ESIA Submission
Energy Security Target and Safeguard
Consultation Paper

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Submitted via energysecurity@environment.nsw.gov.au to:
Director, Climate Change and Energy Savings Policy
NSW Department of Planning, Industry and Environment (DPIE)

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Engagement

The Energy Savings Industry Association (ESIA) is pleased to make this submission in response to the New South Wales (NSW) Energy Security Target and Safeguard released on 33 April 2020 by the NSW Department of Planning, Industry and Environment (DPIE). (Refer to https://energy.nsw.gov.au/media/2031/download)

We welcome the opportunity to discuss this submission prior to a final Report due to be tabled later in 2020. For more information, please contact comns@esia.asn.au

About ESIA

The Energy Savings Industry Association (ESIA) is the peak national, independent association representing and self-regulating businesses that are accredited to create and trade in energy efficiency certificates in market-based energy efficiency and demand reduction schemes in Australia. These activities underpin the energy savings schemes which facilitate the installation of energy efficient products and services to households and businesses. Members represent the majority of the energy efficiency certificate creation market in Australia. Schemes are established in Victoria, NSW, SA and the ACT. Members also include product and service suppliers to accredited providers within the schemes. As well, the ESIA represents member interests in national initiatives that include demand reduction and energy efficiency such as the Federal Government's Climate Solutions Fund.

Abbreviations

AEMC – Australian Energy Market Commission
AEMO – Australian Energy Market Operator
AP – Accredited Person
DMIS – Demand Management Incentive Scheme
DSR – Demand Side Response
DSRP – Demand Side Response Participant
EEOL – Energy Efficiency Opportunity List
ESC – Energy Savings Certificate
ESS – Energy Savings Scheme
EST – Energy Security Target
HVAC – Heating, Ventilation and Air Conditioning
PDRP – Peak Demand Reduction Scheme
PERC – Peak Energy Reduction Certificate
REC – Renewable Energy Certificate
Safeguard – Energy Security Safeguard
SRES – Small-scale Renewable Energy Scheme

Executive summary

The Energy Savings Industry Association (ESIA) is pleased to make this submission in response to the New South Wales (NSW) Energy Security Target and Safeguard released on 33 April 2020 by the NSW Department of Planning, Industry and Environment (DPIE).

Eight key response themes

1. **Energy Savings Scheme (ESS) targets from 2021-2030 need to be increased sooner with an immediate step up from 2022 and with the 13% target to be reached by 2026, well before the proposed 2030 date.** Otherwise large ESC surpluses will continue, and the ESC price will remain depressed, stymieing more complex upgrade opportunities, and delaying jobs creation and investment.

2. **Peak Demand Reduction Scheme (PDRS) targets could be three times greater than proposed, ie 3,000MW of reduction by 2030**. The consultation paper states that the indicative PDRS targets were informed by: AEMO's projections of battery systems; and modelling of the E3 program's Regulatory Impact Statement (RIS) for smart demand response capabilities of air-conditioners, water heaters, pool pumps and electric vehicle chargers. Both sources of information are likely to underestimate the speed and scale with which demand reduction activities can be rolled out. Furthermore, there is an array of other options that could deliver significant peak demand reductions beyond battery systems and appliance controls.

    a. **AEMO's battery projections are inconsistent with NSW Government policy commitment.** Firstly, AEMO's projections of battery systems under the fast change scenario are inconsistent with the Government's own target. The NSW Government announced in February 2019 that it would achieve the roll-out of 300,000 new battery systems by 2030 with a combined capacity of 3000MWh[1]. Yet AEMO's projections are for just 1,336.5MWh of battery capacity. One would expect that 3000MWh of battery capacity would have something close to 1500MW of peak export capability and this could be sustained for two hours which would address a large proportion of the extreme peak periods when wholesale power prices surge to several thousand dollars per hour. Assuming 75% of this capacity could be made available during these major peaks, this intervention alone would deliver almost the entire 2030 indicative PDRS target. *(Refer to Appendix A)*

3. **Target levels for the combined ESS and PDRS should:**
    a. **be based on the highest NPV at a discount rate consistent with the current low interest rate environment** and recommendations of economist Nicolas Stern.
    b. **consider NPV to at least 2040, not 2030,** as significant energy-savings value will occur post 2030. *(Refer to Appendix A)*

