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Mr Warwick Anderson

General Manager, Network Regulation

Australian Energy Regulator

Submitted by email: DM@aer.gov.au

Dear Mr Anderson,

RE: Demand Management Incentive Scheme Supplementary Submission

Thank you for the opportunity to provide additional comments on the development of the DM Incentive Scheme to follow up the Options Workshop on 5 April 2017.

In response to that workshop and the issues raised, we have undertaken significant further modelling and conceptual analysis. As noted below, we would be very pleased to share the full modelling analysis with you.

Please find our supplementary comments attached.

Best regards,

Chris Dunstan
Research Director
Institute for Sustainable Futures

1. Should we introduce a Scheme?

It was disconcerting that the AER started the Options Workshop with this question, given that the AEMC recommended a Demand Management Incentive Scheme (DMIS) in 2012, the COAG Energy Council endorsed this recommendation through a formal Rule change request in 2013, and the AEMC undertook a thorough review that concluded in a Rule Change in 2015 that requires that "the AER must develop a demand management incentive scheme" (NER, s. 6.6.3). There is therefore very clear policy and legal intent that a meaningful and effective DMIS should be introduced.

We therefore presume that the AER intended this question as a rhetorical device to discuss the rationale for and the detailed intent of the Scheme, rather than to call into question whether a Scheme should be introduced. Based on this presumption, we offer the following comments:

Reasons NOT to introduce a Scheme:

1.1 Not entirely clear there is a regulatory bias against DM (CESS, ↓augex)

There has been a longstanding and widespread perception that there are both regulatory and non-regulatory biases against DM. For example, our original submission referred to our research from 2011 on perceived biases against DM.

However, in recent years, the AER has undertaken important reforms to address this bias by, for example:

- moving from an average price cap to a revenue cap model of price regulation to decouple network revenue from sales volume, and
- introducing a Capital Expenditure Savings Scheme (CESS) to offer an incentive to Distribution Network Service Providers (DNSPs) to reduce capital expenditure (capex).

In the wake of these reforms, does a remaining economic regulatory bias persist? The submissions to this process indicate that most stakeholders believe that the answer to this is yes, and they have offered some evidence to support this view.

However, it is also possible to address this question empirically by modelling the operation of the AER's regulatory system.

As discussed in our initial submission, ISF has undertaken modelling to answer this question of regulatory bias. As noted in our initial submission, we have found that there is significant remaining bias in the existing economic regulation as it applies to DNSPs.

The nature of this bias is outlined in detail in our original submission which found:

> *"There are significant barriers to implementing distribution network DM solutions, including:*
>
> 1. *There is a bias in favour of network capital expenditure (capex) solutions relative to DM operating expenditure (opex) solutions;*
> 2. *Recovery of DM opex is treated less favourably than other network opex; and*
> 3. *Future 'option value' is generally excluded when considering DM solutions…"*

The study undertook this assessment of bias by investigating four hypothetical network constraint case studies, which were developed in consultation with our Study Reference Group (SRG) comprising a wide range of stakeholders:

1. Aging urban high voltage cables at the urban regional scale;

2. Low voltage distribution feeder voltage management, reflecting challenges including those associated with high penetration rooftop solar;
3. Urban fringe distribution zone approaching capacity, due to new residential development;
4. Rural edge distribution feeder approaching end of economic life.

For each constraint, we developed plausible hypothetical network capex and DM option solutions, with our Study Reference Group. In each case, we found that a higher net profit outcome for the DNSP using the Network Capex solution than the DM Opex solution, even though the DM Opex solution generally delivered a lower cost for consumers.

