Incentives for network driven DSP

Energy Networks Association

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Executive summary

Our terms of reference

The Energy Networks Association (ENA) has engaged PwC to advise it on whether the regulatory framework leads to a positive or negative incentive for demand-side participation (DSP) projects.

More specifically, the ENA has asked us to examine the following broad questions:[1]

1 Are there particular characteristics of DSP projects that make them different to other projects NSPs undertake?

2 Does the national planning framework, including the Regulatory Investment Test (RIT), allow adequate cost/benefit evaluation of all DSP options, including those that go beyond the provision of regulated services?

The regulatory regime that has been assessed comprises the relevant components of the National Electricity Law (NEL) and the relevant components of the National Electricity Rules (Rules), principally chapters 5 and 6. It is noted, however, that the Australian Energy Regulator (AER) is provided with certain discretions under the regime, which includes to design certain schemes (like the 'efficiency benefit sharing scheme') and also to make decisions (for example, on a regulatory proposal). Accordingly, the AER's practice has also been assessed, with note made of where it is within the AER's power to remedy any shortcoming that we have found.

Overall conclusions

Our overall conclusions can be summarised as follows:

- There is a need for network businesses to undertake DSP projects as part of their regulated services. This need may persist for some time.
  - With fully efficient pricing, a market for DSP initiatives may emerge and the need for distributors to undertake active DSP as regulated projects may fall away. However, this market currently is immature and hampered by the lack of efficient pricing signals (requiring interval meters and removal of government moratoriums). Moreover, efficient pricing at the distribution level requires disaggregated pricing, which may take a long time to gain acceptance.
- The current regulatory framework supports efficient DSP, but there are elements of it that could be:
  - better understood and utilised, such as the effect of tariff basket price controls, the role of the Regulatory Investment Test-Distribution (RIT-D) and the functioning of incentive regulation
  - better tuned by balancing the incentives between capital and operating expenditure as much as possible, which the ENA is already promoting to the AEMC through its consideration of the AER's Rule changes on the framework for economic regulation, or

[1] It is relevant to note that this report was originally provided as an internal report to the ENA in February 2012. It has not been subsequently updated for any information or developments that might have arisen since that time.

  - subject to some refinement (i.e. minor rule changes).

- Even with these changes, under the regulatory framework, network businesses may not currently have the incentive to make the most socially-optimal investments in DSP projects because it only allows them to capture a portion of the benefits of reducing network costs.

  - There is an opportunity to put in place a new DSP incentive scheme that addresses this by effectively allowing network businesses to capture a portion of the benefits of reducing costs in other parts of the supply chain.

  - The AER already has the power to put this type of scheme in place.

- When doing so, there are a few design issues that would need to be addressed, in particular the extent to which it creates a general peak-demand incentive or is still closely aligned with the provision of the regulated network service.

Nature of demand side participation

What is demand side participation?

We interpret the DSP initiatives of interest to network business as those that improve the efficiency of electricity consumption in order to reduce the cost, or improve the performance, of network services. Such DSP initiatives should alter usage of networks at times of peak demand, thereby assisting to alleviate network constraints and capital expenditure requirements. However, such a measure may generate benefits outside of the network business (this concept is discussed further below).

What are the characteristics of demand side participation measures?

Network-related demand side participation measures comprise a range of potential measures, which include but are not limited to:

- Setting efficient prices for the use of the network (which requires interval meters) and possibly also providing technology to assist the customer to respond to those signals

- Paying customers in return for the network being permitted to reduce the customer's use at peak time (direct load control)

- Contracting for network support with an embedded generator, and/or

- Influencing a customer's pattern of use, either by influencing their appliance, installing power factor correction equipment or installing energy storage.

DSP initiatives may be undertaken once a particular constraint emerges, or may involve putting in place technology or undertaking preparatory measures that provide a greater capacity than otherwise to harness DSP once a specific constraint emerges ('broad based' measures). A mass roll-out of interval meters is an example of the latter.

The characteristics of the costs of DSP measures are:

- Broad-based (preparatory) measures – like rolling out interval meters – may involve an upfront expenditure with the expectation of future (uncertain) benefits
- Setting efficient prices is a low-cost activity once interval meters are in place
- Many initiatives may involve operating expenditure, such as payments made when demand response occurs:
  - If payments are made per demand response event, and if demand response is only sought when required, then the quantum of payments may be uncertain, and
- Initiatives may also require small amounts of capital expenditure, which would be heavily weighted towards IT expenditure (i.e., assets with short useful lives).

It is noted that, in general, a DSP measure may require a substitution between some or all of:

- Revenue receipts and capital expenditure (that is, changes to demand may allow capital costs to be reduced but also reduce sales)
- Between operating expenditure and capital expenditure, and
- IT expenditure (short asset lives) and network capital expenditure (long asset lives).

For DSP initiatives to create network benefits, some certainty with respect to the reduction in consumption is required, given that a benefit only arises if planners factor in the peak demand reduction. This is a challenge for some DSP initiatives at the current time.

However, a DSP initiative that creates a benefit for a network may generate benefits at the other levels of the supply chain. That is, a distributor initiative may avoid transmission and generation costs.

Transmission vs. distribution

DSP looks different at the transmission and distribution levels. Transmission businesses already set peak-demand-reflective prices, although distributors are constrained (through metering technology) in their capacity to pass these prices through to final customers. Moreover, the directly connected customers of transmission businesses (large consumers and generators) are much larger than at the distribution level, so that relative transaction costs are lower and sophisticated metering is already in place, although directly connected customers are few in number and typically account for a small proportion of total load.

Is there a limit to the DSP activities that network businesses should do?

Discussion of DSP initiatives by network businesses[2] is often controversial because retailers (and other competitive market participants) may view this as networks extending into activities that can be performed by a competitive market.

[2] We use the expression 'network businesses undertaking activities' to mean that those activities are undertaken as regulated services. An affiliate of a network business may (unless precluded expressly) undertake non-regulated activities as a competitive activity.

It is possible in the future that there may be no need for network businesses to undertake any DSP measures apart from setting efficient prices, with the competitive market inducing DSP if and when efficient. However, it is difficult for the market to produce efficient DSP until efficient prices are in place. Moreover there are substantial challenges to this occurring – interval meters are a prerequisite, government constraints on efficient pricing would need to be reconsidered and locational network prices would need to be set at a very granular level (and updated continuously as constraints emerge). Until that time, it would be inefficient for networks not to undertake active DSP initiatives.[3]

In this report we consider that network businesses should receive some of the benefit that their DSP initiatives create at the other levels of the supply chain. Our assumption is that network businesses would only seek to undertake DSP measures that are driven predominately by a network constraint or by measures that are directed to providing an enhanced means of responding to future network constraints. Having said that, we note that if a general peak-demand related incentive is applied to network businesses (as some have advocated) this would encourage DSP initiatives more generally, irrespective of whether there is a clear nexus to the network.[4]

Form of economic regulation in the NEM and DSP

Form of regulation

The economic regulatory framework in NEM can be described as the 'building block approach plus incentives plus regulatory obligations'.[5] This is achieved by:

- Setting controls over network prices during a periodic reset such that costs are expected to be recovered.
  - Setting prices to allow cost recovery provides the incentive and capacity for investment in the network over the long term.
- Putting in place financial incentive arrangements, whereby network businesses may earn a benefit or penalty if their performance is superior or inferior to the targets/benchmarks/forecasts.
  - These arrangements are intended to motivate the behaviour of network businesses to improve their performance and (where practicable) to make decisions that are optimal from society's point of view.
- Applying additional regulatory obligations.
  - The role of these measures (for economic regulation) is to 'fill in the gap' caused by either imperfections in the financial incentive arrangements or objectives that exist outside the economic regulation framework; such as safety requirements.

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3 We understand that one possible future is that we have interval meters and time of use prices for generation and networks, but that distribution prices continue to be set on a geographically averaged basis across a distributor's service area or large sections of that area, reflecting the political challenges of more disaggregated pricing. In this future, a clear justification would remain for distributors to undertake active DSP initiatives.

4 We address whether there is a legal limit to the activities that can be included in the cost base for direct control (standard control) services.

5 Ofgem used the term 'building block plus incentives' to describe its current approach to regulation during the 'RPI-X @ 20.com' review. The 'plus regulatory obligations' is more accurate in Australia (as well as the UK) given the existence of measures such the RIT-T and RIT-D, planning/reliability standards and like measures.

Questions for DSP

Whether the regulatory regime described above appropriately accommodates DSP initiatives requires a number of high-level questions to be answered, which include the following:

- Whether a network business would expect to recover the cost associated with a DSP initiative? This, in turn, depends upon how the AER would assess the relevant projects.
- Whether a network business would have a financial incentive to undertake a DSP project rather than a network alternative during the regulatory period (that is, irrespective of what was factored into the forecast)?
- Whether the regulatory obligations placed upon network businesses may favour (perhaps inadvertently) meeting those obligations using network options rather than DSP measures?

Our assessment of the NEM economic regulatory regime is structured against these broad questions below.

Assessment of the NEM economic regulatory regime

Expect to recover efficient cost

Our view is that the current regime provides the AER with the power to factor in the cost of efficient DSP projects to network prices during a periodic price/revenue cap review.

In particular, we consider that the AER has the power when applying the expenditure forecasting provisions in the Rules[6] to take account of the benefits that a network-driven DSP option is expected to create at other levels of the supply chain. We also consider that the AER is able to permit the recovery of a project that involves an upfront cost in order to enhance the capacity to use DSP measures to meet future constraints, even though no current constraint exists (i.e., broad-based measures). Similarly, the AER is empowered to grant allowances to 'experiment' with DSP measures, and has done so.

In addition, we observe that there is no obvious constraint as to which assets or activities can be treated as costs associated with direct control (standard control) services. The rules regulate the provision of services rather than assets/activities, and so the relevant question when considering whether a cost can be recovered through regulated prices is the purpose of the expenditure rather than the type of expenditure.

We note that there are some second-order potential biases against DSP options, which are as follows.

