces the capacity for elaborate models that take into account (e). It also means that the performance bar might be set quite low if the highest performing Australian business were still quite inefficient. International benchmarking might assist, but has to be interpreted carefully given that adjusting for the differences noted in (d) and (e) may increase the number of variables at a higher rate than the additional number of businesses used in benchmarking.

If its rigour and accuracy improves, aggregate benchmarking could also encourage early settlement in determinations, short-circuiting the current costly processes. Depending on the divergence between benchmarking and the business proposal, the AER could immediately accept a proposal as reasonable, following consultation with consumers (through the National Energy Consumer Advocacy Body). Alternatively, if the proposal were in the ‘ballpark’, it could initiate a settlement process between the advocacy body and network businesses. The AER could also

request further information (a ‘please explain’ notice) to assist the early resolution of an agreement. Failing a quick resolution, the AER would adopt the current forensic and protracted processes. The risks and costs of those processes would encourage parties to seek negotiated settlements. Negotiated settlements of this kind (overseen by a regulator) have proven practical and effective in utility regulation in several overseas jurisdictions, such as California, Florida, and Italy.

A Rule change would be required to allow the AER to use benchmarking (or any other evidence at its discretion) on a standalone basis, where it led to an early and *mutually agreed* outcome between the business, the regulator and consumers.

What is a reasonable benchmark?

Any use by the AER of benchmarking to estimate values for opex and capex allowances in determining regulated revenue allowances should be accompanied by two protections of the long-run interests of consumers.

First, the AER should use detailed publication and peer review to help demonstrate that the benchmarking results are robust enough to serve that purpose.

Second, in making any judgments about allowable revenues, the AER should choose a yardstick more akin to that applying in competitive markets — which would be a firm close to, but not at the efficiency frontier. The current requirement under the Rules that the AER must accept a ‘reasonable’ proposal appears to be consistent with this standard for gauging efficiency. Using such a standard recognises that the likelihood of error in trying to estimate the perfectly efficient level of costs is (exactly) 100 per cent. Under incentive regulation, under-remuneration is likely, ultimately, to lead to larger costs than over-remuneration of an equal magnitude. This is because the costs of underinvestment affect the long-run provision of reliable network services to consumers. In contrast, if the incentive regime were performing its role, any over-remuneration would not lead to over-investment by a well-governed, profit-motivated network company. Rather it would result in slightly larger profits (which have lower efficiency costs), which the regulator could reduce in subsequent regulatory periods.

This suggests there should be the retention of some bias towards encouraging investment, but not too large a one.

Processes and resources for benchmarking

A major study ranked Australia as a relatively unsophisticated user of benchmarking in electricity networks. Recognising this, the AER has recently reviewed the use and methods of benchmarking by other energy regulators, and is collecting data that would allow it to undertake more elaborate benchmarking. However, the AER should adopt further measures to ensure the successful use and evolution of benchmarking, including:

- the development of publicly available databases and full transparency in the processes and methods the AER uses in its benchmarking. The standard of reporting of benchmarking and testing of its rigour and robustness would need to be high before the results could play a major role in revenue determinations
- the development and retention of internal expertise, strategies that maximise learning and greater international collaboration with other regulators and benchmarking agencies
- peer review of its benchmarking practices ('benchmarking of benchmarking')
- appropriate consultation with stakeholders about the required data and appropriate methods and regular checking to ensure that the benefits of its benchmarking practices exceed the compliance and resource burdens
- effective communication of the results of benchmarking to its diverse audiences, and in particular to consumer groups, which may use the information to place greater pressure for improved performance by network businesses.

Such initiatives may eventually allow benchmarking to serve a greater role in making regulatory determinations and policy reforms. If benchmark methods become sufficiently robust, the current onus of proof might be switched, with a business having to explain why its alternative proposal would be reasonable. Setting the benchmark target at a slightly less demanding level than that of a fully efficient firm could provide some protection against regulatory error.

Interconnectors

In contrast to concerns about over-investment in each region's own network, some stakeholders argue that there has been underinvestment in interconnectors, citing the presence of interconnector congestion as an indicator of this. They claim that underinvestment has led to insufficient trade in energy across borders and the use of market power by some generators, and acted as a barrier to the wider use of low carbon emitting generators (particularly wind).

However, there are several major flaws in these claims.

- Congestion is not inherently bad. Just as in roads, some congestion is efficient because the costs of lowering congestion can exceed the benefits. The current evidence suggests that interconnector capacity is close to its optimal level.
- There is a cost–benefit process for determining the desirability of augmentations of interconnectors. One imminently prospective interconnector upgrade — the Heywood interconnector between Victoria and South Australia — appears to pass a cost–benefit test. (Options for upgrading another interconnector, between New South Wales and Queensland, are also currently being considered.)
- The problems attributed to apparent underinvestment in interconnectors — such as the exercise of market power by some generators — are often the consequence of other aspects of the network and the regulatory system. Simply increasing interconnector investment would often not resolve these problems, or would not be the most efficient way of doing so.

In fact, the current major problem is that existing interconnector capacity is not always efficiently used (quite the opposite of a problem with congestion). This arises because the Rules may sometimes affect the bidding behaviour of generators in perverse ways. Moreover, the regulatory regime for transmission (of which interconnectors are a part) should be future looking. Accordingly, while existing interconnection infrastructure may be satisfactory, the current system may not deliver efficient future investment.

The reasons for this are highly technical, but there are two main factors undermining the efficient use of interconnectors:

- intra-regional transmission networks are not necessarily planned to optimise the use of interconnectors. As AEMO has pointed out, it is a fallacy to depict interconnectors as simply a single piece of wire passing over a state border and linking in an uncomplicated way to the networks on each side of the border. In fact, an apparently ‘single’ interconnector can be composed of several lines of varying capacity and location, and the operation of an interconnector is affected greatly by the capacity and structure of the transmission networks to which it connects. State based transmission planning regimes currently give insufficient attention to the impacts of their decisions on the effectiveness of transmission systems in other states and on the interconnectors themselves
- strategic behaviour by generators, which is encouraged by the design of the spot market in the NEM, the physical configuration of both transmission and generation in the NEM and the way that transmission services are priced.

When transmission constraints bind, it may be necessary to dispatch higher cost generators ahead of more efficient ones to meet demand. But this can also be the result of, or be exacerbated by, strategic behaviour by generators (so-called ‘disorderly’ bidding) located behind a constrained transmission line. They can also prevent the dispatch of efficient generators in another state and thereby reduce traffic on an interconnector, sometimes precisely when maximising flows would be helpful to meet peak demand in another jurisdiction. Indeed, in certain bizarre instances, generator bidding behaviour may result in ‘counterflows’, in which the pattern of trade violates the usual assumptions of comparative advantage. Generators with higher costs send power to a state with lower-cost generators. Disorderly bidding can be a highly profitable strategy for generators.