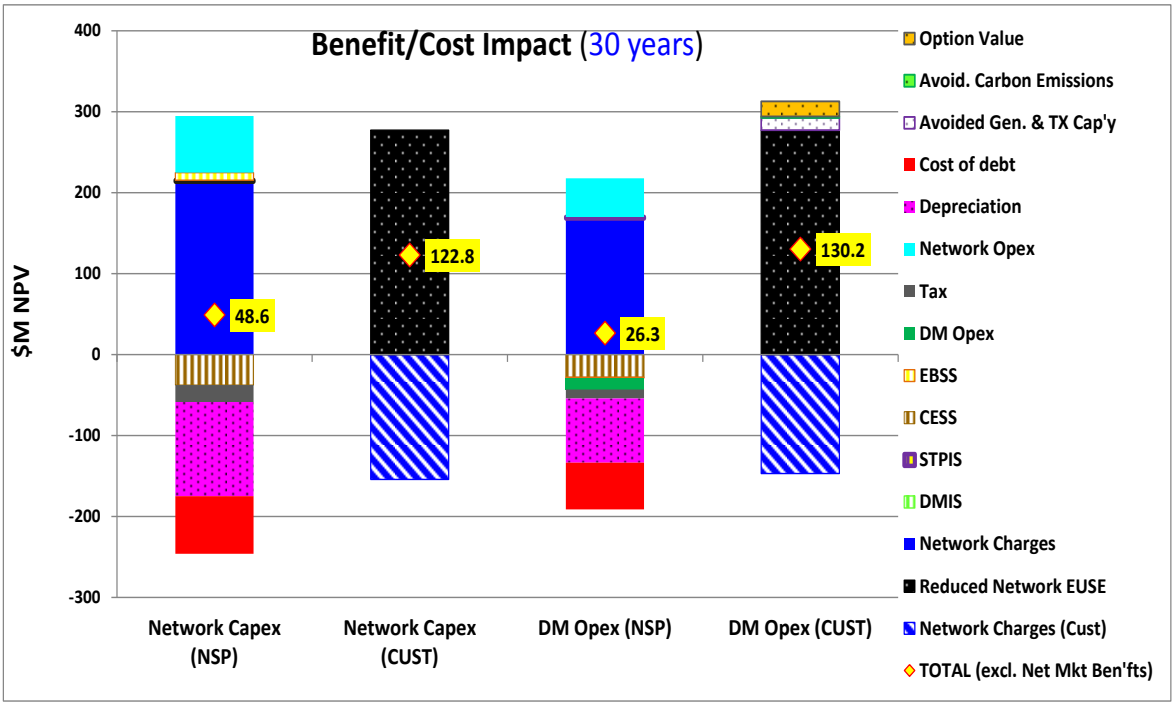


Figure 1. Cost-benefit analysis- Network Capex vs DM Opex (Case 1: 30-year perspective)

(Original Analysis)

Following our initial submission, ISF was grateful to receive feedback from AER staff, including pointing out two errors in our modelling analysis. These errors were:

- We had applied the CESS calculation method to the Efficiency Benefit Sharing Scheme (EBSS);
- We had attributed some accrued costs as recoverable within the first regulatory period, which is contrary to the AER's current ex-ante approach to cost recovery.

Fixing these and several other minor errors led to slightly different results in our analysis, as shown in Figure 2 below. In particular, note that the relative difference in net profit outcome between network capex and DM opex solutions is fairly similar: ($48.6m - $26.3m = $22.3 million in the original analysis, versus $44.6m - $25.8m = $18.7 million in the revised analysis). In both instances, the Network Capex is significantly more profitable than the DM Opex solution from the DNSP's perspective.

The revised analysis shows that the total net benefit for consumers for the DM Opex solution relative to Network Capex solution has increased (from $130.2 - $122.8m = $7.4 million in the original analysis, to $128.3 - $94.1m = $34.2 million in the revised analysis). In summary, the Network Capex solution is more profitable for the NSP, while the DM Opex solution delivers lower cost for consumers.