Certainty of recovery of capital and operating costs

When network businesses incur network capital costs, they face some risk of cost recovery for a defined period under the incentive arrangements;[7] however, after

6 Rules 6.5.6 and 6.5.7 (distribution) and rules 6A.6.6 and 6A6.7 (transmission).

7 That is, a change in operating or capital expenditure compared to the forecast will be result in the network business receiving a benefit or cost during a regulatory period (and longer where an efficiency benefit sharing exists); however, after the next price review (or after any incentive scheme has ended) the business will be restored to a position of cost recovery.

that period, recovery is assured. In particular, actual expenditure is rolled into the regulatory asset base and a 'return on' and 'return of' that amount is added to revenue allowances in the future.

For distribution businesses, there is less certainty as to whether businesses would recover payments under an ongoing non-network arrangement (i.e., operating expenditure) in future regulatory periods. This is because:

- the AER is permitted to question the prudence of the expenditure at each price review, and
- operating expenditure associated with non-network options may be uncertain – for example, if it comprises a payment when demand response or generation support is required.

In contrast, both of these matters have been remedied for transmission, because:

- the AER is required to permit the continued recovery of payments under an existing network support agreement,[8] and
- a cost pass-through of payments under an ongoing network support agreement is permitted in the regulatory periods after the period when the initiative commenced.[9]

The first of these issues for distribution may not be significant – the AER's preferred method is to forecast future expenditure by commencing with the outturn actual amount – although it would be straightforward to fix (applying the transmission model). The second issue also could be remedied in the same manner that it has for transmission businesses if these payments are considered uncertain. **Providing enhanced certainty of recovery of DSP operating expenditure under an ongoing DSP agreement would require a change to the Rules.**

Forecasting demand

Additional DSP measures may make forecasting demand more difficult, given that our knowledge on how customers respond to different DSP measures is still growing. This reduced certainty of demand forecasts could lead to reduced certainty of recovery of cost where a price cap is applied. Additional uncertainty for demand is also flowing from other sources, including the commencement of the carbon price and the other government initiatives on energy consumption.

The best response to this uncertainty is for prices to be restructured to reflect cost, so that any change in revenue would be accompanied with a change in cost.[10] If cost reflective pricing is not possible – for example, if interval meters are not

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8 See rule 6A.6.6(c1)).

9 See rule 6A.7.2. This clause is the same having an ongoing adjustment for any difference between the forecast and actual payments.

10 To be clear, we do not think that well-targeted, network-driven DSP measures would create substantial additional revenue uncertainty for network businesses, even if prices are inefficient. This is because network-driven DSP should be targeting a reduction in consumption during peak periods, and so not have a substantial impact on revenue (and, with any revenue shortfall most likely being outweighed by the value of deferring network capital expenditure). This can also be the case for actions that encourage a more general reduction in consumption (such as energy efficiency measures or roof top PV installations). If the reduction in demand at peak time is sufficient to reduce the costs of meeting peak demand more than the revenue loss for the entire reduction in consumption more general these actions need not be inefficient. This does not hold, however, in a circumstance where a network has predominately energy-based charges and DSP measures reduce revenue without creating an offsetting reduction in cost. It is the spectre of measures that cause a general reduction in energy use without an offsetting cost reduction that provides a strong argument for the removal of any barriers to setting efficient, cost based prices, or to change the form of price control so that a reduction in energy use does not translate into a commensurate reduction in network revenue.

installed or government restrictions remain on cost-reflective pricing – then there may be merit in exploring alternatives to a tariff basket form of price control. One alternative is a hybrid form of price control, under which revenue is de-linked from prices and linked instead to more direct causes of cost (it takes the form of a revenue cap with a cost-driver element). **Exploring different forms of control is permitted under the rules, and a chance would only require a change to the AER's practice.**

Financial incentives for DSP

Our view is that the current Rules for distribution permit the AER to develop a regime that provides financial incentives for network businesses to engage in efficient DSP. For transmission, the regime could be enhanced by allowing for an efficiency benefit sharing scheme for capital expenditure, removing depreciation from the capital expenditure incentive arrangements, and by permitting a demand management incentive scheme.

We note, however, that substantial changes to how the AER applies the Rules would be required with respect to the design of incentives for demand management activities (we believe the Rules permit a network to be rewarded for benefits created outside of its network) and with respect to capital expenditure incentives.

We do not think that the application of a price cap form of price control or the service target performance incentive scheme create a bias against DSP initiatives.

Demand management incentive schemes

Allowing network businesses to obtain part of the benefit that its DSP initiative creates outside of its own network would improve the financial incentive for DSP activities within a regulatory period. For a distributor, this implies a share of the cost reductions that are caused at the transmission and generation levels.

We consider that such an incentive regime is permitted as part of a demand management incentive scheme for distributors, although such a scheme has not been applied by the AER to date.[11]

It may be that this scheme should be subject to a 'sunset' provision or mandatory review (for example, 10 years), reflecting the fact that the need for network businesses to undertake active DSP initiatives will depend upon how the market for these initiatives develops. A sunset or mandatory review may assist to gain broader acceptance of the stronger incentive scheme for DSP that is advocated here.

We observe that it is difficult to create incentives for network businesses to undertake DSP measures that involve an upfront cost in return for possible future benefit. However, this is a more general issue regarding the creation of incentives for innovation under a cost-based regulatory regime. **Projects with upfront cost and the expectation of expected future benefits can proceed under the current regime, but as a regulator-approved cost pass-through project.**[12]

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[11] To be clear, the AER has applied demand management incentive schemes, but none of these schemes provide a network with a share of benefits that a network-driven DSP initiative creates at different levels of the supply chain. We note, however, that businesses are responding to the existing incentives to DSP, even though the incentives may not at present be as strong as they could be.

[12] The AER has approved modest amounts of expenditure of an innovation-type for DSP for electricity. However, a comparable activity is generic marketing of natural gas (where the marketing expenditure is intended to generate greater utilisation and lower future prices). The AER has approved substantial network marketing allowances for the distributors in South Australia and New South Wales.

Operating and capital expenditure incentive schemes

For many DSP initiatives, there will be a substitution of operating expenditure for capital expenditure. Moreover, where DSP initiatives require capital expenditure, it may comprise a greater proportion of IT, which has a shorter economic life than the network assets for which it is substituting.

Currently the reward from reducing operating expenditure is higher than the rewards for reducing capital expenditure (the size of the reward is referred to as the 'incentive power'). This would normally create a direct bias against DSP initiatives (as they are largely operating expenditure). The AER has removed this direct bias by excluding DSP measures from the efficiency benefit sharing scheme (this aligns the incentive power of operating expenditure on non-network options to that of network capital expenditure).

However, this 'fix' is not perfect. Currently the reward that network businesses receive from reducing capital expenditure falls over the course of the regulatory period. This means that network businesses will have less incentive to reduce capital expenditure as the regulatory period progresses, including a reduced incentive to explore non-network options. An alternative remedy would be to improve the power of capital expenditure incentives so that the incentives to reduce capital costs are constant over the period (in effect, raising the incentive power for capital expenditure to the level of operating expenditure). **This is a general issue that is at the heart of the current Chapter 6 and 6A rule changes before the AEMC (noting that rule changes are only required for transmission, distribution merely requires a change in the AER's practice).**

In addition, the current inclusion of depreciation in the capital expenditure incentives creates a bias against IT-related DSP projects. Currently, if a network business spends an additional $1 on capital, it will not commence earning a return on that capital until the next regulatory period and will only earn a return on the depreciated value from that time. Thus, the business will forego the return as well as the depreciation amount. The problem is that the loss attributable to including depreciation in the incentive scheme varies with the life of the asset – a long lived asset will depreciate by less over several years than an IT asset with a much shorter life, which in turn creates a bias against switching from building network assets in favour of IT-heavy DSP initiatives.

An appropriate response to this would be to remove depreciation from the capital expenditure incentives as part of the creation of better incentives discussed above. **Again, this is a general issue that is at the heart of the current Chapter 6 and 6A rule changes before the AEMC (noting that rule changes are only required for transmission, distribution merely requires a change in the AER's practice).**

Price cap form of control

Price cap forms of price control are often held as barriers to efficient DSP projects. We make the following comments about this proposition.

First, if network businesses under a price cap structure their prices to reflect the structure of their costs, then any fall in revenue would coincide with a reduction in network costs, with profit therefore being unchanged. **To the extent that there is a barrier to setting efficient prices (such as government policy), then the best option is for this to be removed. Failing that, there may be benefit in alternatives being explored as permitted under the Rules (see the discussion above under demand forecasting).**

Second and more generally, the revenue change from a properly targeted DSP initiative should be small even if tariffs are not structured efficiently, given that

most DSP initiatives would only seek to reduce the system peak demand.[13] As remarked above, under a price cap with inefficient prices measures that are undertaken to reduce energy usage more generally (e.g., energy efficiency and rooftop PV installations), and therefore have a correspondingly large reduction in revenue need not be inefficient. These measures will be beneficial where the avoided cost of meeting peak demand remains lower than the overall revenue loss from the initiative.

Service target performance incentive scheme

We are aware of the view that the service target performance incentive scheme (STPIS) dissuades DSP options because such projects are less reliable or 'firm' than network options, creating the potential for network businesses to incur penalties. Some parties have proposed that an exception to the STPIS should be provided for DSP options to allow the latter to proceed.

In our view, the STPIS's do not create a bias against DSP, and an exception for DSP should not be provided. If the value of reliability in the STPIS is accurate, then the downside risk that network businesses fear from DSP would translate into a downside risk to customers – put simply, the potential loss of reliability to customers would outweigh any reduction in cost that DSP offered.

It is noted, however, that the firmness of DSP is a matter of fact that will depend on the particular case. It would be expected that the firmness of DSP would increase over time as experience increases and a range of tools is developed for increasing the firmness of DSP. In addition, the firmness of DSP can be improved by purchasing a greater quantity of DSP, implying that the issue is cost, not reliability.

One further benefit that DSP may create is with respect to network losses; although neither transmission nor distribution businesses face an incentive to optimise losses. A general incentive scheme to optimise losses may be appropriate, although this is a matter that would warrant specific consideration in its own right. **Our view is that the Rules that enable the current STPIS for distribution may be wide enough to allow an incentive scheme for losses to be introduced, although this could be made certain through reasonably minor Rule changes. Rule change would most likely be required for a losses incentive scheme for transmission.**

Effect of regulatory obligations

Application of the RIT-T and RIT-D

The purpose of the RIT-Transmission (RIT-T) and RIT-D is to subject a network business's major augmentation decisions to transparency in order to provide a moral suasion for improved decision making. An explicit component of the tests is to encourage explicit consideration of DSP options; however, there is no suggestion in the tests that DSP should be under- or over-weighted.