[1] See: NSW Liberal Party (2019) Helping households cut power bills with clean energy – February 2019, published here: https://nsw.liberal.org.au/Our-Plans/Policies/HELPING-HOUSEHOLDS-CUT-POWER-BILLS

The cost-benefit analysis as it presently stands underestimates the benefits flowing to the community from the PDRS and ESS by truncating the analysis to just 2030. This acts to capture most or possibly all of the costs (which will tend to be incurred upfront when the energy and demand reduction interventions are undertaken) yet excludes a large proportion of the likely benefits flowing from interventions which are likely to last well beyond 2030. Considerations include not being able to value the lifetime savings of activities undertaken closer to 2030, and the positive impact of the ESS and PDRS on downward pressure of electricity prices in the years when major coal-fired power stations are scheduled for closure. Notably, while $2 of benefit for every $1 of cost represents a very high return, further benefits could be captured for the NSW community that significantly exceed their costs. *(Refer to Appendix A)*

4. **Keep the cost of the participation in peak demand reduction markets manageable for small energy customers.** This includes avoiding forcing customers to switch electricity retailers, and ensuring they avoid transaction costs involved in meeting AEMO's dispatch system requirements. *(Refer to Appendix A)*

5. **Establishment of a demand management organisation fully responsible for contracts with end customers** could reduce gentailer conflict of interest issues and will practically support AEMC and AEMO thinking on a two-sided market. Notably, gentailers with capital invested in gas peaking plant are highly conflicted, with peak prices rising to $14,000/MWh for just a few peak event operating days per year.

6. **Fuel switching opportunities need to be broadened and need further consideration given complexities.** Two key principle points to consider that would enable benefits to be effectively counted when switching to cleaner fuels: normalise each fuel type to convert to a MWh equivalent; and ensure that all fuels have the appropriate emissions factor, and this should be marginal and forward looking, particularly where deeming is involved.

7. **The Energy Efficiency Opportunity List needs more stakeholder engagement prior to finalising priority activities**: including explanation and consideration of market pool of opportunity assumptions, data and demand reduction calculations and emissions abatement factor conceptualisation. This 'live' list has the potential to be a primary driver to inform stakeholders of progress of the NSW ESS and PDRS and to provide insights for upgrade opportunities being considered by governments and industry across Australia.

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Setting an Energy Security Target (page 7)

1. **Is the approach to assessing firm capacities from generators, interconnectors and demand response used to meet the EST reasonable and appropriate? Is there an alternative approach?**

   The combined impact of a range of energy efficiency programs should also be considered. Some of these impacts are implicit in AEMO's demand forecasts. However, DPIE's process for setting the EST should specify how energy efficiency is contributing to meet annual targets, including AEMO's assessment.

2. **Is the approach to applying the capacity factors for wind and solar generators reasonable and appropriate?**

   No comment.

3. **Are AEMO's maximum demand forecasts appropriate for use in determining the EST? Should alternatives be considered (e.g. TransGrid's forecasts)?**

   Ensure the Target can account for:
   a) coincident peaks between NSW and Victoria as occurred during summer 2020 *(Refer to Q24 for more information.)*
   b) the impact of climate change which is making peak demand higher and for a more extended period.

   Also refer to response to Question 1.

4. **How often should EST updates be published?**

   At least annually.

Powers to gather information (page 10)

5. **Are the entities required to provide information to the EST register that are listed above suitable and adequate?**

   These requirements ideally should be minimised and use existing arrangements and sources, for example as required by AEMO.

6. **Is there other information that should be provided for the register beyond that listed above?**

   Refer to response to Question 1.

7. **Are the types of projects that may contribute to meeting the EST described above suitable and adequate? How could prospective projects, beyond those identified as committed, be considered within the EST forecast for firm capacity?**

   Refer to response to Question 1.

8. **Many market participants already have requirements to report to AEMO or other market bodies. Where do you consider there may be overlap with these existing requirements that the NSW Government could leverage to ensure industry does not need to report twice? Are there other ways the NSW Government could obtain this information?**

   No comment.