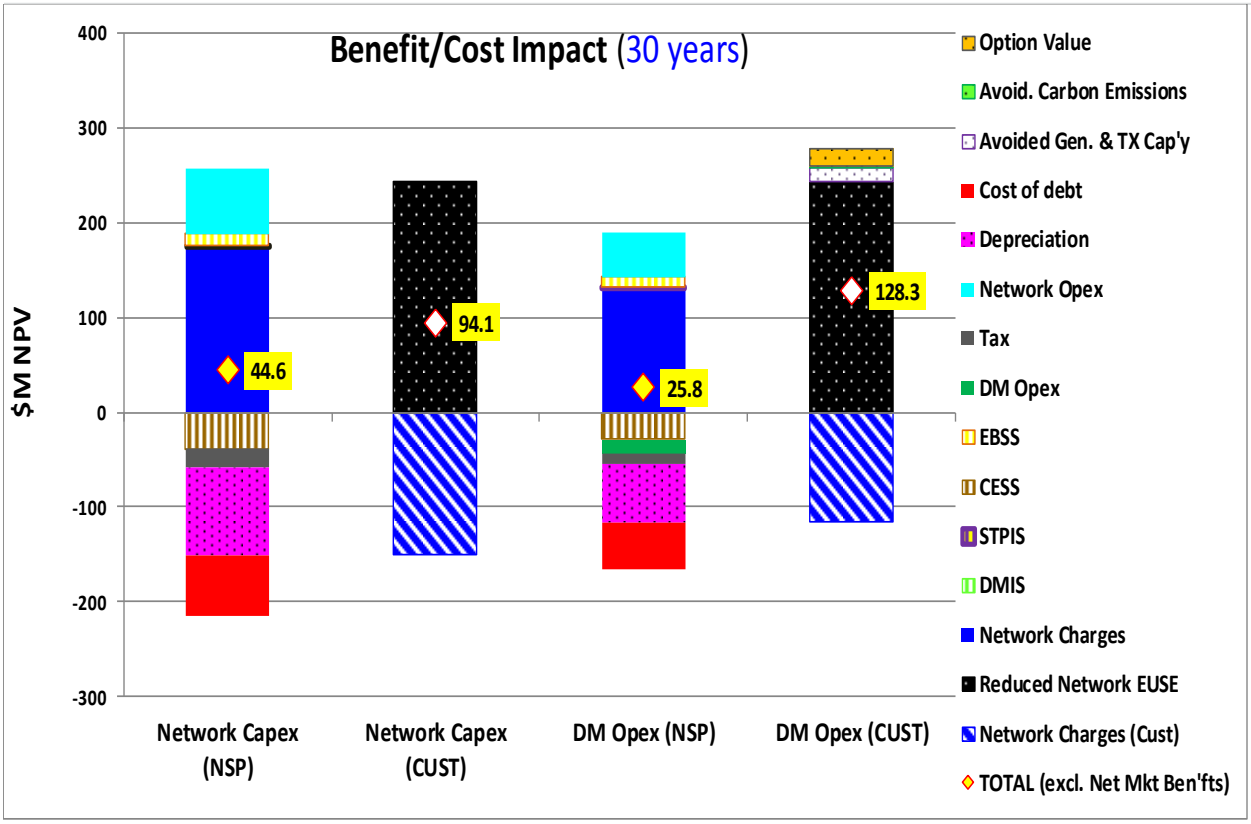


Figure 2. Cost-benefit analysis- Network Capex vs DM Opex (Case 1: 30-year perspective)

(Revised analysis)