We are aware of an argument that the RIT-T and RIT-D may provide a bias against preparatory initiatives because the tests require a constraint to be present. We do not consider that a bias against such projects is created. Under the Rules the requirement to undertake the RIT-T or RIT-D simply would not be triggered – just

[13] A further more technical argument in favour of a price cap is that unless the reduction in payments from a customer to a network business translated into reduced revenue to the network, then the network would not be taking into account the full loss of customer-value associated with the DSP option and may artificially favour DSP. This is because if the customer would have paid a network charge of $100 to consume at peak time, but is induced not to consume, then the loss of customer-value by being induced not to consume is at least $100 (i.e., the loss of network revenue), which is part of the cost of the DSP option. This argument is set out more fully in the body of this report.

as the tests are not triggered for replacement expenditure.[14] The RIT-T and RIT-D are not intended to promote expenditure (the actual intention is to reduce expenditure), and so the absence of the test being triggered should not prevent an initiative.

Planning obligations

Where network businesses are required to plan their networks to an 'N-k' standard, DSP affects the assessment by altering the forecast of demand against which the network is planned.

Network businesses have room for judgement as to whether a DSP measure is sufficiently firm to factor into demand forecasts, and hence such obligations would not appear to present a barrier to using DSP initiatives to assist to meet planning standards.

Conclusions on adequacy of the regime

Our conclusions about the adequacy of the regulatory regime can be summarised in the following table:

	Distribution		Transmission	
	Rules	**Policy/Practice**	**Rules**	**Policy/Practice**
Cost recovery				
Forecasting factors (1)	Accommodate specific and broad based projects	Already precedent for including DSP initiatives in forecasts	Accommodate specific and broad based projects	Already precedent for including DSP initiatives in forecasts
Forecasting factors (2)	Amend rules to provide certainty for ongoing DSP payments	No barriers/bias identified	Rules already provide certainty for ongoing DSP payments	No barriers/bias identified
Allocation of cost between regulated and unregulated	Allocation to regulated depends on *purpose* rather than *type* of expenditure, supports DSP	No barriers/bias identified	Allocation to regulated depends on *purpose* rather than *type* of expenditure, supports DSP	No barriers/bias identified
Incentive schemes				
Demand management incentives	Rules permit sharing of wider benefits of DSP	Current DMIS is limited – would need substantial change to reward for wider benefits	No demand management scheme – could be considered	n/a
Capex incentive scheme	Rules permit an EBSS for capex, discretion over inclusion of depreciation	AER would need to introduce an EBSS for capex and remove depreciation from the scheme	Amend rules to permit a capex EBSS and provide discretion over inclusion of depreciation	n/a
Price control	Rules permit different forms of control	Need constraints to efficient pricing removed (maybe a change in government policy), or move	Revenue cap prescribed, not a barrier to DSP. However, it may promote an inefficient over-	n/a

[14] In theory, a distributor could undertake a roll-out of interval meters during a regulatory period without undertaking any form of cost-benefit analysis or obtaining any sanction from the AER and rely upon the Rules to ensure that costs were fully recovered. However, the Rules (and law) can be changed and a risk of a Rule change would exist if a network business undertook a very large expenditure program without sufficient justification.

	Distribution		Transmission	
		to different forms of control (change to AER practice)	use of DSP.	
Service target scheme (1)	n/a	Scheme not biased against DSP	n/a	Scheme not biased against DSP
Service target scheme (2)	Rules appear to permit incentive scheme for losses (Rule change would clarify)	AER would need to extend the STPIS to cover losses	Rules would need to be changed to allow an incentive for losses	n/a
Regulatory obligations				
Regulatory investment test (1)	Requirement to treat network and non-network equally – unbiased	AER could improve guidance on quantifying full benefits of DSP	Requirement to treat network and non-network equally – unbiased	AER could improve guidance on quantifying full benefits of DSP
Regulatory investment test (2)	RIT-D (as drafted) only activated for specific DSP – not activated for broad based DSP (but no bias against broad based DSP)	n/a	RIT-T only activated for specific DSP – not activated for broad based DSP (but no bias against broad based DSP)	n/a
Planning standards	Planners can exercise judgement over whether DSP sufficiently firm – no issue	No barriers/bias identified	Planners can exercise judgement over whether DSP sufficiently firm – no issue	No barriers/bias identified

Contents

2 Introduction

2.1 What were we asked to do?

The Energy Networks Association (ENA) has established a demand-side participation (DSP) Taskforce to establish its policy position on DSP. A sub-group of the Regulatory Affairs Committee (RAC) has been formed to support the Taskforce by considering regulatory matters and, in particular, the extent to which regulatory arrangements inhibit, or otherwise, the timely and efficient development of DSP.

The Energy Networks Association (ENA) has engaged PwC to assist it in considering the incentive for efficient demand-side participation (DSP) projects. More specifically, we have been asked to examine the following hypothesis:

'There is no fundamental positive or negative incentive in the current regulatory framework for DSP projects – just challenges to cost and justify all types of projects'

The broad questions posed to examine this matter were:

1 Are there particular characteristics of DSP projects that make them different to other projects NSPs undertake?

2 Does the national planning framework, including the RIT, allow adequate cost/benefit evaluation of all DSP options, including those that go beyond the provision of regulated services.

To assist us in performing this task the ENA and its members provided us with valuable information in the form of case studies on the previous application of DSP projects as well as a summary of member submissions to the Australian Energy Market Commission's current review of DSP. This information assisted us in understanding the current perspective of network businesses and the challenges and opportunities that have been evident to date in attempts to develop and implement DSP options.

2.2 What is demand-side participation?

2.2.1 Definition of DSP

Given the focus of this report is on DSP, it is important to be clear about what it means in the context of this analysis.

DSP in general can be characterised as customers making decisions about the quantity and timing of their electricity consumption and embedded generation that reflects their value of the supply and delivery of electricity. However, in the context of electricity networks the concept of DSP has a specific meaning and purpose. The function of network businesses is to deliver network services, and the National Electricity Objective (NEO) will be met if these services are provided at lowest cost for a given level of service, as well as for the service level to be optimised.[15]

[15] The NEO is primarily an economic efficiency objective. The NEO is set out in section 7 of the National Electricity Law.

Therefore, from the perspective of a network business, DSP is a means of reducing the costs or improving the performance of delivering network services.

The consequence of this narrow definition for network businesses is that the DSP initiatives that are of interest to network businesses should be those that alter usage of networks at times of peak demand, thereby alleviating network constraints and capital expenditure requirements. Procuring DSP for the purpose of broader environmental or other policy goals is beyond the functions of network businesses; however, we note that these benefits may nevertheless arise where DSP is implemented as a solution by a network business, which gives rise to a key issue that we address later with respect to the current incentive arrangements for DSP.

2.2.2 *Different network DSP measures*

Efficient pricing and DSP

One of the key mechanisms (but not the only mechanism) for encouraging the efficient use of networks – meaning that customers use the network when they value it more than the costs of provision, but not otherwise – is to set a price for use that reflects the economic cost of network provision.

For a network, this would be expected to imply having a time of use component to prices or capacity charges, and potentially also dynamic or critical peak pricing elements. This price could also include an additional inducement to customers who have the technology and systems in place to respond to peak time price incentives as this would improve the confidence that the customer would reduce usage during peak times. Having interval meters in place is a prerequisite for setting efficient prices.[16]

We can observe that *if* prices are efficient *and* customers are aware of the price *and* respond to the price, any consumption that occurs can be said to be efficient. In this scenario, even if peak use is causing substantial investment, this investment and the corresponding price increase, are efficient from the perspective of society and to encourage further demand reduction is inefficient.

Where interval meters are not in place, prices will be below cost at times of system peak (at least where constraints are emerging). However, even without interval meters, it is possible for network businesses to provide customers with a 'price signal' to dissuade consumption at peak times. This can be done by offering customers a payment in return for that customer agreeing to have its consumption reduced at peak times. This arrangement requires the technology in place that enables the network business to have confidence that the customer will respond as agreed.[17]

Even though the payment for the customer to be controlled is a positive inducement not to consume, it has the effect of increasing the price of consumption – this is because the price of consuming is now the apparent price, plus the rebate that would be avoided if the customer chose not to take up the offer.

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16 The term 'interval meter' is used in this report to refer to meters that accurately record electricity use at different times. This is sufficient for setting efficient prices. A smart meter is an interval meter with remote meter reading, additional measurement capability (voltage and power factor), network control capability and a capacity to communicate with customers through a home area network.

17 There are a range of technologies for this. There are many customers who have part of their load on time clocks, where the load is set to switch on when load on the network is low (or at least that is the intention). In addition, there are technologies that provide network businesses with the capacity to switch on and off a particular circuit at the customer's premises and more recently, technologies that permit the settings on particular appliances to be controlled (providing more options between 'on' or 'off').

In practice, setting efficient prices or using other means to provide a proxy for an efficient price is more complex than suggested above.