In the short run, this conduct mainly results in income flows between parties, but little inefficiency. However, despite arguments to the contrary from some generators, the Commission believes that this problem leads to significant long-run inefficiencies (a view also held by the AER and the AEMC):

- generators face inefficient signals about where to locate
- older higher-cost generators may not be decommissioned early enough
- the capacity of inter-regional contracting across interconnectors to provide insurance through hedging instruments is undermined, forcing parties to use more costly hedging, or to avoid inter-regional trading altogether (raising electricity prices to consumers in either case)
- the signals for the efficient investment in interconnectors are distorted, and with that, network planning across the NEM.

The Commission largely agrees with the option proposed by the AEMC in its transmission frameworks review. The adoption of ‘optional firm access’ (OFA) can remove the incentives that lead to disorderly dispatch. Under OFA, generators can choose to pay for a privileged financial right to a given amount of the capacity of a transmission network (‘firm access’). The generator does not have to actually physically dispatch power, but any other generator displacing the purchased capacity must pay the generator that has acquired firm access. OFA would achieve short-term gains by addressing disorderly bidding and provide long-run signals about the optimal location and investments in transmission and generation.

However, the implementation of OFA will require a reasonable transition. This reflects:

- its complexities

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- the need to ensure that parties do not find ways of gaming the new arrangements, (on the one hand, the risk that a transmission business might overprice access, and on the other, that generators may find new ways to game the spot market)
 - a requirement to undertake adequate consultation on arrangements that will affect all transmission businesses and generators throughout the NEM.

However, in the meantime, the AER has proposed a relatively simple option based on imposing congestion pricing on generators in constrained parts of the transmission network. This would address some of the most serious aspects of disorderly dispatch, and assist the transition to OFA. This should be implemented within two years. The Commission envisages that, subject to the outcomes of cost-benefit analyses (including relative to the AER's proposal), OFA would commence operation in 2018.

Over the very long run, a shift from OFA to a more refined transmission pricing model — 'nodal' pricing — may be beneficial, but this should be tested in a review ten years after the commencement of OFA.

Quite apart from reforms to transmission pricing, the Commission's preferred NEM-wide planning approach (as discussed earlier) is likely to overcome biases against interconnectors arising from a tendency to favour intra-regional transmission options.

Implementation and outcomes

Notwithstanding some progress in reform — or at least in reviews proposing reform — much of the detail of the necessary reforms has yet to be determined, and some crucial policy decisions have yet to be made. This is apparent in the:

- continued lack of a nationally consistent framework for network reliability and planning that takes into account the customer value of reliability. There remains a genuine risk that the ultimate policy outcomes may preserve a backdoor for parochialism
- prolonged gradualism of electricity retail reform, and indeed in reform more generally
- absence of decisions about how a coherent and workable smart meter rollout should proceed
- continued government ownership of networks, and in some cases, retailers and generators

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- as yet, no decision about the best processes for reviewing or appealing the AER's regulatory decisions.

Major stakeholders, particularly investors in long-lived network assets, are understandably nervous about any changes to the rules and regulatory environment that might adversely affect their investments. Meeting the *long-run* interests of consumers requires that investors are confident that the regulatory regime will deliver adequate returns on their investment. Some may argue that the Commission's suite of recommendations represent an unacceptable rate of change and risk to investor confidence. To this, the simple but fundamental point is that the recommendations made by this inquiry do not represent any change to the 'goal posts' of the NEM — with the inherent uncertainty that would entail for consumers and network businesses. Rather, the recommendations are designed to re-orient the framework to better achieve its original objective.

There have been some legitimate reasons for price increases over the last few years, but the system as a whole is inefficient, and price pressures could be reduced substantially over the longer term if a coordinated set of reforms were introduced. Consumers have much to gain from the proposed reforms.

Reform needs to be more timely

Some of the more critical reforms in the NEM have already taken far too long. While the complexities of the NEM, the number of stakeholders involved, and the issues relating to investor confidence noted above, justify a considered and thorough examination of reforms before they are implemented, the current system has sometimes descended into paralysis by analysis. Reform appears to have been frustrated by complex processes, constant and overlapping reviews, and a lack of agreement by relevant governments about either the reforms themselves or the need for more timely progress to a genuinely NEM-wide approach to energy regulation.

This is exemplified by the processes for reforming transmission planning and reliability. Sweeping national reform was first proposed in 2002, with follow-up reviews commencing in 2006, 2007, 2009, 2010 (the latter AEMC review taking three years) and in 2012 (this inquiry). Notwithstanding this extensive pre-existing analysis, SCER has just initiated a new AEMC review, covering much of the same territory. This will trigger to a further protracted process, including:

- the time required to complete the review (scheduled for completion by November 2013)
- the need to alter the National Electricity Law at the conclusion of that review (provided SCER reaches a consensus). SCER would also need to develop an

implementation plan and then request that the AEMC initiate a Rule change process

- the time taken to complete the Rule change process (expected to be around one year)
- the time for transmission businesses to understand the new Rules and to incorporate them into their initial regulatory proposals
- the fact that regulatory determinations are staggered over several years.

As a result, under current arrangements, the most optimistic outcome is that national reform could be in place by 2019, but a significant risk that a fully national framework for transmission planning and reliability would not be in place until 2022 — or 20 years after initial national reform was proposed. At any point in the next nine years, even that extended reform process could be derailed by further reviews or indecision.

This is despite the fact that reform of this area is one of the most critical components to enable achievement of the National Electricity Objective. Slow reform progress has already been costly, and further delays will cost consumers hundreds of millions of dollars of avoidable costs to their electricity bills. It appears that consumer interests have been subordinate to process. Yet, paradoxically, all jurisdictions, transmission businesses, AEMO, and the AEMC have agreed to many elements of the reforms suggested by the Commission (or close alternatives to these).

There would be equal concern that other major reforms — such as those relating to smart meters and time-based pricing — could also be unduly delayed. As emphasised earlier, SCER must change its processes to accelerate reform. The current review into transmission and distribution reliability should be converted into an AEMC Rule change process to be completed by the end of 2013, and should draw on the Productivity Commission's recommendations and other inputs. This more speedy process means that the reform process would be completed by 2018. By bringing forward reform from the current likely completion date of 2022, the Commission estimates that even under conservative assumptions, the gains in transmission alone could generate over \$500 million in additional benefits.

How can the Commission's review fit into the reform agenda?

The Commission was struck during this inquiry by an anomaly in policy decision-making in the NEM that adds yet another friction to efficient decision-making. The Commission has undertaken an extensive public inquiry into many aspects of network regulation and made many highly specific recommendations that could be

given effect in Rule changes. The same could be said of several other reviews concerning electricity network regulation — for example, the independent panel carrying out the limited merits review commissioned by SCER, the inquiry of the Senate Select Committee on Electricity Prices and, indeed, many of the AEMC’s own reviews. Yet, even if SCER considered that any such recommendations should be implemented, this could not happen with any speed, if at all. This is because under the present regime, SCER would have to make a request to the AEMC to consider a Rule change. The AEMC would normally then go through a lengthy review process (a review of a review), which at best would cause delays and, at worst, might end up with a less effective reform than intended. (In contrast, a change to the National Electricity Law could be made quickly, despite the fact that it and the Rules are both statutory instruments giving effect to policy.)