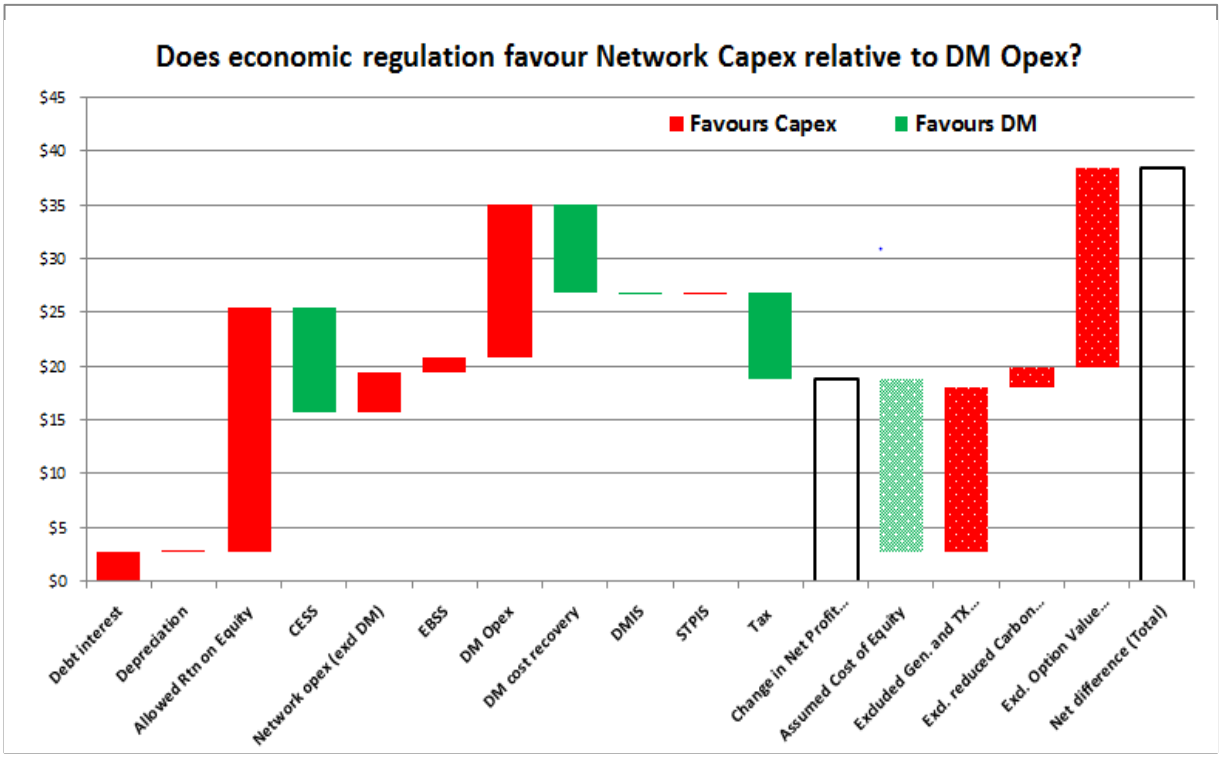
All of the above values exclude the additional value of net market benefits that DM can provide. In the revised analysis, a similar pattern of "what is good for DNSPs is bad for customers" was observed in two of the four network constraint case studies, if net market benefits are excluded, and in all four case studies if net market benefits are included. This suggests a bias in favour of Network Capex solutions and against DM Opex solutions.

To be clear, DM is not always a lower cost solution for consumers than network capex and testing this was not the purpose of this study. Rather, this study indicates that in a range of plausible scenarios ***where DM is a lower cost solution***, ***the current regulatory settings will tend to discourage NSPs from adopting DM because it will adversely affect DNSP profitability***.

In order to illuminate the drivers of this bias, ISF has undertaken further analysis to disaggregate the components of the difference in net profit result for the Network Capex and DM Opex solutions. As noted above, our modelling found this difference to be $18.7 million in Case 1, that is, the Network Capex solution was $18.7 million more profitable than the DM Opex solution for the NSP. This difference is shown as the smaller of the two black rectangles in Figure 3 below. The red bars represent factors that contribute to a higher net profit for Network Capex relative the DM Opex, and in contrast, the green bars indicate factors which favour the profitability of the DM Opex solution.

The largest drivers favouring the DM Opex solution are:

- the CESS, which effectively means the NSP is not able to recover from customers all of the additional $300m in network spending on the network capex options
- DM Opex cost recovery, via AER's normal base-step-trend opex forecasting mechanism.



- Tax, which offsets the increased profit of the network capex options.

Figure 3. Disaggregation of drivers of higher net profit for Network Capex in case 1

The major drivers for higher net profit for the Network Capex solution are:

- The cost of the DM Opex solution, of which only about half is recovered via DM cost recovery;
- Allowed return on equity (pre-tax). However, this is to a significant extent offset by tax (paid out of the gross profits) and the assumed cost of equity (paid out of net profits); and
- Interest on debt, non-DM opex (net of cost recovery) and the EBSS are the significant other contributors to the higher net profit for the Network Capex solution.