Customers do not always respond as predicted by standard economic theory to prices, and technology 'beyond the meter' may be required to assist customers to understand the more complex prices and to respond to the signals created. Moreover, there is empirical support for the proposition that customers are more likely to respond to positive (rather than negative) inducements not to consume at peak times.[18]

In addition, using indirect mechanisms (like direct load control) to increase the effective price of consumption at peak times is likely to be less effective than applying price signals directly.[19] First, in practice, only part of the customer's consumption is likely to be targeted. Secondly, when customers are paid not to consume at peak times, network businesses are in effect selling the product at below cost and offering to buy it back at cost. This inevitably creates strong perverse incentives for customers to increase their actual or apparent consumption, in order to have more peak use available to sell back to the network. At worst, this measure could increase the problem that the network business is trying to remedy. More likely, however, measures to address the potential for perverse incentives would just raise the cost of DSP options.[20]

It is worth noting that the potential for payments to people to avoid negative behaviours creates a perverse incentive has been well known for some time, and indeed was described well in the famous economics text, Catch 22:[21]

> *Major Major's father was a sober God-fearing man whose idea of a good joke was to lie about his age. He was a long-limbed farmer, a God-fearing, freedom-loving, law-abiding rugged individualist who held that federal aid to anyone but farmers was creeping socialism. He advocated thrift and hard work and disapproved of loose women who turned him down. His specialty was alfalfa, and he made a good thing out of not growing any. The government paid him well for every bushel of alfalfa he did not grow. The more alfalfa he did not grow, the more money the government gave him, and he spent every penny he didn't earn on new land to increase the amount of alfalfa he did not produce. Major Major's father worked without rest at not growing alfalfa. On long winter evenings he remained indoors and did not mend harnesses, and he sprang out of bed at the crack of noon every day just to make certain that the chores would not be done. He invested in land wisely and soon was not growing more alfalfa than any other man in the county. Neighbors sought him out for advice on all subjects, for he had made much money and was therefore wise. "As ye sow, so shall ye reap," he counselled one and all, and everyone said, "Amen."*

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18 See: http://www.aemc.gov.au/Media/docs/EPR-0022-Power-of-choice-review---Directions-Paper-FINAL-for-publication-pdf-92ab8df4-d019-4e39-9d77-c0fb0c7407de-3.PDF

19 The discussion here focuses only on network prices. If interval meters are in place, retailers will have incentive to encourage customers to improve their load shape. This is because all non-interval meter customers are settled based on the load shape of the average customer (the net system load profile). Thus, if a retailer encourages its customers to improve their load shape, the benefit from the improvement flows to all retailers in the relevant area (i.e., through a change to the average customer's load shape).

20 For example, a network business may offer all customers with air conditioners a payment (an identical payment) in return for their appliances being controllable (cycled) over summer. Assuming that this does not encourage the purchase of air conditioners, offering the same payment to all customers will avoid encouraging customers to inflate their use. However, by paying customers the same amount irrespective of how much they would have consumed means that this is likely to come at a higher cost than if customers could be paid an amount that reflected their likely use – indeed, the customers who would be most attracted by this offer are those who were less likely to be using their air conditioners.

21 Heller, J., (1961), *Catch 22,* Simon and Schuster, New York.

Non price or supplementary DSP measures

There are a range of non-price or supplementary measures that would fall under the general heading of DSP. Some of the different types of initiatives include:

- Initiatives that seek to alter a customer's consumption directly – this could include inducements to customers to change appliances,[22] installing power factor correction equipment at the customer's site, or installing energy storage

- Initiatives to increase customer response to prices – which may include advice and possibly also sale of the technology required for customers to understand and respond to more complex prices, and

- Contracting with an embedded generator for network support.

The purpose of this report is to review whether the regulatory regime accommodates DSP initiatives in a neutral manner, and hence has only surveyed and sketched the various initiatives to the extent that is necessary to meet this objective.

2.2.3 *When do you implement DSP measures – specific DSP vs. broad based (preparatory) measures*

A further dimension to DSP measures that can be distinguished is between those measures that are undertaken to defer a specific, identified network constraint (specific measures), and those measures that may be implemented to provide enhanced capability to use DSP to respond to future constraints that may arise (broad based or preparatory measures).

An example of broad based measures is the large scale roll-out of interval meters, which expands substantially the capacity to use prices to encourage efficient demand. Other, lower cost broad-based initiatives include researching the customer base to identify opportunities for DSP, which may extend to signing customers up in advance to provide a capability when required. Experimentation on how customers respond to various DSP measures is a further possible broad based measure.

Both of these classes of measures could (and, most likely, should) be part of an efficient portfolio of DSP options. However, the important distinction is the timing of the costs and benefits. For reactive measures, costs are incurred simultaneously with benefits being generated (that is, investment being deferred). In contrast, preparatory measures involve upfront expenditure (and possibly a large expenditure) for the purpose of creating possible but uncertain future benefits.

In general, it is more difficult to encourage the latter class of projects in a cost-based regulatory regime, given that costs may be incurred in one regulatory period, but with the expected benefits being created over the following several periods. However, this is not an issue that is limited to DSP, with the weak incentive for innovation a known shortcoming of cost-based regulation. It is also more difficult to justify these preparatory projects more widely to stakeholders.

Lastly, it is also important to bear in mind that the NEO is advanced by deferring any expenditure by as long as possible (for a given level of service performance).

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[22] For example, prior to the ban on incandescent light bulbs, a network business deferred an augmentation by giving away energy efficient light bulbs. A subsidy to upgrade or dispense with second refrigerators is another possible measure.

Accordingly, it should be expected that the regulatory regime would discourage the early expenditure that could be deferred to when a particular constraint arises.

2.3 Characteristics of DSP

2.3.1 Costs of implementing DSP measures

Passive DSP requires that there is appropriate metering technology in place, and so requires a large upfront investment for customers who have accumulation meters. Once that metering technology is in place, there is no necessary additional capital or operating expenditure required, other than the internal cost to the network business of deriving and reviewing tariff structures and the associated regulatory requirements.

However, as noted above, for efficient pricing to be fully effective, it may require additional technology to be provided 'beyond the meter' so that customers are better able to make and give effect to real time decisions about their electricity consumption. In addition, customer response (and acceptance) would be enhanced by information campaigns.

Active DSP would typically require an operating expenditure outlay, such as through an incentive payment to undertake certain action. Active DSP may also require some enabling capital expenditure to either facilitate the response or to validate it, which would be largely IT investment or investment in other short-lived assets.

2.3.2 Benefits from implementing DSP measures

The benefits from DSP are likely to have an element of uncertainty for both active DSP measures and where network businesses set efficient prices to encourage response (passive DSP), at least until the practice of DSP matures.

The effectiveness of DSP (and the benefits that can be obtained) at the network level depends upon the extent to which a network business can rely upon the peak load reducing in the future when that business is undertaking its network planning. For passive DSP there is still only limited experience with how customers respond to price signals, which would impact upon the confidence for planners to factor in the demand reduction. Equally, while for active DSP the demand response may be more certain, there may still be uncertainty about the amount of demand response, depending upon how the program is designed and the types of customers who are targeted.

Importantly, provided that DSP results in a predictable reduction in demand, the benefits generated will extend beyond the distribution or transmission component of the supply chain. Taking distribution as an example, a reduction in peak demand at the distribution level may permit a deferral of projects at the transmission level,[23] and also the ability to avoid high cost generation operation and to defer future generation augmentation.

[23] Short term transmission costs – losses – may also be reduced.

2.3.3 *Relevant differences between distribution and transmission DSP*

There are some important differences between transmission and distribution that need to be taken into consideration with respect to the applicability and use of DSP for each.

Distribution networks have many more users directly connected to the network. These users are also predominately smaller electricity consumers, who on the whole, only take supply of electricity. At present the majority of the customers do not have access to an interval meter. The first implication of these factors is that it is relatively more difficult to set an efficient price for these customers. In addition, the fact that there is a large number of small customers means that any active DSP program would require a correspondingly large number of customers to be engaged to have a meaningful impact on network requirements. The dispersed nature of customers means that the geographical 'catchment' for deferral of a particular project may be limited.

The sizes of projects are much larger for transmission than for distribution. Transmission businesses set charges at the level of transmission connection points, and these charges do apply a price component that reflects peak use.[24] If transmission businesses were assumed to only implement active DSP measures in relation to its directly connected customers, then this would more administratively feasible than at the distribution level, including because those customers are large and already have sophisticated metering technology in place. Against this, capacity additions at the transmission level come in much larger increments than at the distribution level, which poses a substantial challenge for assembling sufficient demand side response at the relevant location to make a meaningful deferral in an augmentation.

2.4 *The operating model for DSP – or who should do it?*

The purpose of this report is to address whether the regulatory regime supports efficient DSP by network businesses, where such services would be provided as regulated services. However, one of the important contextual questions is whether DSP activities are activities that should be undertaken by network businesses. There was a policy intention in the design of the NEM that where activities are able to be performed by a competitive market, then competition should be permitted (and facilitated) and network businesses not undertake those activities.[25]

Drawing a line between which DSP activities should and should not be undertaken by network businesses is complex.

New technologies are having a considerable impact on the possible operating models for procuring and providing DSP services. Such technology has the potential to facilitate the entry of multiple new services providers in the NEM. In particular, the internet and the National Broadband Network, may create scope for traditional electricity infrastructure, such as the meter, to be bypassed as a

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[24] Distributors pay these charges and convert the aggregate charge into a per customer charge. The ability for distributors to pass on the transmission pricing signal is dependent upon the metering technology at the final customer's site.

[25] We use the expression 'network businesses undertaking activities' to mean that those activities are undertaken as regulated services. An affiliate of a network business may (unless precluded expressly) undertake non-regulated activities as a competitive activity.

mechanism for providing information to customers or suppliers. A possible 'future' for DSP – which may be more science fiction than science – is as follows:

- Transmission and distribution network businesses set prices that accurately reflect the cost of using the networks, including price inducements for customers to have in place technology and systems that improve the certainty of demand response. These prices are dynamic in that they reflect the time and cost of resolving the next constraint, and also have critical peak elements to allow network outages or other contingencies to be managed in an operating time horizon. Distribution prices would vary across service areas, reflecting the utilisation assets and the cost of the next augmentation.

- Retailers set prices for customers that reflect the cost of using energy as well as their retailing costs, and network charges are passed through. Retailers also offer inducements to customers to make their demand response firm, as this would provide a more certain basis for its hedging strategy (effectively allowing a retailer to substitute DSP for caps).

- Energy service companies offer customers assistance to respond to these price incentives,[26] which would include providing technologies to enable that response. The energy service company may also repackage the raw prices from the different participants where that repackaging was more likely to encourage demand response, and/or provide advice on appliances.

Under this possible future for DSP, it would be unnecessary and undesirable for network businesses to undertake any DSP activities outside of setting prices (including price inducements for demand response to be 'firm'). Rather, where DSP was worthwhile, it would be provided by the market. More than this would crowd out the competitive market.

However, a moment's analysis of the possible future suggests that we are a long distance from the outcome where it is efficient for networks to step outside of active DSP. In particular, a critical prerequisite for the 'market' to emerge and be effective in DSP is the installation of interval meters for all residential customers and the removal of constraints to setting fully efficient prices. Without this metering technology in place, networks cannot set efficient prices, retailers have no ability or incentive to set prices that properly signal generation costs and so it is impossible for a market to emerge that will encourage efficient consumption (and so efficient DSP).