Three adverse consequences of this are that the usual sovereign powers of parliaments are weakened, the large benefits from reforms are delayed, and there is an added consultation burden on stakeholders and duplication in the resourcing of reviews. The burdens posed by inertia and compliance costs could be resolved by amending the National Electricity Law so that SCER can request that a Rule change process be completed within six months, where the reform proposal is underpinned by an independent and consultative review undertaken by an appropriate agency, including the AEMC itself. The role of the AEMC would then be to draft the relevant Rule changes and seek (expedited) commentary on these, in a manner similar to the release of an exposure draft bill at the Commonwealth level.

Table 1 A summary of the Commission's main proposals

<i>Current problem</i>	<i>Proposed response</i>	<i>Main benefits from reform</i>
<i>Timeliness in decision-making and Rule changes</i> SCER processes and decision-making, and AEMC Rule change processes take too long.	A commitment by SCER to identify the critical areas for reform, and to prioritise these through tighter timetables for their implementation. SCER should avoid overlapping and protracted reviews. Speed up the current review into transmission and distribution reliability. Accelerated AEMC Rule changes for SCER requests arising from independent appropriately conducted reviews.	A more coherent reform process and a more rapid realisation of benefits for consumers.
<i>A focus on consumers</i> The NEO (the long-term interests of consumers) has lost its pre-eminence in regulatory decisions.	The National Energy Consumer Advocacy Body to cover all consumers, and have the expertise and funding to be an effective participant in the regulatory process. The limited merits review process should also be reformed.	Customers would have more power in the regulatory process, keeping the NEO in sight and preventing undue focus on technical, financial and legalistic details.
<i>Reliability</i> Reliability is critical to electricity networks, but the current standards are not set efficiently, and often bear little relationship to the value to customers.	Reliability decisions should be based on customers' valuations, not prescriptive standards. For distribution, a new national reliability framework should be introduced, and incentive schemes reformed to reflect customer preferences. For transmission, reliability standards should be set at the connection point level across the NEM. Investment decisions should be made by the transmission businesses, but with scrutiny by the AER and AEMO for large projects (and subject to a cost-benefit test and consideration of NEM-wide impacts and efficiency).	Distribution: in New South Wales alone, \$1.1 billion of network capital expenditure could be deferred until the next five year regulatory period. The actual, NEM-wide, savings are likely to be larger. Transmission: were it implemented in a timely way, a new reliability framework could defer around \$2.2 to 3.8 billion of investment across the NEM, over the next 30 years.
<i>Demand management</i> Some 25 per cent of (expensive) system investment is required just to meet 40 hours of critical peak demand each year (in New South Wales).	A coordinated suite of reforms should be introduced over time, including consumer consultation; removal of retail price regulation; the capacity for distributors to include the installation of smart meters as part of standard regulatory arrangements; common meter standards; a capacity for all parties to install meter add-ons or upgrades; and time-based pricing for critical peak periods. Direct load control options would also play a role.	System use and investment would be better aligned, reducing the amount of expenditure required just to meet peak periods. Critical peak pricing and smart meters could produce average net savings of around \$100–\$200 per household each year in regions close to capacity constraints.
<i>Network ownership</i> State-owned network businesses and their owners have conflicting objectives, frustrating the effectiveness of incentive regulation. State-owned businesses perform worse than private ones.	State-owned network businesses should be privatised. If not, governance should be improved, and non-commercial objectives and policies should be removed. An orderly, well planned privatisation process, with consumer engagement.	In the first instance, the efficiency of network businesses can be expected to improve, reducing costs to customers. Incentive regulation would also become more effective, reinforcing efficiency improvements.

Table 1 **continued**

<i>Current problem</i>	<i>Proposed response</i>	<i>Main benefits from reform</i>
<i>Incentive regulation</i> The current incentive regulation regime encourages businesses, especially state-owned ones, to build too much.	Ensure that state-owned network service providers obtain financing (both debt and equity) at rates that reflect the risk of the investment. The AER should use a long-term trailing average to estimate the debt risk premium and the risk-free rate.	Incentive regulation would be more effective at encouraging efficient investment.
<i>Governance of NEM institutions</i> AER governance arrangements are not clear. There are mixed perceptions about the capacity of the AER to fulfil its current obligations. Future reforms would only add to these obligations. Other bodies need periodic review.	The AER to issue a separate annual report; have administrative control over its budget and resources (including a capacity to acquire specialist expertise); publicly reveal its strategies for improving its performance; negotiate resource sharing agreements with other agencies as it feels appropriate; strengthen and retain its specialist expertise; and develop a program for regular consultation with all stakeholders. All NEM institutions should be reviewed by 2018 and, thereafter, at regular 10 yearly intervals.	Ensure effective performance of the AER, AEMC, AEMO and the new consumer advocacy body.
<i>Benchmarking</i> Information asymmetries make it difficult for the regulator to accurately assess the efficiency of businesses' proposals.	Benchmarking is currently too unreliable to set regulated revenue allowances, but could better inform the regulator's decisions. In the future (after the rigour and accuracy of benchmarking improves), reforms could be made to underpin negotiations for 'early settlements' with businesses, and potentially to base allowances on benchmarking.	Better information could improve the accuracy and effectiveness of incentive regulation, lowering prices to consumers. Additionally, in the future, lengthy regulatory determinations could be avoided, reducing compliance costs.
<i>Interconnectors</i> There is no evidence of insufficient physical capacity of interconnectors at present. Indeed, they are sometimes underutilised due to perverse incentives in the structure of the wholesale market. Underutilisation may often coincide with periods of peak demand when the interconnectors would be most valuable.	Reform the wholesale market to influence generator bidding behaviour, and change the way they pay for access to the transmission network. Ensure intra-regional transmission networks are planned to optimise the use of interconnectors. Implement a short-term congestion pricing mechanism as the precursor to the potential adoption of the 'optional firm access' package currently being considered by the AEMC. In the long term, the potential for 'nodal pricing' with a system of financial transmission rights should be considered, pending a review of its merits compared with the firm access arrangements.	Generator bidding behaviour (and locational choices) would be more closely aligned to efficient levels. In the long term, this would allow better flows along interconnectors; improve certainty in (electricity) financial markets; and improve interconnector planning. Introduction of 'optional firm access' would lead some transmission investments becoming market-driven, improving the alignment of investment expenditure with user benefits. The networks on either side of an interconnector would be better designed to help utilise its full potential.