Implementation timeframes for the Safeguard (pages 12-13)

9. **What would be a reasonable commencement date for the new energy saving and peak demand reduction targets? Please provide an explanation for your response.**

   The ESIA recommends that targets for the new ESS and PDRS start from 1 January 2021, or alternatively 1 July 2021 if the Government decides to move the annual compliance period to align with the financial year.

   This would bring forward economic stimulus benefits: getting industry to start investing and creating jobs. There could be flexibility around liable parties meeting their obligations, for example, commencing six months later.

   We understand that the NSW Government may need to provide 12 months' notice to change the existing ESS target and therefore seek an increase announcement as soon as possible.

   Eligibility for the PDRS could start earlier than the start date for the liability. Businesses would be incentivised to start rolling out activities sooner, even though liability would not commence until later. This could apply for activities that already have methodologies in place under the ESS (such as HVAC) and would need little further work on methodologies etc.

   Low-hanging fruit activity opportunities are considered under Question 13.

   Trigger for target review – rule requires clarity

   Note that the NSW ESS has in recent years had a significant oversupply of certificates. In the first six months of 2017 alone, on a pro-rata basis, the ESS target was exceeded by 40 per cent. At that time in 2017, the ESIA (then named EECCA) wrote to the then Minister (on 26/7/17) to request the process of target review commence as soon as possible as this option is in the Electricity Supply Act 1995.[2] This did not occur. Notably, there are ambiguities found in the wording of the legislation which need clarification to enable reasonable interpretation.

   This passed up trigger opportunity to increase targets indicates that increases should already have happened. It also provides justification for bigger targets sooner for the ESS, given that

[2] ELECTRICITY SUPPLY ACT 1995 - SECT 105. Conditions under which energy savings scheme targets may be changed (Source: (http://www.austlii.edu.au/au/legis/nsw/consol_act/esa1995242/s105.html, downloaded 25/7/17) ELECTRICITY SUPPLY (GENERAL) REGULATION 2014 - REG 58A. Conditions under which energy savings scheme targets may be changed. (Source: http://www.austlii.edu.au/au/legis/nsw/consol_reg/esr2014388/s58a.html, downloaded 25/7/17)

there has consistently been an over-creation of certificates for the past five years.

Need for better data collection, transparency, and use

The ESS, and pending PDRS, will benefit greatly from more transparent availability of data and data collection methods by government. This will greatly assist in reaching bigger targets sooner.

The Victorian Government has been more transparent and more thorough in its ongoing collection and availability to the public of data in relation to VEU upgrades. This has helped industry to better target upgrades sites and to avoid marketing to sites that have already been upgraded. It has also enabled the Victorian Government and the VEU administrator, the Essential Services Commission (ESC) to undertake internal audits. In comparison, the NSW ESS collects little data and relies on its provision from external auditors and does not make this publicly available.

10. **Could elements of either scheme, such as the early accreditation of certificates ahead of surrendering requirements, be brought forward? Please provide an explanation for your response.**

    Yes – see above.

    The ESIA believes that there is opportunity to fast-track some PDRS activity using existing ESS methodologies. The NSW Government could work to isolate a short list of demand response opportunities that exist within approve ESS methodologies to help establish markets and provide stimulus to both the ESS and PDRS that would result in certificate creation in the timeframe suggested in Q9.

    The ESIA would welcome the opportunity to provide a short list in due course in discussion with the NSW Government.

11. **What support does industry need to prepare for the introduction of the scheme? Please provide an explanation for your response.**

    Industry business models will be largely dependent upon calculation methods decided by the NSW Government. The earlier these are made available, the more readily industry will be able to prepare and plan investment.

    DPIE and/or the scheme administrator will need to continue to educate the market surrounding the opportunities to deliver the PDRS. Tools that have been used to establish and support the existing ESS should be used as a basis (forums, method guides etc).