Moreover, even once efficient pricing is in place, it may take some time for the market sketched out above to develop. It may well be that fully efficient pricing for distribution would never develop – this would require a level of locational disaggregation to pricing, as well as changes to those prices over time, that are administratively or politically infeasible. If the 'perfect' market of the future does not arrive and if obvious DSP measures remain, it would be undesirable for networks not to opt to undertake active DSP measures. Moreover, as we discuss in this report, where network businesses are contemplating DSP activities, it is appropriate for networks to take account of the broader benefits caused by the DSP to be taken into account – for a distributor, this would extend to cost reductions at the transmission and generation level.

This raises the question, however, of where the line should be drawn as to which activities that network businesses should undertake and whether a line can be drawn. We would argue that when networks are considering how to resolve a network constraint that it should include the value of a DSP option in avoiding

[26] This function could be undertaken by a retailer.

generation cost, and that an incentive scheme should exist to encourage this outcome.[27] However, this raises the question of whether network businesses should be undertaking DSP activities whose sole or predominant benefit is the avoidance of generation costs?

We expect that this issue will be a controversial one between networks and current and potential participants in the competitive market, as well the question of how the line is drawn over time. The reason is simple – if the networks undertake these activities, the other players cannot. Our assumption is that network businesses would only seek to undertake DSP measures that are driven predominately by a network constraint or by measures that are directed to providing an enhanced means of responding to future network constraints. Having said that, we note that some parties have advocated a general incentive on distributors to reduce or optimise peak demand. This incentive could motivate network businesses to undertake activities for which the nexus with network costs is weak. While we are not saying that this is inappropriate, it should be noted that such an incentive scheme would create a wide bound for distribution activities and be expected to be controversial.

[27] To be clear, if there was a competitive market for active DSP, it would be inappropriate for a network to have an incentive to take account of the costs that peak demand causes outside of its network.

3 Approach to regulation in the NEM

The purpose of this chapter is to summarise the various elements of the regulatory framework to identify the key factors that are likely to influence whether network businesses will properly consider DSP when undertaking their functions.

The regulatory regime that has been assessed comprises the relevant components of the NEL and the relevant components of the Rules, principally chapters 5, 6, and 6A.

3.1 Combination of incentives and administrative obligations

The regulatory framework in NEM can be described as 'building block approach plus incentives plus regulatory obligations'.[28] This is achieved by:

- Setting controls over network prices during a periodic reset such that costs are expected to be recovered
- Putting in place financial incentive arrangements, whereby network businesses may earn a benefit or penalty if their performance is superior or inferior to the targets/benchmarks/forecasts, which is intended to motivate the behaviour of NSPs, and
- Applying additional regulatory obligations, whose role is to 'fill in the gap' caused by either imperfections in the financial incentive arrangements or by objectives created outside of the economic regulatory regime (such as safety).

A sustainable level of income is required to preserve the capacity and incentive for long-term service delivery. Under current and expected arrangements, this objective is met by aligning revenue with costs on an ex-ante basis.

The incentives for desirable behavioural change in a regulatory framework is created by ensuring that 'income' changes with the level of performance. These marginal rewards and penalties are what is intended to motivate behaviour. However, it is also important to ensure that the variation in actual income (a function of ex-post revenue and costs) is not so large as to make the scheme politically unsustainable or commercially unsustainable (i.e. exposure to a level of risk that threatens retention of an investment grade credit rating).

It is generally accepted in regulation that well designed incentive based arrangements will lead to better outcomes than would be achieved by direct regulatory intervention alone. The reason for this is that incentive arrangements

[28] Ofgem used the term 'building block plus incentives' to describe its current approach to regulation during the 'RPI-X @ 20.com' review. The 'plus regulatory obligations' is more accurate in Australia (as well as the UK) given the existence of measures such the RIT-T and RIT-D, planning/reliability standards and like measures.

provide network businesses with the opportunity and incentive to find better ways of meeting the desired objective, or to provide a superior outcome for the same cost.

Administrative arrangements, such as planning obligations, support the incentive arrangements in the framework. This is to overcome any imperfections that may exist within the incentives framework. Administrative obligations set aside the commercial interests of the regulated entity and require it to focus on the best solution from society's point of view.

3.2 Capital and operating expenditure

Price or revenue caps are set every five years with the objective of providing network businesses with a reasonable opportunity to recover the economic costs they are forecast to incur, including a return on past investments.

However, price/revenue caps are then locked-in until the next periodic review. This is intended to encourage businesses to minimise expenditure, consider trade-offs appropriately between operating and capital expenditure and – in combination with the form of price control and service incentive mechanism:

- take account of any cost consequences of tariff rebalancing, and
- trade-off the cost increases of savings associated with raising or reducing service levels with the benefits or costs associated with the change, and select the optimal level of service.

The strength of the incentive for a regulated business to improve efficiency is dependent on a number of factors and, in particular, how the AER treats outturn expenditure (and efficiency gains) at the next price review.

If prices are reset in line with actual cost at a price review, then the network will only retain the benefits from efficiency gains during the regulatory period. The incentive to make an efficiency gain will also decline over the period. The later in the period the gain is made, the shorter period for which it is retained. Indeed, if the new expenditure forecasts are expected to be set with reference to actual cost, then a perverse incentive to spend more in the last years (e.g., by advancing planned maintenance) of the period may be created.[29]

An Efficiency Benefits Sharing Scheme (EBSS) applies in the NEM to offset the reduction in the incentive to reduce cost over the regulatory period by ensuring that those benefits do not stop at the time of the price review. In particular, the normal design criterion is an attempt to ensure that the gain from a change in cost is borne for the same period of time, irrespective of the year in which the gain is made.

If strong incentives are provided to minimise cost, then it can be inferred when resetting prices that actual expenditure is efficient, and so:

- include actual capital expenditure in the asset base, and
- using actual operating expenditure as the starting point for the new forecast, adjusted only for expected changes in productivity growth and input prices.

[29] This point is acknowledged in submissions by the ENA and Grid Australia to the AER's Rule change on economic regulation that is presently under consideration by the AEMC.

In practice, however, the design and use of efficiency carry-over mechanisms for capital expenditure have been problematic. One of the main reasons for this is that it is challenging to design an incentive scheme for capital expenditure that deals correctly with projects that are deferred from one regulatory period to the next.

As a consequence of the concerns associated with applying a carry-over to capital expenditure the AER has chosen not to apply the EBSS to capital expenditure for distribution businesses to date. The transmission framework does not allow for the application of an EBSS for capital expenditure. The implication of applying an EBSS to operating expenditure only is that the incentives to reduce capital expenditure are unlikely to be as powerful as those applying to operating expenditure, particularly later in the regulatory period.

To partly address the relatively weak incentives for capital expenditure in transmission, the Rules require that actual depreciation be applied to the roll-forward of the regulatory asset base (RAB). The AER has the option of applying actual or forecast depreciation in distribution. However, the application of actual depreciation may create further incentive issues given it provides a different incentive rate depending on the economic life of an asset.[30]

3.3 Service performance incentives

Service performance incentive schemes exist in order to expose the network provider to a share of the economic benefit (or cost) that is born by users if there is an increase (or decrease) in service performance. Thus, while the cost efficiency arrangements are designed to encourage network businesses to spend less, the role of the service incentive scheme is to signal to network businesses that market participants place a value upon the quality of service provided, hence reducing the likelihood that costs will be reduced at the expense of service.

Service incentive schemes are distinct from other regulatory obligations and measures focused on service performance. Administrative tools, such as a reliability standard, puts a limit on the extent a business can reduce expenditure. This is because the business needs to incur expenditure so to at least meet the minimum standard. Conversely, service incentives seek to provide a financial reward for businesses achieving a socially desirable standard of performance and financial penalties for under-performance.

The challenges in designing service performance incentives differ between distribution and transmission. For distribution, the service performed by the network almost universally is to transport electricity from the transmission connection point to consumers. Accordingly, the service that is desired is continuity of supply (with quality of that supply (i.e. voltage etc) within acceptable limits). As a result, the universal measures of service (reliability) for distribution service incentive schemes are per customer minutes off supply and its derivatives (per customer frequency of interruptions and the average (customer weighted)) duration of interruptions.

In contrast to distribution, the service benefit that a transmission network delivers is both delivery of electricity to final customers as well as the transportation of electricity from generators, with the additional network capacity potentially leading to lower generation costs (by permitting additional output from existing and potentially new lower cost generators). Attaching incentives to these wider market benefits is challenging. The service incentive scheme for transmission provides an incentive:

[30] That is, a stronger incentive is provided for assets with a shorter economic life compared to those with a longer economic life.

- to minimise outages to customers
- to have existing assets in service and available particularly at times when those assets are required by the market, and
- to reduce outages that may have a market impact, or to reduce the likelihood that a network outage will have a material market impact.

We note that losses are one dimension of service performance over which networks have some control, but which is not subject to an incentive scheme currently. We consider that the rules underpinning the service target performance incentive scheme for distribution would permit an incentive scheme for losses, but the Rules for transmission would not (the latter being more prescriptive about the types of service performance for which an incentive can be applied).

3.4 Demand Management Incentive Scheme

The distribution Rules include a provision for the AER to develop an incentive scheme to promote efficient demand management. The Demand Management Incentive Scheme (DMIS) has the objective of providing an incentive for distributors to implement efficient non-network alternatives or to manage the expected demand for standard control services in some other way.[31] The guidance for the AER in the design of a scheme is relatively broad and requires it to have regard to:

1 The need to ensure the benefits to consumers likely to result from the scheme are sufficient to warrant reward or penalty for a distributor

2 The effect of a particular control mechanism on incentives to adopt or implement efficient non-network alternatives

3 The extent a distributor is able to offer efficient pricing structures

4 The possible interaction with other incentive schemes, and

5 The willingness of customers to pay for increases in costs resulting from the implementation of the scheme.

The AER has developed a number of different DMIS for different jurisdictions. There are two key elements that exist amongst the schemes developed by the AER:

1 A cost-pass through mechanism for the cost of approved DSP projects, and

2 An offset of the perceived revenue penalty from DSP that arises under a tariff basket price control.

We observe that the current scheme has motivated DSP activities, and in that sense has been a success. However, neither of these aspects of the DMIS are a true incentive scheme, that is, a scheme where the distributor receives a share of the *benefit* that is created by the DSP measure. Instead, the DMIS operates as a pass-through of *costs* incurred in undertaking such initiatives.