Table 2 The timing of reform

<i>Timing</i>	<i>Measure (and corresponding recommendations)</i>
Already underway	<ul style="list-style-type: none"> • Changes to incentive regulation were made in a Rule change in November 2012, but the AER must develop guidelines to give effect to some of these (r. 5.2).
Initiate now	<ul style="list-style-type: none"> • SCER to commit to more speedy reform and acceleration of the current review into transmission and distribution reliability (r. 21.7, 21.8). • SCER to establish an accelerated process for Rule changes where policies arise from the recommendations of independent and appropriately undertaken reviews (r. 21.6). • Ensure guidelines for the WACC take account of long-run conditions (r. 5.1). • State and territory governments to phase out retail price regulation, subject to effective retail competition (r. 12.2). • State and territory governments to introduce feed-in tariffs that reflect the value of providing power to the grid at peak and non-peak time (r. 13.1). • The AER to: <ul style="list-style-type: none"> – at this stage, use aggregate benchmarking to inform (but not use as the exclusive basis for) determinations (r. 8.1, 8.5) – begin (ongoing) development of detailed benchmarking performance and control variables, with periodic review for relevance and compliance costs (r. 8.2, 8.3, 8.6, 8.8, 8.9, 8.10, 8.12). Benchmarking results and data to be public (r. 8.7, 8.11) – be given greater control over, and accountability for the resourcing and management of its functions (r. 21.1). • AEMO to: <ul style="list-style-type: none"> – review the technical aspects of probabilistic planning, in consultation with network businesses and experts (r. 16.5) – assist the AER in its compliance and auditing of transmission networks (r. 16.6) and act as planner of last resort where it considers underinvestment could expose the network to serious reliability problems (r. 16.7) – oversee the contestability arrangements for the connection of new generators to the NEM (r. 16.10). • Transmission businesses that do not already use them should transition to dynamic capacity ratings (r. 16.9). • Amend the Rules so smart meter investment can be part of regulatory determinations for distribution businesses (r. 10.3).
By end 2013	<ul style="list-style-type: none"> • Reliability standards in the NEM to be based on the value customers place on reliability (r. 14.1) and AEMO to commission the Australian Bureau of Statistics to undertake surveys to identify the value of customer reliability (r. 14.2). • SCER to develop common criteria for assistance to vulnerable consumers (r. 11.8). • Change the RIT-D and finalise advanced metering infrastructure standards (r. 10.1 and r. 10.2). • The AER to complete a review of the Service Target Performance Incentive Scheme for transmission to ensure consistency with the new reliability framework (r. 16.8); and amend the Service Target Performance Incentive Scheme for distribution (r. 15.2) and move to determinations based on revenue caps (r. 12.1). • A short-term congestion pricing mechanism be introduced as a precursor to the 'optional firm access' package of reforms (r. 19.1). • The proposed new National Energy Consumer Advocacy Body should have certain characteristics, including adequate funding and expertise (r. 21.5).

(continued on next page)

Table 2 continued

<i>Timing</i>	<i>Measure (and corresponding recommendations)</i>
2013–2018	<ul style="list-style-type: none"> • SCER to remove jurisdiction-specific distribution reliability requirements. Distribution reliability settings to be contained in the Service Target Performance Incentive Scheme, with the reliability settings driven by consumer preferences (r. 15.1). • Undertake the 2014 review of the AER, and in a 2018 review, consider further changes, including to its location within the ACCC (r. 21.2, r. 21.3). • AEMO to take on the role of a national transmission reliability setter, using probabilistic planning and a cost–benefit framework for the entire NEM network to set standards at the connection point level (r. 16.1, 16.2). • Transmission businesses to plan reliability investments and be subject to a RIT-T for large projects (r. 16.3, r. 17.1, 17.2, 17.3, 17.4, 17.5). • The AER to review the adequacy of AEMO’s transmission standard setting role (r. 16.4). • State and territory governments to adopt a single set of licence conditions for network businesses, expressed in the National Electricity Rules and administered by the AER (r. 11.2, 11.3, 11.4). • Time-based network charges to be implemented after guideline development, consultation and policies for vulnerable consumers (r. 11.1, 11.5, 11.6, 11.7, 11.8, 11.9). • Complete phase out of retail price regulation by 2015 (r. 12.3). • State and territory governments should privatise network businesses (r. 7.1), after announcing the new reliability framework, ensure adequate communication to all stakeholders, and follow a coherent privatisation pathway (r. 7.3). If not, they should improve the governance of those businesses (r. 7.2). • Subject to the completion of cost–benefit analyses, the AEMC’s ‘optional firm access’ package to be implemented by 2018. It should: <ul style="list-style-type: none"> – operate for at least 10 years – be monitored by AEMO for effects on network planning and, in concert with the AER, for changes in observed patterns of generator bidding behaviour. AEMO should also provide information to applicants for firm access relating to the (long term) upgrades required, and benchmark indicators of their cost (r. 19.2). • Incentives for more efficient investment in distributed generation (r. 13.1) would be created by: <ul style="list-style-type: none"> – fully phasing out subsidies that stimulate inefficient investment in and positioning of rooftop photovoltaic units (but existing feed-in contracts should be honoured) – distribution businesses remunerating distributed generation providers at a level that reflects the network value of the distributed generation capacity and output. • Review the AEMC, AEMO and the proposed new National Energy Consumer Advocacy Body by 2018, and, thereafter, review these institutions and the AER at 10 year intervals (r. 21.4).
2019	<ul style="list-style-type: none"> • If benchmarking becomes robust enough, and where the divergence between estimates is narrow, the AER to have discretion to reach a mutually acceptable negotiated settlement with a network business, with the involvement of the representative consumer body (r. 8.4).
2028	<ul style="list-style-type: none"> • Conduct a review to consider whether the introduction of nodal pricing is warranted on cost–benefit grounds, or if other reforms (such as alterations to the ‘optional firm access’ model) offer greater benefits (r. 19.3).

Recommendations and findings

The process for reform is part of the problem and must change

RECOMMENDATION 21.7

The Standing Council on Energy and Resources should reform its processes and decision making so that critical policy reviews of the National Electricity Market, the corresponding changes to the National Electricity Rules, and their implementation occur in a timely fashion.

RECOMMENDATION 21.6

The National Electricity Law should be amended to require the Australian Energy Market Commission (AEMC) to accelerate the process for making Rule changes within six months where they:

- *are requested by the Standing Council on Energy and Resources, and*
- *arise from the recommendations of an appropriately conducted independent review, including previous AEMC reviews, relevant to the National Electricity Market.*

RECOMMENDATION 21.8

The Standing Council on Energy and Resources (SCER) should convert the current Australian Energy Market Commission's (AEMC's) review of distribution and transmission reliability into an accelerated Rule change process (as set out in recommendation 21.6) to be completed by December 2013. SCER should request the AEMC to draw on the Productivity Commission's recommendations 15.1, and 16.1 to 16.7, as well as the quantitative assessment of the benefits of the recommended reforms, in formulating the proposed Rule changes.

The institutions need to change too

RECOMMENDATION 21.1

The Australian Energy Regulator should have greater control over, and accountability for, the resourcing and management of its functions. It should:

-
- *submit a separate annual report of its performance*
 - *have administrative control over its own budget, which would need to be adequate for it to manage its functions efficiently and effectively, including acquiring, developing and retaining the necessary specialist expertise*
 - *publicly reveal its strategies for addressing current stakeholder concerns and those raised in future stakeholder surveys*
 - *have an independent capacity to negotiate resource sharing arrangements with a range of agencies, not just the Australian Competition and Consumer Commission*
 - *ensure that it strengthens and retains the necessary specialist expertise to competently carry out its role, in accordance with recommendation 8.6*
 - *develop a program for regular ongoing communication and interaction with network businesses, their customers and other relevant stakeholders, with those interactions not just confined to periods of regulatory determinations.*

RECOMMENDATION 21.2

The 2014 independent review of the resourcing and capacity of the Australian Energy Regulator (AER) should be undertaken by a small group of senior and experienced persons.