The NSW Government will extend the ESS to 2050 and increase targets (pages 16–17)

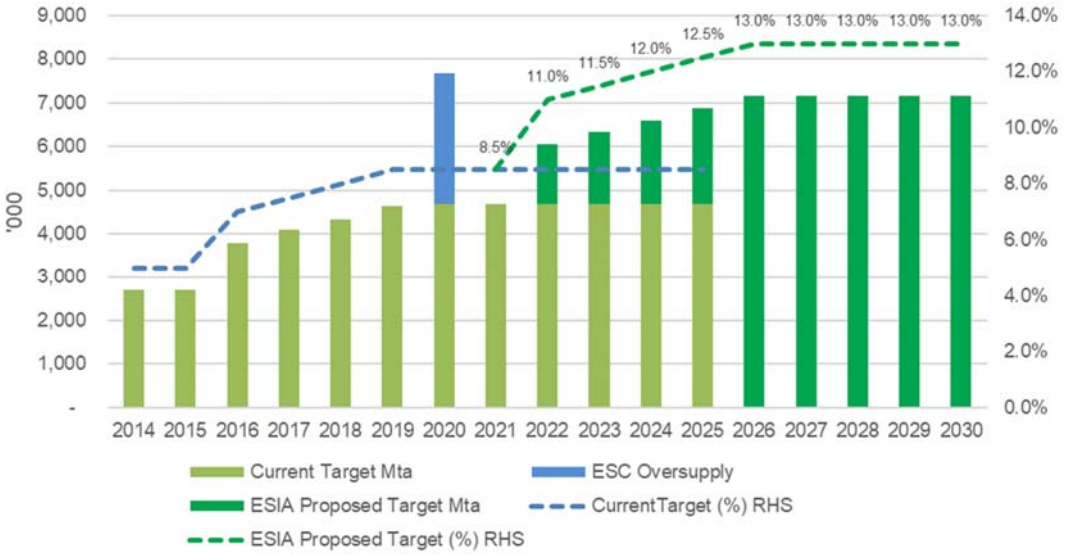
12. **What issues should the NSW Government consider when setting targets to 2030? At what rate should the targets be increased to reach 13% by 2030?**

    Energy Savings Scheme (ESS) targets from 2021-2030 need to be increased sooner with an immediate step up from 2021 and with the 13% target to be reached by 2026, well before the proposed 2030 date. Otherwise large ESC surpluses will continue, and the ESC price will remain depressed, stymieing more complex upgrade opportunities and delaying jobs

creation and investment. Given the Government's stated position that it needs to provide liable parties with 12 months' notice, then we recommend that the 2022 target be increased to 11%, which allows for absorbing oversupply of three million ESCs, which was the level of oversupply at the end of 2019.

The commencement of the PDRS target from 2021 will bring forward some abatement activity into the ESS that would not otherwise occur. This means a higher ESS target will be more readily achievable. This complementary start date will provide additional incentive for the upgrade of, for example, HVAC systems that reduce both energy use and peak demand, with the creation of both ESCs and PERCs. (Refer to Chart 1 below)

Chart 1: ESIA proposed ESS target 2022-2030



The extensive oversupply of ESCs in recent years should have triggered a target review sooner, which is now being considered.

13. What are the most promising opportunities once commercial lighting reaches market maturity? What is the likely size and cost of these opportunities?

The ESIA believes that there a significant pool of commercial lighting opportunity remains that is additional. *Please refer to the ESIA Submission to the VEU Lighting Activities Issues Paper.* The co-payment requirement in NSW has resulted in high quality energy saving lighting upgrades but at a slower rate than in Victoria. Commercial lighting should continue to make a significant contribution to the ESS in coming years.

a) Energy Efficiency Opportunity List needs unpacking

Regarding the NSW Government's 'live' EEOL published as part of the consultation, the ESIA recommends that more consultation time is provided to 'unpack' this list for stakeholders, including the assumptions, data and calculations used and their rationale. This 'live' list has the potential to be a primary driver to inform stakeholders of progress of the NSW ESS and PDRS and to provide insights for upgrade opportunities being considered by governments and industry across Australia.

b) VEU RIS activity opportunities identified

The ESIA supports the activities identified in the VEU Regulatory Impact Statement (RIS) 2019 acknowledged as 'Main activities projected for the 2021-2025 period … Some of the key cost-effective measures identified' [3] and encourages the NSW Government to consider these:

- Replacing a non-ducted gas heater with a variable refrigerant flow (VRF) air to air heat pump or split system air to air heat pumps
- Replacing a heating hot water (HHW) gas boiler with either a ground to water heat pump, an air to water heat pump or a water to water heat pump
- Installing a 100kw+ rooftop solar photovoltaic (PV) system
- Replacing a low-efficiency gas boiler with a high efficiency gas boiler
- Installing smart thermostats for ducted gas space heaters
- Integrated and disaggregated whole of building energy management and information systems (EMS).
- Upgrading or introducing electricity meter interface and appliance/webs services
- Introducing smart diverters for electric hot water storage systems to utilise excess solar energy produced by behind the meter rooftop solar PV systems.
- Upgrading IT equipment linked cooling systems
- Upgrading refrigeration EMS

c) Other key recommendations from ESIA

i. **Commercial and industrial projects under PIAM&V** – with greater streamlining and flexibility *(Refer to ESIA Submission to ESS Statutory Review, 20 May 2020)*

ii. **Behind-the-meter solar PV 100+kW** – with Large-scale Renewable Energy Target (LRET) having effectively been met, the LGC price has reduced significantly. 2024 forward prices are now as low as $5 per certificate which means that the LRET increasingly provides little support for abatement from solar greater than 100kW. Solar PV that is installed behind the meter acts in a similar way to other energy savings activities in that it reduces the amount of electricity that a customer needs to use from the grid. As a result, we believe that it should be an eligible activity under the ESS, for example under the PIAM&V methodology, to the extent that it reduces electricity imported from the grid. This approach is consistent with that which is proposed to be incorporated under the VEU. That is, ESCs could be created provided that the project is not registered for LGCs and while the system could export electricity to the grid: only the level of grid electricity displaced would be eligible for ESCs.

iii. **Building shell retrofits (including insulation and draught-proofing)**

iv. **More fuel switching** – including to renewable fuels, and including from grid electricity, natural gas or LPG to biogas or biomass fuels. *(Refer also to Q19.)*

v. **Solar hot water systems replacing electric hot water systems**

(Refer to response below vi. for heat pumps replacing hot water systems.)

vi. **Heat pumps replacing electric hot water systems**

This activity ticks all the boxes as an ideal parallel transition activity:

[3] VEU RIS Dec 2019, p 83. (Source: https://engage.vic.gov.au/victorian-energy-upgrades/targets)

1. **Ease of administration and program introduction** – a successful and proven working model exists in Victoria under the VEU program which is gathering momentum each month.
2. **Availability of quality product:** Australian Standards approved; proven technology is ready for immediate roll out.
3. **Affordable upgrade at scale immediately**: many heat pump types are also eligible for STC's under the RET scheme, so when combined with state-based incentives, upgrades are affordable for the great majority of households, supporting immediate uptake at scale.
4. **Methods already established and proven** under the VEU and SA REES, which could be readily adopted. (The NSW Government has targeted stakeholder workshops in train, with significant progress in the area, with learnings from the NSW HEER method.)
5. **Pool of opportunity significant**: NSW government EEOL estimates indicate market penetration rates of 25% which is reasonable and conservative when considering residential and small commercial sites.[4] This appears to align with the assumption that at least one in every three hot water systems in NSW are still operating using electric element heating (1.2 million units across 3 million dwellings (Census data 2016).
6. **Penetration estimates conservative**: the 25% potential market penetration in the EEOL seems conservative, based upon the market insights and affordable product availability with the right incentives
7. **Significant energy savings**: comparable to traditional lamp to LED abatement percentages, creating significant savings opportunities - an average family of four will potentially save $825 each year upgrading an electric element hot water system[5]
8. **Low risk activity with licensed trades and good compliance**: this upgrade type must be installed by a licensed tradesperson (plumber or electrician). There have been minimal compliance concerns under other incentive programs.
9. **Strongly aligned with solar PV generation initiatives**: modern appliances are equipped with timer functionality to operate during daylight hours only (within the self-generation curve), essentially operating on free, 100% renewable, off-grid electricity.
10. **Low cost upgrade**: Heat pumps are one of the lowest cost technologies to implement and one of most technologically and commercial readily available solutions, according to the Federal Government's Technology Investment Roadmap Discussion Paper.[6]