In addition to the differential impact on NSP profit, this analysis also shows the relative impact of estimated net market benefits. As discussed in our original submission, there is some uncertainty about how to estimate the value of these net market benefits, so ISF has taken a conservative approach to estimating these values which probably understates their true value. As net market benefits are explicitly referred to in the DMIS Rule (6.6.3c), **it is strongly recommended that the AER undertakes its own assessment of these values**.

It should be noted that there are by necessity very many assumptions in the data and the mathematical relationships in this modelling. Subject to the limited time available and budget constraints of the project, ISF has endeavoured to apply transparent and unbiased estimates

throughout. ISF strongly **recommends that AER draw on its own resources to verify and where it judges appropriate improve on these assumptions**. To this end, ISF would be very pleased to make the full revised modelling available to the AER.

It should also be noted that **this modelling is not intended to provide a complete analysis of all potential biases against DM that are relevant to the AER's deliberations**. For example, this modelling does not take account of the following other potential biases:

- Any cultural preference within the NSP for network capex over DM opex, due to for example, familiarity, convention or organisational expertise.
- Opex cost pass through is largely based on *actual* expenditure, via the base-step-trend opex forecasting approach, while Capex pass through is largely based on regulatory *estimates* of cost of capital.
  This may give the DNSP more capacity to increase profit via capex rather than opex, for example:
  - Cost of debt may be less than that assumed by the regulatory model.
  - Cost of equity may be lower than that assumed by the regulatory model.

1.2 Better to address imbalanced incentives outside the Scheme

While it may in principle be "better to address imbalanced incentives outside the Scheme", this has been an in-principle option for many years and yet major imbalanced incentives remain, due to both factors under AER's control and factors not under AER's control. Until such time as these imbalanced incentives are redressed, the Scheme should be developed and implemented in accordance with the National Electricity Rules.

1.3 Other ongoing reforms should increase DM (e.g. RIT-D, pricing)

Other ongoing reforms, such as the RIT-D and cost reflective network pricing, have an important role to play in supporting cost effective DM. However, other reforms also have their own limitations and to date have failed to deliver an efficient level of network DM (and other DM). These other reforms are likely to be much more effective in the context of a complementary well designed and implemented DM Incentive Scheme.

1.4 May undermine efficient market development

It is important for the AER to seek to encourage efficient market development. At first glance, using the DMIS to create a more level playing field for DM is likely to create a more efficient market. In the current context, where the NSP does not face balanced incentives to seek DM solutions, there will be little or no market for network DM.

Building the network DM market is also likely to support the development of other segments of the DM market, such as DM in the wholesale and retail energy market and in ancillary services.

Establishing a well designed and implemented DMIS will not undermine efficient market development. It will enhance efficient market development.

Reasons to introduce a Scheme:

The AER lists a number of possible reasons to introduce a DMIS. These include:

- Kick-start efficient DM procurement;
- Address a perceived capex bias;
- Enhance DNSP's incentive to incorporate option value;
- Allow DNSPs to capture some value at other parts of the supply chain.

While the above are all likely to result from an effective DMIS, they are not essential reasons to introduce a scheme. Rather they are intermediate means for helping to achieve the outcomes that are the essential reasons for introducing the Scheme. These essential reasons include:

- To reduce costs to consumers.
- To give customers more control over their energy bills.
- To enhance the reliability of electricity supply.
- To facilitate government policy about increasing the supply of renewable energy and reducing carbon emissions.

It is recommended that in establishing the DMIS, the AER ensure that effective performance monitoring is in place to ensure that these goals are being met.

2. Should a Scheme include incentives or cost-recovery for supporting infrastructure?

It is not clear why the DMIS should include specific incentives or cost-recovery for DNSPs for setting up infrastructure to support DM market development as opposed to other DM activities.

To the extent that DM infrastructure complements other DNSP supporting infrastructure, they should be recovered on the same basis as other infrastructure. To the extent that they relate to specific DM projects, they could be supported on the same basis as other DM costs within the DMIS.