- *These persons should be external to the Australian Competition and Consumer Commission and the AER, have an appropriate understanding of the competencies required to undertake utility regulation, and include some contemporary international experience from counterpart regulators.*

The review should, among its other tasks:

- *specifically address any difficulties the AER has in attracting and retaining specialist staff*
- *consider the commissioning of an independent stakeholder survey covering the relevant review issues*
- *consider funding options for the AER.*

RECOMMENDATION 21.3

The Australian Energy Regulator (AER) should remain located within the Australian Competition and Consumer Commission (ACCC). However, a follow-up independent review should be carried out in 2018 to examine if the reforms to the AER's resourcing and transparency (recommendation 21.1) have had the desired impacts. If not, the issue of the AER's structural separation from the ACCC should be examined together with other possible changes to improve its performance.

The operation and performance of the Australian Energy Market Commission, the Australian Energy Market Operator and the proposed new National Energy Consumer Advocacy Body should be independently reviewed by 2018 to identify opportunities for improvements. All these institutions and the Australian Energy Regulator should be reviewed at least at 10 year intervals after that time.

Consumers need a clear voice in the regulatory regime

The new National Energy Consumer Advocacy Body proposed by the Standing Council on Energy and Resources should:

- *have expertise in economic regulation and relevant knowledge and understanding of energy markets*
- *represent the interests of all consumers during energy market policy formation, regulatory and rule-making processes, merits reviews, and negotiations with providers of electricity networks and gas pipelines*
- *subsume the role of the existing Consumer Advocacy Panel into its broader functions, but only provide grants to consumer bodies where the research proposal is judged to have merit and unlikely to proceed without some government funding*
- *ultimately subsume the role of the Consumer Challenge Panel*
- *receive adequate ongoing funding through a levy on market participants, drawing on the approach used to currently fund the Consumer Advocacy Panel*
- *have a governance structure that involves an expertise-based board of members appointed on merit, and an advisory panel to give the board advice on the needs of the mix of customers concerned*
- *be independent from the Australian Energy Regulator.*

The recently commissioned independent review into the best design of the National Energy Consumer Advocacy Body should take these recommendations into account.

Effective demand management requires pricing and other regulatory reform

RECOMMENDATION 10.2

The Standing Council on Energy and Resources should finalise a minimum technical standard for advanced metering infrastructure, including smart meters, which should:

- *ensure that distribution businesses and other parties can purchase off-the-shelf equipment from global manufacturers of smart meters with no, or minimum, modification*
- *incorporate capacities for:*
 - *interoperability with add-on technologies that distributors, retailers and third parties wish to offer customers*
 - *open access to information for distributors, retailers and third parties, subject to privacy provisions*
 - *direct load control.*

RECOMMENDATION 10.3

The National Electricity Rules should be amended so that distribution businesses would be able to include the rollout of advanced metering infrastructure, including smart meters, as an eligible category in their regulatory revenue proposals to the Australian Energy Regulator. During the regulatory period, distribution businesses should be able to decide on the timing, location and number of smart meters in any rollout. These changes should be accompanied by:

- *engagement with consumers and retailers about the process, and the implications of smart meters for them*
- *the development of an incentive program by the Australian Energy Regulator that takes account of the benefits of smart meters:*
 - *in reducing network expenditures in subsequent regulatory periods*
 - *accruing to others in the energy supply chain*
- *time-based network charges to retailers (recommendation 11.1)*
 - *options for direct load control.*

RECOMMENDATION 10.1

The Regulatory Investment Test for Distribution in the National Electricity Rules should be altered so that a preferred investment option cannot have costs that exceed the benefits. The current \$5 million threshold value and the use of exemptions should be reviewed if the test imposes unjustifiably high compliance costs on distribution businesses, the Australian Energy Regulator and other parties.

RECOMMENDATION 11.1

The Standing Council on Energy and Resources should oversee the progressive implementation of cost-reflective, time-based pricing for distribution network services, predicated on the long-run marginal costs of meeting peak demand. Amongst other things, the Council should:

- *following consultation with key stakeholders, set timelines for the various steps in the development and implementation process, having regard to:*
 - *the Commission’s proposed process (recommendations 11.2 to 11.9)*
 - *progress in making necessary changes elsewhere in the system*
- *monitor compliance with those timelines*
- *address any areas where greater engagement between key stakeholders (distribution businesses, retailers, state and territory governments, the Australian Energy Regulator and customer representatives) would assist the expeditious implementation of the new pricing regime*
- *if and as necessary, take specific steps to address implementation delays.*

RECOMMENDATION 11.2

The Standing Council on Energy and Resources should initiate a process to establish uniform licence conditions for all transmission and distribution network businesses in the National Electricity Market.

- *The uniform licence conditions should have regard to the Commission’s proposed changes to the reliability framework (recommendations 15.1 and 16.1) and should not conflict with, or impede, the implementation of that framework.*
- *The uniform licence conditions should be included in the National Electricity Rules and replace the current state and territory licence conditions.*

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- *Standardised provisions governing technical standards and safety should ultimately be encompassed in the national licence conditions, but with a transition to recognise the practical implementation difficulties of any rapid changes in this area.*

The Council should task the Australian Energy Market Commission to undertake a framework review to assist the transition to uniform licence conditions.

- *The supporting framework review should clearly spell out the justification for any jurisdiction-specific conditions included in the new licensing regime.*

RECOMMENDATION 11.3

Before incorporation into national licence conditions, preparatory work should be undertaken to develop a common approach to the identification of customers in need of special support to meet their electricity bills (recommendation 11.8).

Pending agreement on appropriate national criteria and approaches to funding, each state and territory government should continue to be responsible for targeted financial support to address affordability.

RECOMMENDATION 11.4

The Australian Energy Regulator should be responsible for ensuring compliance with most new licence conditions, with the exception that a relevant independent national, state or territory regulator should have responsibility for compliance with national safety licence conditions.

- *The Australian Energy Regulator would still oversee any economic incentive schemes relating to safety and would need to ensure that revenue determinations took into account the agreed national safety standards.*

The Australian Energy Regulator should be given authority under the National Electricity Rules and the National Electricity Law to:

- *issue and revoke licences*
- *seek advice from relevant agencies on any technical matters relating to compliance assessment.*

RECOMMENDATION 11.5

When the process of implementing cost-reflective, time-based prices for distribution network services is sufficiently advanced, the National Electricity Rules should be amended to:

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- *ensure that any time-based tariff is determined by (rather than ‘take into account’) a reasonable estimate of the long-run marginal cost for the service concerned*
 - *ensure that the grouping of customers for the purposes of setting time-based tariffs is based on economic efficiency (rather than ‘having regard to’ it)*
 - *make it explicit that significant differences in the long-run marginal cost of meeting peak demand between locations and across customer groups should be reflected in network pricing structures*
 - *with any deviation from this principle arising from any state or territory government decisions about community service obligations transparently funded by the relevant jurisdiction.*

RECOMMENDATION 11.6

When the process of implementing cost-reflective, time-based prices for distribution network services is sufficiently advanced, the requirements governing assessments by the Australian Energy Regulator of pricing proposals by distribution businesses should be amended such that the regulator:

- *can only approve a distribution business’s peak demand forecasts if they include reasonable estimates of the likely demand response to critical peak time-based pricing*
- *subject to the above condition, must approve any reasonable estimate by a distribution business of the long-run marginal costs of meeting peak demand.*

To support these changes, the Australian Energy Regulator should develop a capacity to model demand responsiveness to time-based pricing.