[31] We note that the AEMC has made a Rule change that changed the DMIS to the Demand management and embedded generation connection incentive scheme. However, the AER is yet to develop a scheme under this new Rule.

3.5 Planning obligations

3.5.1 Information and transparency obligations

The planning framework in the NEM has undergone significant change in recent times. In particular, the AEMC is presently considering a number of important changes to the planning framework for distribution networks. Nevertheless, the key aspects of the current transmission framework and the proposed distribution framework are:

- **Ongoing information sharing** - Processes for ongoing information sharing between network businesses, consumers, potential and actual market participants and other stakeholders, being:
  - an annual planning and reporting process, and
  - for distribution, a Demand Side Engagement Strategy.
- **Consultation and analysis of specific investments** - The RIT-D and RIT-T for consultation and transparent economic analysis of specific investments.

3.5.2 Jurisdictional planning standards

Jurisdictional obligations set out the network planning standards and service performance levels which are a key input to expenditure forecasting and investment planning. These are commonly separated into a range of 'input' design targets and measurable 'output' performance targets.[32]

Details are normally set out in state-based Codes, Regulations or Licences which set a range of compliance obligations on network businesses which allow little or no discretion on the standards required. Penalties for non-compliance vary but include loss of Licence, fines and payments to customers suffering poor performance. There is also a level of reputational risk around any reportable breach.

Further to the local compliance is the Rules obligation that:

> 'A Network Service Provider must comply with *applicable regulatory instruments*'[33]

An applicable regulatory instrument is a defined term under the Rules relating to such local obligations such as Licences referred to above.[34] Civil penalties can be applied for non-compliance with this part of the Rules. This requirement is separate and additional to breach provisions in each instrument. Even non-financial penalties can create a strong disincentive for non-compliance – for example, shareholders may lose confidence in management if there is a breach. It is therefore to be expected that network businesses and their management direct appropriate focus on compliance with such obligations (as is clearly the intent).

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[32] An example is the 'Design, Reliability and Performance Licence Conditions' (DRPLCs) which apply to the NSW electricity distributors.

[33] Rule.5.2.3.

[34] "Applicable regulatory instruments: All laws, regulations, orders, licences, codes, determinations and other regulatory instruments (other than the Rules) which apply to Registered Participants from time to time, including those applicable in each participating jurisdiction as listed below, to the extent that they regulate or contain terms and conditions relating to access to a network, connection to a network, the provision of network services, network service price or augmentation of a network."

4 Testing the economic regulation framework

The purpose of this section is to examine whether the existing framework for the economic regulation of distribution and transmission networks inappropriately biases for or against DSP options. To do so we have examined the key parts of the framework, specifically the approach to:

- Expenditure forecasts
- Cost based efficiency incentives
- Service incentives
- Incentives to capture broader market benefits, and
- Incentives for innovation and capability building.

Principally we have considered the Rules based framework. It is noted, however, that the AER is provided with certain discretions under the regime, which includes to design certain schemes (like the 'efficiency benefits sharing scheme') and also to make decisions (for example on a regulatory proposal). Accordingly, the AER's practice has also been assessed, with note made of where it is within the AER's power to remedy any shortcoming that we have found.

4.1 Expenditure forecasts

The current framework for the approval of expenditure forecasts at a price review provides sufficient guidance, and includes sufficient flexibility, for the AER to properly consider and approve DSP expenditure, including for broad based measures.

However, there is a second order issue in distribution that may place expenditure for DSP at a disadvantage to capital expenditure. In particular, there is a different treatment of ongoing costs between operating and capital expenditure. It is not clear that these issues would have a material impact on the incentives to undertake DSP projects. We note that these issues have been remedied for transmission and this remedy would be appropriate for distribution.

Approval of new DSP expenditure

For operating expenditure related to DSP, the AER would, in most cases, not be able to rely upon previous outturn expenditure to determine whether forecasts are prudent and efficient. In this circumstance the network business would need to demonstrate that a step change in expenditure was necessary and efficient. The AER would then make its assessment with respect to the operating expenditure criteria in the Rules having regard to the expenditure factors.

The Rules set out, in effect, the principles, sources of evidence and evidentiary standard (or onus) that the AER is required to apply when assessing a revenue proposal. The operating expenditure objectives upon which the AER is to consider an expenditure proposal against are defined in the Rules as the total operating

expenditure for the relevant regulatory control period the distribution / transmission business considers is required in order to achieve a number of outcomes. These outcomes include, for instance, meeting expected demand, complying with regulatory obligations and maintaining the quality, reliability and security of supply of the distribution / transmission system and through the supply of standard control services (or prescribed transmission services as the case may be).

The evidentiary matters are set out in the Rules (referred to as factors) that the AER should have regard to in undertaking its assessment. These factors specifically include that the AER is to have regard to the extent that the network business has considered, and made provision for, efficient non-network alternatives.

We consider that given this framework, DSP can properly be considered as a means of achieving the expenditure objectives in the Rules. This is reflected in the requirement for the AER to have regard to the extent that provision has been made for efficient non-network alternatives. As a consequence, there does not appear to be a constraint to the AER approving expenditure for DSP. AER practice to date also bears this out with numerous examples of it approving expenditure for DSP projects at a price review. It is important to note, however, that as with other expenditure items the AER has sought detailed justification of DSP expenditure proposals and has rejected amounts when it has not been satisfied that sufficient justification has been made.[35]

An important issue that may arise in a price review is whether proposed or actual expenditure is properly allocated to the regulated service – this is important because a cost item needs to be allocated to the regulated service before it can be recovered through regulated prices.

We do not believe that there are any obvious barriers to the recovery of DSP costs from regulated prices, for the following reasons:

- The Rules regulate the price for the provision of services rather than for the provision of assets/activities.

- As a consequence, the question is whether the DSP activity is being done for the provision of the regulated service. This is a test that is based upon *purpose* rather than on the type of measure being undertaken.

Cost recovery for ongoing DSP expenditure

Actual capital expenditure undertaken during the regulatory period is automatically rolled into the RAB from the commencement of the next regulatory period. This means that there is no-ex-post prudence test of capital expenditure undertaken and the business only bears the costs of differences between forecast expenditure and actual expenditure until the end of the regulatory period.

Conversely, for operating expenditure, the AER makes an assessment of any ongoing expenditure at each price review. The implication of this is that, implicitly, the AER undertakes a prudence test of ongoing operating expenditure at each price review. In addition to this, where a capital project is undertaken, the quantum of expenditure to be recovered is known once the project is in place. In contrast, a DSP initiative may involve an uncertain stream of future payments.

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35 See for instance: Australian Energy Regulator, 2010, Queensland distribution determination 2010-11 to 2014-15, May 2010, pp.181-2.

Absent other arrangements, this would mean that there would be an imbalance in the risk of cost recovery between capital expenditure and operating expenditure, including for DSP, where the DSP initiative spans regulatory periods.

The imbalance that results from rolling actual capital expenditure into the RAB is overcome in transmission in two ways. First, the AER is required to accept the forecast of operating expenditure for any costs associated with network support payments made in the previous regulatory control period that the transmission business must continue to make in the next regulatory control period. Second, where there are differences between forecast expenditure and actual expenditure for network support payments, these are treated as a pass through in transmission.

The distribution Rules do not include the same provisions that exist in transmission to align the treatment of capital and operating expenditure. While it is not clear that the absence of this provision is a significant barrier to distributors using DSP, it would likely be prudent to align the distribution framework with the transmission framework in this instance.

4.2 Cost-based efficiency incentives

The incentives for efficient capital expenditure in the framework are relatively weaker than for operating expenditure. Absent additional arrangements this would place a bias against additional operating expenditure for DSP compared to capital expenditure. This bias is overcome by reducing the power of the incentive for DSP expenditure down to the level of capital expenditure. A more preferable approach to balance the incentives, however, would be to increase the power of capital expenditure incentives so that a stronger powered incentive to minimise DSP costs exists.

We assume at the outset that DSP is a substitute for capital expenditure on network assets. Where DSP predominately requires the use of operating expenditure, this implies a substitution of operating expenditure for capital expenditure. As identified in the previous chapter, an EBSS applies only to operating expenditure for distribution and transmission businesses. As a consequence of this, there is a stronger incentive to minimise operating expenditure than there is for capital expenditure. This balance of incentives between capital and operating expenditure would imply that, absent any other arrangement, network operators are likely to have a financial incentive to prefer network options rather than DSP. That is, the benefit from reducing capital expenditure is likely to be lower than the implicit penalty from inducing demand response through operating expenditure.[36]

The current Rules seek to overcome the potential bias against DSP, and other non-network solutions, by aligning the payoffs from the reduction in capital expenditure and the increase in operating expenditure. This is achieved by reducing the power of incentives with respect to operating expenditure for DSP. Specifically, for distribution providers the AER's guideline for the calculation of the EBSS states that non-network options will be excluded from the calculation of the carry-over in respect of operating expenditure as follows:[37]

> *The AER maintains the view that excluding opex relating to non-network alternatives from the operation of the EBSS will minimise distortions on*

[36] A caveat to this would be where DSP is able to defer capital expenditure from one regulatory period to the next and no adjustment is made for this deferral, then an unduly strong incentive may be created for DSP in the last years of a regulatory period.

[37] AER, *Efficiency benefit sharing scheme for distributors – final decision,* June 2008, p.14.

incentives to undertake non-network alternatives and is consistent with clause 6.5.8(c)(5) of the NER.

The Rules also allow the AER to exclude operating expenditure relating to non-network alternatives from the EBSS in transmission.

While excluding operating expenditure relating to non-network alternatives removes any distortion between capital and operating expenditure for these projects, this approach means that the incentives for DSP are wound down to the level of the relatively weak capital expenditure incentives. As a consequence, a network business is relatively neutral to using DSP and there is no strong incentive to minimise the cost of DSP projects compared to forecast. In terms of encouraging overall efficiency, this approach is second-best.