If DNSPs are effectively incentivised to procure cost-effective DM then they will be incentivised to provide appropriate information to the market

It will be important to provide efficient incentives for competitive 3rd party DM procurement, but this can be done by the design of the DMIS as a whole rather than via specific incentives for supporting infrastructure.

3. Should a Scheme provide financial incentives?

Yes.

As commercial entities, DNSPs have strong drivers and responsibilities to enhance their financial bottom line. They also currently have financial disincentives to undertaking DM as described above. Efficient network DM has been demonstrated to be able to deliver major net benefits to consumers. Well targetted financial incentives to DNSPs for DM will increase the delivery of net benefits to consumers.

Reasons NOT to provide incentive payments

3.1 DNSPs already face obligations to consider efficient DM (e.g. RIT-D, DAPRs).

Yes, DNSPs do have obligations to *consider* efficient DM, but they do not have effective obligations or incentives to *implement* efficient DM.

3.2 If DNSPs choose efficient options, consumers will pay extra for no gain.

It is not entirely clear what this means. If this means, "*If DNSPs **are already choosing efficient DM options**, consumers will pay extra for no gain*", then this would only be true if DNSPs are currently undertaking an efficient level of DM, and this level did not increase in response to the DMIS. Given the current low level of DM in general and network DM in particular in the National Electricity Market, this seems very unlikely.

3.3 If incentive is too high, consumers overpay for the gain (net-loss).

This is not an argument against providing incentives. It is an argument against setting the incentive too high. The AER has an obligation to use its resources and judgement to set an incentive that maximises the net benefit for consumers. Among other things, this means setting an incentive that is high enough to stimulate efficient DM activity by DNSPs, but not so high that DNSPs capture an excessive share of the financial benefits of this DM activity.

This is equivalent to the similar judgement that the AER is required to apply in relation to the EBSS, the CESS, the Service Target performance Incentive Scheme (STPIS), the Network Capability Incentive Performance Action Plan (NCIPAP), etc.

3.4 Accountability potentially inadequate — can we assess value for consumers' money?

This is not an argument against providing incentives. It is an argument in favour of effective and efficient accountability to ensure value for consumers' money. This is an issue that has been effectively addressed around the world wherever DM programs are run by regulated businesses.

Reasons to provide incentive payments

3.5 Overcomes perception of bias → consumer net-benefits

This proposed reason implies that the bias against network DM is only "perceived", rather than real. If this is the view of the AER, it would be helpful if the evidence substantiating this view, could be shared and discussed with stakeholders.

3.5 'Kick-start' efficient DM procurement as BAU → dynamic efficiency

It is likely that the low level of network DM activity has itself been a barrier to efficient DM. Low DM activity means that there is a less developed market for DM products and services and DNSPs are less familiar with the DM. It is crucial that financial incentives are set high enough to achieve dynamic efficiencies in the DM market. A minimal DM incentive payment may lead to a low level of relatively high cost DM activity, without tapping into these efficiencies.

3.6 Linking incentive value to DM value →better valuation methods

A well designed DMIS will also encourage the use of other DM strategies such as more cost reflective network pricing.

3.7 Are consumers willing to fund incentive payments?

The primary reason to provide DM incentive payments to DNPS is to deliver net benefits to consumers. Provided that such net benefits are delivered and made transparent, it is very likely that consumers would be willing to "fund" incentive payments.

As noted in our original submission, overseas data suggest that DM has been very cost effective for consumers. ISF and other stakeholders have for many years been publicly calling for the AER and others to collect and publish systematic data on DM costs, benefits and performance for many years[1]. The absence of such publicly available data has retarded the development of efficient DM in Australia. It is imperative that this gap is filled as soon as possible, both in order to provide baseline data to monitor the impact of the DMIS and to inform consumers about the cost effectiveness of both DM and network expenditure.

4. How can we link incentives to performance?

ISF's original submission recommended that the best way to link incentives to performance was to create a DM incentive payment that is proportional to benefit delivered as measures by reduced peak demand, that is an incentive payment of the form: $\$x/kW_{peak}$ per year.