RECOMMENDATION 11.7

The National Electricity Rules should be amended to:

- *require the Australian Energy Regulator to publish guidelines on the appropriate methods for estimating the long-run marginal costs of meeting peak demand, and the factors that should be encompassed in those estimates*
- *give the Australian Energy Regulator the authority to publish guidelines about efficient, time-based tariff structures, including definitions of ‘peak’ pricing events.*

These guidelines should be developed in consultation with the relevant stakeholders and should be improved over time as the implementation of time-based pricing progresses.

RECOMMENDATION 11.8

The implementation of cost-reflective, time-based pricing for distribution network services should be accompanied by assistance for vulnerable consumers, which should target those who:

- *are potentially exposed to large price increases and who do not have reasonable opportunities to switch their demand to non-peak periods*
- *will potentially face significant difficulty in meeting the fixed component of network charges.*

The Standing Council on Energy and Resources should develop common criteria for identifying who should receive such assistance and how it should best be delivered. These criteria should be based on the outcomes of a review commissioned by the Council of Australian Governments of concessions for utility services across all levels of government (consistent with recommendation 8.1 of the Productivity Commission's Urban Water Sector report).

These criteria, and a commitment to transparent funding of the electricity sector-specific support, should then be reflected in the new National Electricity Market-wide licence conditions for network businesses (recommendation 11.2).

RECOMMENDATION 11.9

The Australian Energy Regulator should require:

- *distribution businesses to demonstrate that they have actively engaged with retailers very early in the development of new time-based pricing structures, including on ways to incorporate those charges in retail prices to clearly signal to customers the costs of meeting peak network demand*
- *distributors and retailers to demonstrate that they have engaged with, and educated, customers prior to the introduction of smart meters, and again prior to the introduction of new time-based tariffs. Such engagement should occur sufficiently early to ensure that customers have been:*
 - *given sufficient information and time to respond appropriately to time-based pricing (including of the various means to manage their peak demand)*
 - *informed about the implications for their electricity bills*
 - *given clear guidance about the way in which advance warning of critical peak pricing events will be communicated*

-
- *provided with support mechanisms in the event that the new pricing regime creates financial difficulties for them.*

RECOMMENDATION 12.1

The Australian Energy Regulator should use revenue caps, rather than weighted average price caps, in the regulation of all distribution businesses.

RECOMMENDATION 12.2

State and territory governments should implement, as soon as practicable, any advice from a retail competition review by the Australian Energy Market Commission to remove retail price regulation, and/or undertake consumer awareness measures and structural reforms to improve the effectiveness of retail competition.

RECOMMENDATION 12.3

The Standing Council on Energy and Resources, in consultation with the Australian Energy Market Commission, should revise the current timetable for retail competition reviews to enable all retail price regulation to be removed no later than 2015.

RECOMMENDATION 13.1

Governments should, as soon as practicable, discontinue subsidies for rooftop photovoltaic units and other forms of distributed generation delivered via feed-in tariffs and the small-scale component of the Renewable Energy Target scheme.

State and territory governments should change the way small-scale distributed generators are reimbursed by:

- *instituting arrangements for network businesses to remunerate such generators at a level that reflects the savings in network costs from distributed generation capacity and output, particularly taking into account the extent to which distributed generation reduces the requirements for peak network capacity*
- *setting feed-in tariffs that approximate the wholesale price of electricity at times of peak and non-peak demand.*

To provide a transition to the new arrangements, current feed-in tariff schemes should continue for existing customers until the end of their contract period or until those schemes expire (whichever is earlier), but be closed to new entrants one year from the governments' formal acceptance of this recommendation. Prior to that date, state and territory governments should develop replacement feed-in schemes with tariffs that approximate the wholesale price of electricity.

Network expenditures are inefficient

RECOMMENDATION 5.1

The Australian Energy Regulator should consider the use of long-term trailing averages to estimate the debt risk premium and risk-free rate used in the calculation of the weighted average cost of capital.

RECOMMENDATION 5.2

Where the Australian Energy Regulator considers that the National Electricity Rules constrain its capacity to make appropriate revenue determinations, it should publish its preferred estimate along with the final determination, explaining the differences. In any subsequent merits review of its determination, the Australian Energy Regulator should ensure that the reasons behind its preferred estimate are clearly communicated to the merits review body.

Using benchmarking in incentive regulation could improve efficiency

RECOMMENDATION 8.1

The Australian Energy Regulator's regular aggregate benchmarking of the performance of network businesses should include comparisons of:

- *multifactor productivity — the output of services for given inputs*
- *separate productivity of capital, labour and intermediate inputs.*

The results should control, to the best extent available, for any significant variations in the operating environments of the businesses, including customer density, line type and length, reliability requirements, and the age of relevant capital assets.

RECOMMENDATION 8.2

Subject to compliance and other costs (recommendation 8.12), the Australian Energy Regulator should accompany aggregate analysis with detailed benchmarking of particular aspects of the performance of the businesses, including:

- the rate of investment relative to the age-weighted capital stock by asset class*
- the efficiency of major maintenance activities*
- the adoption rate of best-practice commercial processes and equipment, including the use of customer panels and surveys, outsourcing, demand management, information technologies, financial controls, procurement practices, occupational safety, and project management.*

In determining relevant benchmarking performance and control variables, the Australian Energy Regulator should consult with:

- network businesses, generators, retailers and network equipment suppliers*
- customer representatives*
- relevant experts within Australia and internationally.*

RECOMMENDATION 8.3

The Australian Energy Regulator should periodically assess the comparative performance of network business units within particular sub-regions of the National Electricity Market, where:

- those sub-regions share similar physical operating environments*
- the costs and informational requirements of doing this are not too great (recommendation 8.12).*

The comparisons should relate to units within a particular business, as well as comparable units in different businesses.

The Australian Energy Regulator should place most emphasis on comparisons of the efficiency of distribution networks in metropolitan areas.

RECOMMENDATION 8.4

When benchmarking is sufficiently reliable, the National Electricity Rules should be changed to allow the Australian Energy Regulator (AER) to have the discretion to initiate a three-way negotiation of a mutually acceptable settlement. This should involve itself, the network business and the representative and qualified customer body identified in recommendation 21.5:

-
- *Negotiation would only be triggered if the AER judged that the divergence between aggregate benchmarking estimates of forecast spending and the business's proposal were sufficiently narrow.*
 - *Where an agreement was successfully negotiated using this process, the AER should not be obliged to go through the current formal draft/final determination processes.*

RECOMMENDATION 8.5

In any of the next rounds of regulatory determinations, the Australian Energy Regulator should not use aggregate benchmarking as the exclusive basis for making a determination. Instead, it should use aggregate benchmarking as a diagnostic tool in responding to business cost forecasts.