A better solution to balancing the incentives between capital and operating expenditure would be to wind-up the incentives for capital expenditure so that they are better aligned with operating expenditure incentives. Doing so would mean that there would be no imbalance of incentives between the types of expenditure and network businesses would be able to receive a benefit from undertaking DSP initiatives more efficiently. We note that this would also require the regulator to address the known issues associated with applying a carry-over mechanism to capital expenditure.[38] This issue, and whether the strength of capital expenditure incentives should be strengthened to better align with operating expenditure incentives, is an important matter under consideration by the Australian Energy Market Commission in its assessment of the AER's Rule change relating to the economic regulation of networks.

A further matter is that given the present relatively weak incentives for capital expenditure efficiency, the regulator has the option in distribution, and the obligation in transmission, to apply actual depreciation to the roll-forward of the RAB. However, a problem with applying actual depreciation is that there are greater capital expenditure incentives for assets with a short economic life compared to those with a longer life. This result may have implications for the rewards and penalties for expenditure on enabling technologies for DSP to the extent that these have a relatively short economic life.

4.3 Service incentives

The existing service incentives schemes for distribution and transmission networks appear to provide incentives for the proper consideration of DSP solutions. The relevant schemes allow for network businesses to compare levels of reliability and continuity of supply with likely benefits or penalties.

The service incentive schemes identified in the previous chapter encourage network businesses to consider the probability weighted expected penalty from outages and compare it to the cost of service improvement projects. The focus on expected outages means that network businesses will consider the relative reliability of different service improvement options. The consequence of this is that demand-side response will not be summarily dismissed if it is considered less reliable, but rather the penalty from the lesser level of reliability will be considered and valued. It follows that incentive schemes for reliability should provide an incentive for a neutral assessment of the relative impact of demand-side response projects.

[38] As identified in the previous chapter, one particular issue is the challenge of designing a scheme for capital expenditure that deals correctly with projects that are deferred from one regulatory period to the next.

The size of the incentive for reliability that is provided may also influence whether there is an incentive to undertake efficient DSP projects. For distribution the size of the incentive is based explicitly upon an estimate of the value of customer reliability (noting that the value of customer reliability is not something that can be valued with precision). In contrast, the incentive rate that applies to transmission is not explicitly set with reference to the value of customer reliability or market benefit of asset unavailability, although it is unclear what effect this has on DSP relative to network options.

4.4 Incentives to capture broader market benefits

Under the present arrangements a network business would only retain the benefit that the DSP project creates for the delivery of network services (that is, a share of reduced cost, assuming service does not change). However, the DSP project may create benefits at other levels of the supply chain – for example, as well as avoiding distribution costs, a distribution-driven DSP solution may:

- reduce losses on the distribution network
- avoid capital expenditure and reduce losses on the transmission network, and
- avoid generator operating and capital expenditure.

As these wider benefits do not translate into a financial outcome for the network business, some DSP initiatives that would be efficient from a NEM-wide perspective (i.e., NEM-wide benefit is greater than NEM-wide cost) may not be privately profitable to the network business and so not proceed.

The appropriate mechanism of encouraging network businesses to take into account these external benefits when undertaking a financial evaluation of these projects is to provide the network business with a (financial) share of the broader benefits created by a DSP initiative. This would take the form of an additional incentive scheme – just like the STPIS permits distributors to retain a share of the customer benefit from reliability improvement, this new incentive scheme would permit a network business to retain a share of the benefits that a DSP scheme creates at other levels of the supply chain. Doing so would mean that the incentives for the network business are better aligned with the interests of all NEM players.

Before such a scheme was implemented a number of questions, or issues, would need to be resolved including:[39]

- How could the broader market-benefits be calculated?
- Should the incentive apply in respect of individual DSP initiatives, or should there be a more general incentive scheme that encourages network businesses to take measures to optimise peak demand?
- What risks for network businesses may be created by such a scheme (different for the narrow and broad scheme) and could the scheme be designed to reduce the exposure to exogenous events (like weather)?

[39] As noted earlier, a prior question is whether it is considered appropriate for the network business to undertake this function. We are assuming here that we have satisfied this condition.

If a decision is made to implement a network incentive to capture broader benefits, a further consideration is whether the scheme should apply to distribution businesses, transmission businesses, or both. Unless there is some method of coordinating who undertakes projects, there is a risk that providing an incentive to both transmission and distribution leads to a duplication in effort and a potential over-rewarding for DSP benefits. If this was the case it may be more appropriate for the scheme to apply to distribution businesses only given they would be able to capture transmission benefits as well as generation benefits. Conversely, it may be that the benefits that transmission businesses are able to gain are different to benefits that distribution businesses are able to gain. In this circumstance it may be appropriate for an incentive scheme to apply to both.

Estimating the broader market benefits from a particular DSP project is feasible, albeit complex and most likely controversial. However, for an incentive scheme to be administratively feasible, the 'benefit' that is assumed to occur outside of the network in question would need to be a single figure reflecting some form of average across market conditions. This means that the reward the network business receives will at best be an approximation to the true benefits created – this is not really a problem given that the objective is to improve, not to achieve perfection.

An incentive to reward network businesses for broader market benefits they create could take a number of forms. For instance, it could apply to peak demand reductions more generally or be limited to the impact on specific DSP projects. Applying a set reward for any form of peak demand reduction would probably be more administratively simple to operate (although likely to be harder to establish), but could expose network businesses to risk associated with exogenous events (namely weather). Such a scheme may also over-reward some activities (assuming that an even more averaged incentive reward is involved). Conversely, a narrow scheme would be more contained (and so create less risk), but at the expense of administrative expense and potentially also limiting the scope of initiatives that network businesses may pursue.

4.5 Incentives for innovation and capability building

Under cost based regulation, network businesses are typically unable to capture fully the benefits that are created through innovation-type activities. The reason for this is that incentive schemes typically reward businesses for improvements within a regulatory period, which does not address properly activities that incur an upfront cost but generate benefits in many years time. Cost-based regulatory regimes typically deal with innovation-like projects by providing for cost recovery of the project (after obtaining regulatory approval). Thus, rather than the business incurring a cost and taking a risk as to whether the research and development pays off, the network business has its costs recovered (with the future benefits flowing through to customers rather than the network business).

It is second-best to treat innovation activities as cost-recovery projects (that is, rather than allowing network businesses take a risk and make a return). However, this is a general issue with cost-based regulation for which there is no simple fix (although it is pressing issue that should be the subject of refinement).

We note that the broad-based DSP-type initiatives offer similar pay-offs to research and development projects (that is, upfront costs in return for uncertain future benefits). Installing interval meters is one such example, as this involves an upfront cost in return for the capability to manage peak demand more efficiently in the future. Experimentation with different types of tariffs is a further activity. Many of the other broad based measures – whereby initiatives are undertaken now to sure-up future DSP when required – also fall into this category.

The Rules at present enable the costs associated with broad based DSP measures and experimentation with different tariffs to be recovered through regulated prices. The AER has the power to accept these costs in a network business's forecasts, although like all forecasts the AER needs to be convinced of the project's worth. In addition, the DMIS as it currently functions provides for a cost pass through of approved projects (as well as insulation against possible risk).

Accordingly, we consider that broad based DSP projects are accommodated within the regulatory regime, noting that this will be as cost-recovery projects given the difficulties with creating sustainable incentives for innovation.

4.6 Price setting

The form of price control has two interrelated effects which are:

- to influence the incentive of the network to set efficient prices, and
- to determine the revenue gain or loss to the network from an increase or decrease in the quantity supplied, which in turn will affect the network's incentive to serve demand growth or induce DSP.

This paper focuses primarily on two forms of price control. These are the weighted average tariff basket (or price caps), and revenue caps.

4.6.1 Incentive to set efficient prices

The relevant question for setting prices to encourage efficient DSP is whether the network will have an incentive to set prices that reflect cost, or whether it will have an incentive to set prices that are higher or lower than cost.

The regulatory framework does not impede network businesses from setting cost reflective tariffs. Indeed, under a price cap form of price control there is a financial incentive for network businesses to set cost reflective tariffs (although this may not always be strong). A revenue cap form of control may provide an incentive to set prices that deter otherwise efficient consumption; however, this is overcome through the regulatory obligations for cost reflective pricing.

Having said this, the two constraints to setting efficient prices are the available metering technology and the existence in some jurisdictions of government policies that discourage a move to more efficient pricing.

4.6.2 Incentive to procure DSP

The question discussed in this section is whether a network business will have an incentive to undertake other measures to procure efficient DSP in a circumstance where prices alone do not, or are unable, to deliver an efficient signal for consumption. Price caps properly align the private incentives of network businesses to procure active DSP with those of society. For revenue caps, there is scope for a network business to provide a larger subsidy for active DSP than is efficient.

Under a price cap form of control if a customer responds to a signal, or inducement, to not use the network at peak times, under the tariff basket the network business would lose revenue equal to the amount that the user would have paid (in network charges) at that time. Thus, if the measure proposed is a subsidy and one unit of consumption is assumed, then the total cost of the DSP initiative will be the sum of the loss of revenue from the customer *plus* the cost of the subsidy to reduce consumption. The network business, therefore, will find it

profitable to encourage DSP to the point where the total cost of DSP, including the revenue loss, is equal to the network cost.

Importantly, the circumstances when a network business would find it profitable to encourage DSP under a price cap is also when it would be efficient from the viewpoint of society. If an additional financial inducement is profited for a user to cease using the network at peak time, then the opportunity cost to the user of using the network at the time, and hence the effective price for the user is the network price *plus* the subsidy for demand response. Given this effective price for active DSP, when a network business is considering whether purchasing DSP is a lower cost option than network augmentation, it is incorrect to merely compare the cost of purchasing DSP to the cost of the network option. This comparison will only induce an efficient level of network use if the price for using the network is zero, and in other cases may over-induce DSP. Rather, when considering whether DSP or network augmentation are the most efficient, DSP should be preferred where the cost of DSP is less than or equal to the network cost minus the network price.

In practice, whether the network price, and the subsequent loss of revenue, is a material item in the calculation is an empirical matter and will largely depend on how much prices divert from an efficient price. However, the fact that the evaluation of DSP projects requires an allowance to be made for the signal that is already included in the network price, and under a price cap revenue would reduce by this amount through DSP, means that this form of control does not provide a bias against DSP.