We recognise that not all network investment is driven by peak demand and consequently not all DM is best measured as avoided peak demand. For this reason, in our original submission, ISF recommended that the AER "normalise DM cost recovery", including by encouraging DNSPs to propose DM expenditure as part their normal expenditure program and not rely on the DMIS to recover the cost of this DM.

ISF also notes that a peak demand reduction performance based incentive would require a means for the AER to measure and verify DM performance. Such mechanisms have been established overseas. For example, the comprehensive International Performance Measurement and Verification Protocol (IPMVP)[2] has been developed to support this role.

On the other hand, ISF notes that the AER has flagged the option of a DM cost uplift mechanism as an alternative to a performance based incentive. While ISF has concerns about a mechanism that is tied to expenditure, rather than to performance, it recognises that such an approach could be effective if it is complemented with a rigorous measurement and verification system to ensure efficiency and value for money for consumers. Such an approach could also have potential benefits in the early stage of a DMIS in reducing uncertainty about funding and reducing the scope for complex technical and administrative processes.

If a DM cost uplift option is adopted, it should be accompanied by effective and transparent measurement, verification and reporting systems.

ISF supports accountability by requiring competitive procurement by DNSPs to find the efficient DM options, where possible. However, the AER should not preclude alternative procurement processes where these can be shown to deliver a superior outcome for customers. For example, in high cost delivery areas on the rural fringe of a DNSP's service territory (as in case study 4), competitive procurement may not elicit any viable bids for DM service provision, and the DNSP may be best placed to provide low cost DM services. In such a case, as in all cases, the onus should be on the DNSP to demonstrate that they are adopting the lowest cost option for customers.

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[1] See for example:
Dunstan, C., Downes, J. & Sharpe, S. (2013) ***Restoring Power: Cutting bills & carbon emissions with Demand Management***, Institute for Sustainable Futures, University of Technology Sydney. Prepared for the Total Environment Centre
Dunstan, C., Ghiotto, N., Ross, K., (2011) ***Report of the 2010 Survey of Electricity Network Demand Management in Australia***. Prepared for the Australian Alliance to Save Energy by the Institute for Sustainable Futures, University of Technology, Sydney.

[2] Lawrence Berkeley Lab, ***International Performance Measurement and Verification Protocol***, http://mnv.lbl.gov/keyMnVDocs/ipmvp

In order to maintain consistent regulatory treatment between network capex and DM opex solutions, the AER should allow cost recovery of DM resources procured, rather than DM resources used. Just as a new transformer or cable may not be used at full capacity or at all in a given year, not dispatching a DM resource in a given year does not mean that this was not an efficient expenditure in order to provide a reliable network system. On the other hand, for measurement and verification purposes and in order to build DNSP, AER and customer confidence in DM resources, it is important that such resources are regularly used, even if system reliability does not strictly demand this.

5. How should we determine the magnitude of financial incentives?

Determining the magnitude of the financial incentives must begin with determining the form of the incentives. In its original submission, ISF recommended an incentive form of dollars per kilowatt of demand reduction per year, and recommended that, based on this form, an appropriate level of the incentive would of the order of $50 to $100 per kW_{peak} per annum. Our further modelling analysis has not given us reason to change this recommended range significantly.

In response to the discussion at the DMIS option day, regarding the DM Cost Uplift, ISF has considered what level of DM Cost Uplift would be appropriate in order to stimulate DNSPs to undertake efficient network DM while still maximising net benefits to consumers.

Drawing on the same analysis as discussed in section 1.1, our analysis assessed the level of DM cost uplift necessary to achieve three different outcomes:

1. **Low cost uplift:** What level of DM cost uplift would be required to equalise DNSP's net profit less assumed return on equity for Network Capex and DM Opex solutions? This is the minimal level to seek to neutralise the regulatory bias against DM, but would only be effective if:
    a. DNSP are motivated purely by maximising return on equity, rather than net profit;
    b. the assumed cost of equity and cost of debt are no higher than the actual cost of equity and cost of debt;
    c. net market benefits are ignored; and
    d. other cultural and non-regulatory bias are not significant.
2. Medium cost uplift: What level of DM cost uplift would be required to equalise DNSP's net profit for Network Capex and DM Opex solutions? This level assumes that net profit is a reasonable proxy driver for decision making by DNSPs. It does not take account of the cost of equity on the one hand, or the value of net market benefits on the other.
3. High cost uplift: What level of DM cost uplift would be required to equalise DNSP's net profit, less assumed return on equity, plus net market benefits for Network Capex and DM Opex solutions? This level assumes that return on equity is the key underlying driver for decision making by DNSPs but then allows them to capture the full value of net market benefits. This level would maximise the level of efficient DM, but would also mean that the DNSPs capture the full value of net market benefits. The AER should not set the DM cost uplift at this high level.

The results of this analysis is shown in **Figure 4**.

DM Cost Uplift – Bias Equalising Goal Seek Analysis					Medium	Low	High
Case	Net profit (NP): **Network Capex** ($m NPV- 30 years)	NP: **DM Opex** ($m NPV)	DM Opex Cost: **(DMC)**	Net profit: **Diff** ($m NPV)	**Profit** Equalising uplift (%): **(NP:D = 0)**	**(Profit - RoE)** eql'sing uplift (%)	**(Profit -RoE +Net Mkt Ben)** equalising uplift (%)
1	44.6	25.8	14.1	18.7	142%	21%	290%
2	0.1	-0.3	0.7	0.4	60%	40%	104%
3	4.7	-3.9	9.5	8.6	106%	37%	144%
4	0.7	-2.3	6.6	3.0	52%	36%	188%
Avg					**90%**	**33%**	**181%**

Figure 4. Estimated DM Cost Uplift to offset current bias in favour of Network Capex

As shown, the DM Cost Uplift required to **neutralise the bias in NSP Net Profit** outcome across the four cases examined would average 90% (range: 52% to 142%).

To neutralise the **bias in (NSP Net Profit minus assumed return on equity)** across the four cases would average 33% (range: 21% to 40%).

To neutralise the **bias in (NSP Net Profit, minus assumed return on equity, plus estimated net market benefits)** across the four cases would average 181% (range 104% to 290%). However, as noted above, to offer a DM cost uplift at the top of this range means that the NSP would capture the full value of net market benefits (which is not a desirable outcome!).

It is apparent from this analysis that the appropriate uplift level depends on the particular context, and there is no single "correct" level for a DM Cost Uplift. However, based on the above analysis a reasonable DM Cost Uplift should be above the "low" level and below the "high" level. Consequently, **ISF recommends a DM Cost uplift of around 90%** of the cost to the DNSP of the DM solution. To offer a broader range for guidance in setting the level, the AER could aim to set the DM Cost uplift **between the upper bound of the lower range (40%) and the lower bound of the upper range (104%).**

ISF believes that there would be merit in examining a wider range of case studies and assumptions than has been possible in this analysis, and recommends that the AER undertakes or commissions further analysis to increase its confidence in setting the level of the DM cost uplift it chooses to adopt this approach.

6. How should the Scheme account for interactions with other incentives?

ISF has no further comment on interaction between the Scheme and the STPIS beyond that it made in its original submission.

In relation to the EBSS, ISF notes that, as illustrated in **Figure 3**, the impact of the EBSS on the profitability of the DM Opex solution, relative to the Network Capex solution, is negative but relatively modest. It is therefore recommended that instead of further complicating the operation of the EBSS by excluding DM opex, the AER should simply take account of this factor in setting the level of the DMIS.

The other crucial interaction that the AER should consider in the design of the operation of DMIS, relates to the expenditure planning undertaken by DNSPs as part of the five yearly regulatory reset. As noted in our previous submission, it is crucial that proposed DM opex and its cost recovery be treated no less favourably than capex and other opex. ***It is therefore crucial that this principle, the operation of the DMIS and the treatment of network DM be made very clear*** to DNSPs, and interested stakeholders, as part of the AER's Framework and Approach to the forthcoming regulatory determinations.

7. Demand Management Innovation Allowance:

We have no further comment on the DMIA at this stage, beyond what was included in original submission.