RECOMMENDATION 8.6

The Australian Energy Regulator should develop and maintain appropriate benchmarking databases and in-house expertise for the technical analysis required to undertake sophisticated benchmarking.

RECOMMENDATION 8.7

The Australian Energy Regulator should make all benchmarking input data publicly available (recognising that the businesses being benchmarked are regulated monopolies) except where the data can be demonstrated to be genuinely commercial-in-confidence.

Where the latter holds, the Australian Energy Regulator should still make the full datasets available to:

- *independent researchers who are using the results for non-commercial purposes*
- *the consumer body involved in any negotiations described under recommendation 8.4.*

Provision of data should be subject to statutory requirements for non-disclosure of information predetermined as commercial-in-confidence, drawing on existing models for data protection.

RECOMMENDATION 8.8

When making its revenue allowance determinations, the Australian Energy Regulator should make judgments about capital expenditure forecasts that take account of:

-
- *any discrepancy between the Australian Energy Market Operator's top-down demand forecasts and the aggregate of network businesses' bottom-up demand forecasts*
 - *any discrepancy between previous expenditure forecasts and actual outcomes by different parties.*

RECOMMENDATION 8.9

The Australian Energy Regulator should collaborate with other leading regulators, academic experts and global commercial benchmarking specialists to enable robust meta-analysis of electricity network benchmarking results from individual country (and where credible, multi-country) studies. The collaboration should include cooperation in developing:

- *the most meaningful measures of performance*
- *consistent data collection*
- *consistent reporting of results*
- *best-practice analytic frameworks.*

RECOMMENDATION 8.10

The Australian Energy Regulator should submit its major benchmarking analyses of electricity networks for independent expert peer review to establish their ongoing relevance, scientific validity, adoption of best-practice, and to gauge the degree of uncertainty in the results.

RECOMMENDATION 8.11

The benchmarking analysis produced by the Australian Energy Regulator should include:

- *accessible reporting of the results to inform consumer groups, network businesses, and others*
- *disclosure of the importance of factors outside the control of businesses, but that may be controllable by governments*
- *publication of the modelling strategy used to produce the results*
- *the sensitivity of the results to changes in key assumptions*
- *the performance of any statistical models against accepted scientific standards, including confidence intervals, parameter stability, and specification testing.*

RECOMMENDATION 8.12

The Australian Energy Regulator (AER) should periodically examine its benchmarking methodologies and processes — with input from an independent expert referee — to assess their usefulness in the determination process and the costs they impose on stakeholders. It should compare these costs with the likely benefits when determining the appropriate frequency and type of detailed benchmarking. In undertaking such assessments, the AER should consult closely with network businesses.

The AER should make all such assessments publicly available.

State-owned enterprises are part of the efficiency problem

RECOMMENDATION 7.1

State and territory governments should privatise their government-owned network businesses.

RECOMMENDATION 7.2

If state and territory governments do not implement recommendation 7.1, then they should promote more efficient outcomes for their government-owned network businesses by ensuring that:

- *directors are appointed on merit, following a transparent selection process*
- *ministerial directions are publicly disclosed at the time they are made and are also disclosed in the annual report*
- *directors and officers are subject to the obligations under the Corporations Act*
- *governments review objectives currently given to network businesses and:*
 - *remove those that would be more appropriately allocated to other agencies*
 - *remove those that are non-commercial and make it clear that the board is expected to deliver a dividend payout and rate of return on the equity invested in the network business that would be considered acceptable by a commercial investor*
 - *where conflicting objectives remain, provide publicly transparent guidance on how to prioritise them.*

RECOMMENDATION 7.3

In giving effect to recommendation 7.1, governments should:

- *be guided by the overarching objective of maximizing the net benefit to the community, with clear identification and prioritisation of any subsidiary goals*
- *undertake key regulatory reforms prior to sale*
- *avoid the transfer to the new owner of unjustified liabilities, obligations or restrictions that may inhibit the future efficiency of the business*
- *establish an expert unit within the relevant treasury to oversee the process, and develop clear milestones and a timetable*
- *undertake genuine consultation with the public and key affected groups, including likely beneficiaries, accompanied by effective communication of the benefits of privatisation*
- *ensure adequate accountability through independent auditing of the privatisation process.*

Reliability standards are mostly too high

RECOMMENDATION 14.1

Reliability standards throughout the National Electricity Market should be based on the value that customers place on network reliability.

RECOMMENDATION 14.2

The Australian Energy Market Operator (AEMO) should commission and pay the Australian Bureau of Statistics to undertake regular, detailed, disaggregated surveys based on best practice methodologies to reveal the value of reliability for different categories of customers, with the methodologies and results made public.

AEMO should commission suitably qualified experts to consider and measure the costs of interruptions not likely to be captured in the Australian Bureau of Statistics surveys. This should include the costs associated with citywide disruptions, including to telecommunications, water services and public transport, and the resulting loss of international reputation from lower reliability. AEMO should use these measures to supplement the results of the surveys.

RECOMMENDATION 15.1

All jurisdictions should adopt the Australian Energy Regulator's Service Target Performance Incentive Scheme as the basis for setting efficient reliability requirements for distribution businesses. The Scheme should replace all existing jurisdiction-specific distribution reliability requirements.

RECOMMENDATION 15.2

The Australian Energy Regulator should make the following amendments to the Service Target Performance Incentive Scheme:

- *reliability performance targets for the system average interruption duration index, system average interruption frequency index and momentary average interruption frequency index should be adjusted annually, according to a rolling five-year average of annual performance*
- *incentive payments for deviations from the reliability performance targets should reflect the preferences of customers by using the estimated values of customer reliability, as spelt out in recommendation 14.2, and should be specific to the distribution business*
- *revenue at risk should be negotiated as part of the Australian Energy Regulator's revenue determination process*
- *the reporting and information component of this scheme should require distribution businesses to report their reliability performance at the zone substation level. Worst performing feeders should be identified as part of this process*
- *reporting by all distribution businesses of performance against the parameters in the scheme should be published annually and be at least as detailed and comprehensive as current reporting mechanisms for distribution businesses in Victoria.*

RECOMMENDATION 16.1

The Standing Council on Energy and Resources should, in consultation with the Australian Energy Market Operator and the Australian Energy Market Commission, develop a National Electricity Market-wide transmission reliability framework in which reliability settings would be determined by customer preferences (recommendation 14.1).

This framework should replace all jurisdiction-specific transmission reliability settings.