The finding for a price cap does not apply, however, for a revenue cap. The distinguishing feature of a revenue cap is that revenue is unchanged, irrespective of whether quantities change. As a consequence, a network business' revenue is not affected by DSP. Thus, assuming the business is appropriately rewarded for cost reductions, it would be profitable for the business to offer a subsidy for DSP until the point where the subsidy for DSP is equal to the network cost.

As the user is already paying a charge for the use of the network at peak time, the user's value from using the network at that time is at least equal to the network charge (otherwise it would have responded already). Thus, if the maximum subsidy is paid, and a demand response then occurs a customer would be over-compensated for its response. In turn, it can also be concluded that a revenue cap provides the network with an incentive to encourage an excessive amount of DSP by not encouraging the network to take account of the incentive for DSP that is already provided through the network price.

Having said that, if a DSP measure is properly targeted, then the loss of revenue should be modest in any event, given that network-related DSP should be directed to reducing the system peak. It is noted that measures that seek to reduce energy consumption generally – such as energy efficiency measures or subsidies to rooftop PV installations – can create revenue loss to network businesses without necessarily reducing costs at all times consumption is reduced where prices remain predominately energy-based (that is, rather than reflecting the cost structure of the network). This does not imply that it will always be inefficient to undertake such actions. Indeed, it would be efficient for a network business to undertake such broad based schemes where the total cost, including the loss of revenue at times other than at peak, is less than costs that are nevertheless avoided through reduced consumption also occurring at peak times.

5 Testing the planning framework

The two core areas of the administrative arrangements that seek to support economic incentives are:

- The planning framework, which provides processes which contribute to expenditure forecasting and investment planning by facilitating information flows and improving transparency of investment decisions made in line with the incentives, and

- Jurisdictional planning obligations, which provide the service performance levels and planning standards which are an input to expenditure forecasting and investment planning.

It is important to recognise that a key objective of administrative arrangements for planning are more often than not focused on stopping inefficient investment from proceeding. That is, the arrangements themselves do not *promote* investment, but instead make sure that network businesses do not proceed with investments that would not be in society's interests. The difficulty of using administrative tools to promote socially efficient network investment is a limitation of their use compared to financial incentives.

5.1 The planning framework

5.1.1 Annual planning and information provision

The Annual Planning Review and associated report published by network businesses is a useful information tool to inform potential demand-side providers of upcoming network needs. While there may have been perceptions in the past that it was difficult for DSP proponents to engage in the process, the proposed requirements for the development of a Demand-side Engagement Strategy (DSES) for distribution may be a helpful tool for DSP providers to help them to engage in the process. In addition, the information gathered by distribution businesses through the DSES, in particular the register of DSP participants, should allow distribution businesses to develop a relationship with DSP proponents and better identify when a DSP solution may be able to resolve a network constraint.

The annual planning obligations are designed to ensure that the processes applied for network planning are clearly defined, contain common elements across the NEM and are transparent and efficient. A key requirement for annual planning reviews is to forecast expected demand and identify any areas where intervention may be necessary for service standards to be met, and to identify possible options to solve the problem.

While the annual planning processes are predominately focused on identifying where network investment is proposed to address a particular constraint, the Rules also require network businesses to consider any potential non-network alternatives at the planning stage. Indeed, it could be argued that a key purpose of these planning documents is to provide information to non-network proponents so that they are able to put forward alternative projects to address network constraints.

Whether these processes are a barrier to efficient DSP depends on ensuring that demand-side participants understand the nature of the network problem that

needs to be addressed and are provided with sufficient time to propose a legitimate alternative. For instance, an issue may be more complex than 'peak load exceeds firm capacity at a particular location in a particular year'. There may be a range of factors, such as voltage or fault level constraints, which combine at a location and at a point in time to mean that a possible solution is not simple. However, it is not clear that the current arrangements for transmission and the proposed arrangements for distribution provide an impediment to DSP in this respect.

We note that a concern from DSP proponents in the past has been that:

- Proponents of DSP solutions are not engaged in the planning process at a time which allows any opportunities to be properly considered and developed in time, and
- There is limited transparency in how network businesses consider DSP in planning activities.

It is proposed by the AEMC that a DSES be introduced that will include documented processes for proactive engagement and information sharing between distribution businesses and non-network solution providers. In theory, this engagement will alert non-network solution providers to emerging constraints while providing distribution businesses with information about whether demand side solutions exist at a scale and location which could address the network need.

The proposed arrangements will require distribution businesses to publish their processes which cover development, investigation, assessment and reporting on potential non-network solutions. Doistribution businesses may also be required to be more transparent around payment principles and methodologies relating to contracting with demand side participants. In addition there will be a requirement for reporting against the application of these processes, for example, in the Annual Planning Report.

As well as process transparency, distribution businesses would be required to maintain a Demand Side Engagement Register (of interested parties) and to maintain and publish a database of non-network case studies. These would be used to demonstrate economic assessments undertaken by distribution businesses.

The AEMC notes that the impact of the proposed Rules will depend on the extent to which demand side participants find the information useful. This appears to be an important caveat. Each situation where a demand side solution is applied is likely to be slightly different. For example, each demand side opportunity will relate to different locations, frequencies and timing of a required load reduction and different service 'values' (and therefore contract pricing). Case studies can only therefore provide a limited guide as to what sorts of services might be procured by distribution businesses and what the structures of arrangements are. Given the likely requirement for sanitisation of commercial information from the case studies, their utility could be further reduced.

5.1.2 Regulatory Investment Tests

The current specification of the RIT-T, and the proposed RIT-D, allow for the proper consideration of the costs and benefits of demand-side projects and do not prevent broad based DSP projects proceeding.

The stated intention of the RIT-T and proposed RIT-D are to create a process whereby network businesses can identify the credible option for meeting a network need that maximises the net present value (NPV) of economic benefits, regardless of whether the solutions is provided by network assets or other demand side technology. The analysis can conclude that a solution with 'negative benefits' is still

appropriate and this situation could occur where a network need is driven by a reliability standard.

The 'test' includes a requirement for network businesses to consult on options to meet a specific need and on the economic analysis applied in choosing the most efficient which solves the problem.

The three main steps are:

- Specification threshold test – this is a screening test to check if thresholds are met that trigger a particular path of consultation. At this time a check can be made for whether scope exists for the application of non-network alternatives. The test also includes a requirement for network businesses to consider the scope for non-network solutions in the circumstances – basically to consider whether 'technically feasible' options could exist.

- Project specification – at this time a network business would develop and consult on alternative options. This is approximately a four month process. While four months may be too short a period for a significant demand side option to be identified and specified to a 'credible' level of detail from scratch, the other supporting processes (APR and DSES) do provide possible demand side participants with an early indicator of a need.

- Project assessment – this process is the key economic cost and benefit assessment of credible options.

The AER is required to publish guidelines to cover many important details including definitions, analysis approaches, methods for estimating costs and benefits, and for dispute resolution.

Network businesses are required to undertake a cost benefit analysis of each of the credible options in a range of scenarios. With one of the fundamental objectives of the RIT being to remain technology neutral, there does not appear to be any inherent barrier to DSP when this analysis is undertaken. Indeed, the current specification of the tests allow network businesses to include generation cost reductions, and for distribution transmission cost reductions, as benefits under the test. This is key to ensuring that network businesses properly assess the benefits from the perspective of electricity users more broadly.

Another factor with respect to the RIT is whether it 'allows' for certain types of projects to proceed. In particular, concerns have sometimes been raised that these economic tests only apply when there is a specific project in response to a constraint. As a consequence, it is perceived that there is no allowance for broader based projects. It is important to note in this respect that the RITs do not prevent a network business from undertaking a project. They are purely a consultation and transparency tool. Therefore, a network business is free to undertake any expenditure it considers is in the interests of delivering its required service obligations efficiently. Further to this, we note that the AER, either through operating or capital expenditure allowances, or through the DMIS, is able to provide an allowance for broader based projects irrespective of whether a RIT assessment is undertaken or not.

In summary, while applying a proper cost benefit analysis may be complex, and unfamiliar for distribution businesses, there does not appear to be a bias against a complete assessment of costs and benefits or DSP in the framework.

5.2 Jurisdictional planning standards

Where planning standards factor in the economic costs and benefits of maintaining reliability they do not present a bias against the proper consideration of DSP options. For deterministic planning standards this economic assessment is done at the time the standard is developed. For probabilistic planning standards the economic assessment is undertaken at the time a project is proposed.

DSP and network assets are not directly comparable in performance. When planning a network to meet local security criteria network businesses considering network and DSP options to meet a need must take account of the different 'output' performance of each. Network assets will normally be assumed to be highly reliable and fully available while DSP options can have different performance characteristics – they may not be as reliable (eg due to human factors) or fully available (eg due to contract terms which limit the number of load reductions in defined time period). Further, different types of DSP will have different reliability and availability profiles.

Taking account of these aspects in network planning is complex, potentially time consuming and could lead to a lack of transparency. The considerations are slightly different for deterministic and probabilistic planning criteria.

Deterministic planning standards create a 'trigger for action' when peak load is higher than the 'firm' capacity of the network or area of it. The application of deterministic planning standards is therefore relatively simple and transparent. However, in considering solutions to the constraint the network business needs to choose an option which ensures that peak demand is less than the firm capacity. It can choose to therefore to increase firm capacity through investing in assets or apply a demand side option to bring peak demand below existing firm capacity.

While a specific DSP solution may, on the face of it, appear to be lower cost, if the solution only partly addresses the need it cannot be relied upon as a solution to meet a reliability standard. In this case either some other mechanisms to increase the firmness of the DSP solution would need to be identified or a network solution would need to proceed. Solutions may include diversifying DSP providers. Nevertheless, in circumstances where the deterministic standard has been derived on an economic basis this is not an inherent barrier to DSP. It simply means that without additional DSP capacity a particular non-network option is insufficient to meet the network need.

The outcomes under a probabilistic planning standard should be the same, or similar, to those that would exist under an economically derived deterministic standard. That is, again there is a trade off require between the firmness of a DSP option and the value customers place on reliability. The main difference, however, is that because a probabilistic assessment is done each time a network need arises it can rely on more up-to-date information about relevant matters such as the value customers place on reliability.