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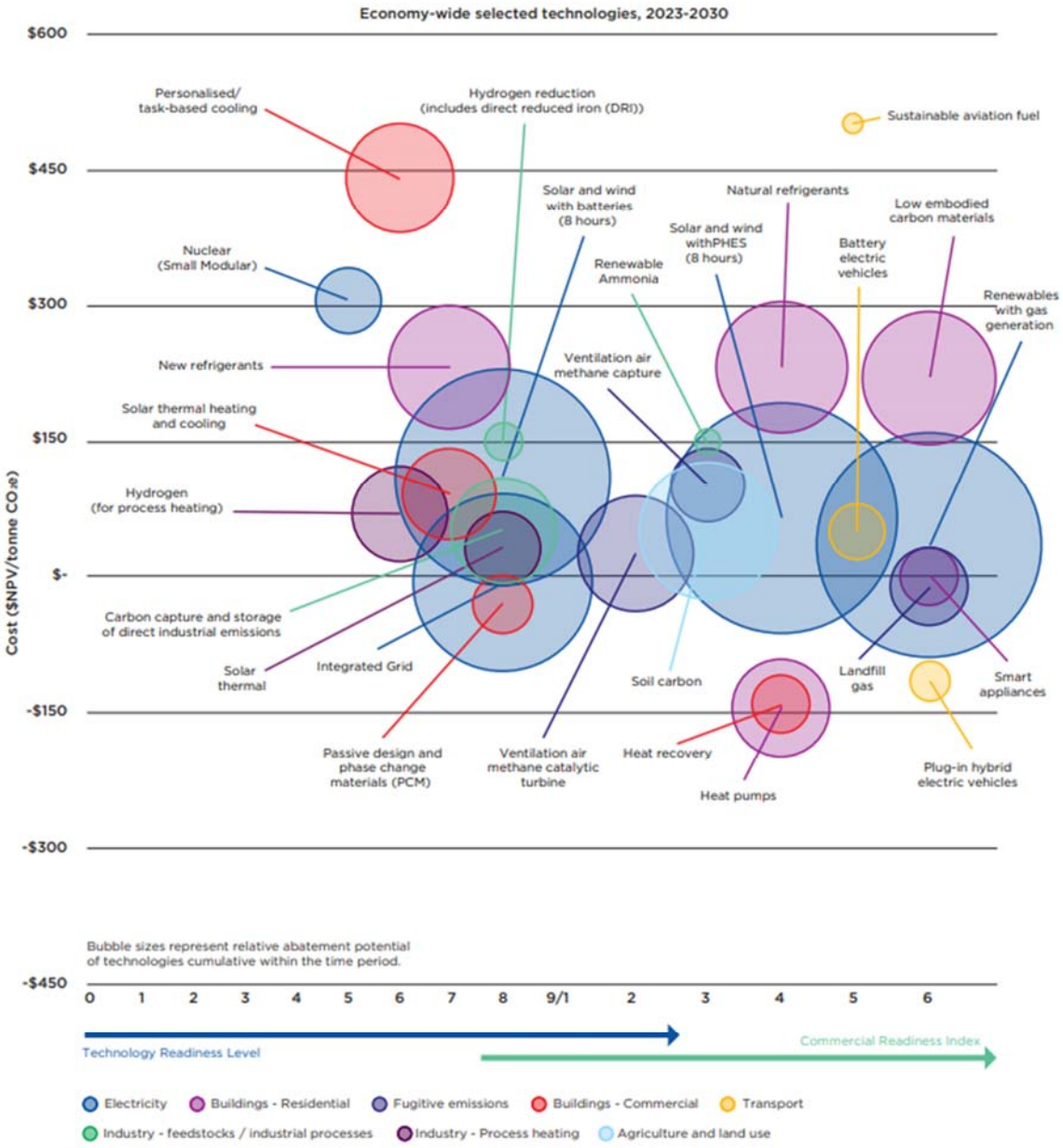
[4] Energy Efficiency Opportunity List downloadable Excel spreadsheet a) Activity ID 697: Replace electric storage with Electric Heat Pump (Residential HI) – number of nominal units 1,199,823, Initial penetration of technology 25%, Applicable number of units: 299,956, Energy savings 86%. b) Activity ID 698: Replace electric storage with Electric Heat Pump. (Residential LI) – number of nominal units 860,034, Initial penetration of technology 25%, Applicable number of units: 215,008, Energy savings 86%. https://energy.nsw.gov.au/government-and-regulation/consultation/energy-security-target-safeguard (Accessed 16/6/20)