A new approach to transmission reliability planning should be adopted. The Australian Energy Market Operator (AEMO) should carry out probabilistic cost–benefit transmission planning for all transmission networks in the National Electricity Market in order to set reliability standards and demand forecasts at each connection point. AEMO should:

- *use Values of Customer Reliability (as obtained through recommendation 14.2)*
- *use best practice probabilistic processes in its cost–benefit analysis of efficient standards*
- *make public all methodologies, parameters, data and other inputs used in the analysis*
- *work closely with each of the transmission companies concerned to make sure that their experience and input is fully understood and, where mutually agreed, appropriately incorporated into the analysis*
- *work closely with the relevant distribution companies in determining demand forecasts and cross checking the reliability settings for each connection point*
- *use its best estimate of peak demand forecasts, having sought input from all relevant stakeholders*
- *set standards reflecting the probabilistic analysis at the connection point level throughout the National Electricity Market.*

The regional transmission network service providers should plan necessary augmentation and replacement investments with reference to the reliability standards set by the Australian Energy Market Operator (AEMO) and the National Transmission Network Development Plan. This should have two components.

For augmentation and replacement projects below a threshold value:

- *the regional transmission network service provider should submit plans and seek funding for investments to meet reliability standards as part of the ex ante revenue determination process with the Australian Energy Regulator (AER), but could, ex post, decide to solve reliability problems in any way it decided was most efficient.*

For augmentation and replacement projects above a threshold value:

-
- *the regional transmission network service provider should submit details and seek funding of investments to meet reliability standards as part of the improved Regulatory Investment Test for Transmission process under which the AER would approve the allowable expenditure, having taken advice from AEMO.*

At the next regulatory reset, the actual capital spent on such projects should be included in the transmission business's Regulatory Asset Base, subject to any ex post review if expenditures exceeded the allowable revenues as set out in the approved Regulatory Investment Test for Transmission. If an ex post review identified instances of over-expenditure linked to inefficiently timed capacity increases, inclusion of the over-expenditure in the Regulatory Asset Base should be deferred until such time that the additional capacity would have been net beneficial. For cost overruns, only the efficient investment spend should be included in the Regulatory Asset Base.

RECOMMENDATION 16.4

The Australian Energy Regulator should ensure that, in the Australian Energy Market Operator's role as a transmission standard setter, its public reporting and planning processes are adequate, transparent and meet the National Electricity Objective.

RECOMMENDATION 16.5

The Australian Energy Market Operator (AEMO) should review and, where necessary improve, the technical aspects of its probabilistic processes, particularly those relating to low-probability, high-risk events. In undertaking the review, AEMO should closely consult with network businesses and seek independent peer review of its technical methods.

RECOMMENDATION 16.6

Where necessary, the Australian Energy Market Operator should assist the Australian Energy Regulator in its compliance and auditing of transmission networks, to ensure that the agreed projects are completed, appropriate maintenance and operational standards are being achieved, and intrinsic network reliability is maintained.

RECOMMENDATION 16.7

The Australian Energy Market Operator (AEMO) should act as the planner of last resort where it considers that underinvestment could expose the network to serious reliability problems, with the right to direct investment should AEMO believe that not to do so could seriously compromise the reliability of the National Electricity Market. The Australian Energy Regulator would act as an arbitrator in any disputes.

RECOMMENDATION 16.8

The Australian Energy Regulator should review the Service Target Performance Incentive Scheme for Transmission to ensure the incentives and targets are consistent with the recommended National Electricity Market-wide reliability framework.

RECOMMENDATION 16.9

Transmission businesses not already using dynamic capacity ratings on all critical equipment should transition to this approach.

RECOMMENDATION 16.10

The Australian Energy Market Operator (AEMO) should oversee the technical details of connection of new generators to the National Electricity Market to allow for contestability. AEMO should:

- on receipt of an application for connection from a generator determine, in consultation with the relevant transmission business, the details of the augmentation and upgrades to shared network infrastructure that would be required to implement the connection, as well as the detailed specifications that ensure that the safe operating state of the network is maintained. This would complement information provided by the transmission business. The transmission business would have the opportunity to review and provide commentary on AEMO's proposed specifications but AEMO would make the final decision on the required specifications*
- provide the specifications to enable the generator to seek tenders to build the connection assets.*

The Australian Energy Regulator should provide guidelines on the provision of information from transmission businesses to new connection applicants.

This framework should replace the existing arrangements in Victoria immediately and be implemented elsewhere in the National Electricity Market once Victorian arrangements are finalised and any regulatory barriers have been overcome.

RECOMMENDATION 17.1

The Regulatory Investment Test for Transmission process should be revised. The new test should continue to be performed by transmission businesses, but:

- be accompanied by parallel independent analysis from the Australian Energy Market Operator. This analysis should be published, and provided as advice to the Australian Energy Regulator (AER). The advice should have presumptive force in the AER's deliberations***
- be used by the AER as the basis for a revenue determination for the individual project in question, in a manner similar to the current 'contingent projects' process. The AER should assess and approve both the merit and process of the analysis.***

RECOMMENDATION 17.2

The revised Regulatory Investment Test for Transmission should apply to all large projects, subject to a uniform threshold value, whether augmentation, replacement or a combination of both.

RECOMMENDATION 17.3

The revised Regulatory Investment Test for Transmission, and the associated project-specific revenue determination, should be triggered when a project (or any of the considered options) exceeds a threshold value. In the first instance, this should be based on the current threshold for application of the full test (\$38 million), which should then be indexed over time to maintain its real value.

RECOMMENDATION 17.4

The Regulatory Investment Test for Transmission should be changed so that reliability is only assessed as a component of overall benefits and not as a separate criterion.

When a Regulatory Investment Test for Transmission is triggered for a major project, a full cost-benefit analysis involving a (public) probabilistic reliability assessment should be conducted.

RECOMMENDATION 17.5

The Regulatory Investment Test for Transmission should not be amended to include indirect effects of investment decisions.

Regulatory policy on interconnectors and transmission pricing should take a long-term view

FINDING 18.1

The available evidence suggests that, given the existing network conditions, the current physical capacity for interconnection is appropriate.

RECOMMENDATION 19.1

As an interim measure before the potential full introduction of the Australian Energy Market Commission's optional firm access package, a short-term congestion pricing mechanism as suggested by the Australian Energy Regulator should be introduced to the National Electricity Market.

RECOMMENDATION 19.2

Provided that cost-benefit analyses show net benefits (including incremental net benefits in moving from short-term congestion pricing), and once technical matters have been resolved, the Australian Energy Market Commission should commence implementation of the optional firm access package for generator access to the transmission network.

- *It should operate for a period of at least 10 years.*
- *The Australian Energy Market Operator (AEMO) should provide information to applicants for firm access and the Australian Energy Regulator relating to the (long-term) upgrades required, and benchmark indicators of their cost.*
- *Optional firm access should be monitored by AEMO for its effects on network planning and performance and, in concert with the Australian Energy Regulator, changes in observed patterns of generator bidding behaviour. Monitoring results should be made public annually.*

RECOMMENDATION 19.3

After the optional firm access package has been operational for 10 years, a review should be conducted to consider whether the introduction of nodal pricing is warranted on cost-benefit grounds, or if other reforms (such as alterations to the optional firm access model) offer greater benefits. The review should have particular regard to the structure of the National Electricity Market at the time, the views of consumers and other stakeholders, and any remaining barriers to the introduction of nodal pricing.