[5] Based on comparing hot water running costs for 4 people (150 litres per day) for various water heater types: a) **electric:** peak tariff – storage, no energy rating, annual energy cost $1115 with b) **heat pump**: peak tariff, high efficiency rating, annual energy cost $290. Saving potential $825. https://www.sustainability.vic.gov.au/You-and-your-home/Save-energy/Hot-water/Hot-water-running-costs (Accessed 16/6/20)

[6] Technology Investment Roadmap Discussion Paper: a framework to develop low emissions technologies, department of Industry, Science, Energy and Resources, Australian Government, May 2020. Figure 4: summary of selected technologies with the potential to reduce emission across the economy, 2023-2030, p19. https://consult.industry.gov.au/climate-change/technology-investment-roadmap/supporting_documents/technologyinvestmentroadmapdiscussionpaper.pdf

Graphic 1 – Summary of selected technologies with potential to reduce emissions across the economy, 2023-2030

Figure 4: Summary of selected technologies with the potential to reduce emissions across the economy, 2023–2030



Notes: Refer to Footnote 10 for assumptions. Figure 4 shows a selection of the over 140 technologies surveyed for this Roadmap for the 2023–30 time period. The area of bubbles shows relative abatement potential of technologies over the given time period. Technology and commercial readiness are as projected to the end of the end of the time period (that is 2030). Details of the Technology Readiness Level and Commercial Readiness Index scales are given in Appendix C. The cost of abatement relating to a particular technology is indicated by the centre point of each bubble.

14. What would prevent the uptake of new opportunities? What support (including new standards and calculation methods) does industry need to transition to new opportunities?

Air conditioning barriers

For example, HVAC provides an excellent opportunity particularly when considering the potential demand reduction stacked opportunities. Such as replacing an inefficient split systems air conditioner. However, existing methodologies only allow baselines to be calculated from MEPS baselines. This restricts upgrade potential. What needs to be addressed is the issue of a reasonable approach to baselines, given that there is such of range of technologies to be considered for upgrades (eg gas furnace, resistant, ducted, hydronic). The NSW Government should consider developing a Commercial Lighting Formula kind of solution to target the most inefficient systems.

In comparison, hot water heat pump upgrades are easier to roll out now as the range of baselines to be established are fewer: including the common electric element baseline. The VEU has grasped this opportunity and heat pump upgrades have taken off in recent months.

New Administrator approach needed

The current greatest impediment to uptake of new opportunities is IPART's administrative approach. *(Refer to ESIA Submission to ESS Statutory Review, 20 May 2020)*

Certificate oversupply

The existing oversupply of ESCs as this has contributed to downward pressure of certificate prices. This has hampered investment appetite and uptake in new technologies which require higher ESC prices to be marketable.

15. **What additional data sources are available that could inform assessment of the size and cost of the energy efficiency opportunity in New South Wales? Refer to Appendix B for technical assumptions.**

    Refer to Appendix 1.

16. **What feedback can you provide to improve the other modelling assumptions set out in Appendix B?**

    Refer to Appendix 1.

Penalty rates and exemptions (page 16)

17. **Is the current penalty rate set at an appropriate level to incentivise retailers to buy and surrender certificates?**

    The current proposed penalty regime seems reasonable, if:
    - improvements are made to methods;
    - new methods are introduced; and
    - the administrator works to support the continued development and improvement of the scheme (not against it).

18. **Should small retailers be exempt? If so, up to what size?**

    Given that the whole market for ESCs is very active, it should not be overly burdensome for smaller retailers to comply with their liabilities.

The NSW Government will expand fuel switching activities (page 21)

19. Which cleaner fuel switching activities should the scheme provide incentives for?

All of them should be considered.

20. Should the scheme cover technologies that are being wound down under the SRES? If so, what is the best way to do this?

Yes, this would help to integrate the schemes and ensure they complement each other. However, ensure that there is no support provided twice for the same abatement: 'double-dipping'. The requirements can be made clear. Such as, for an eligible activity, both ESCs and PERCs could be created, but not SRES RECs and PERCs. Ie/ as the SRES tails off incentive attractiveness approaching its 2030 end date, the ESS can top up for the balance of the period. For example, for behind-the-meter solar PV, incentives could be made up of four years under the SRES and 6years under the ESS. (It is likely that most incentives would switch to the ESS in 2026.)

21. How should energy savings be counted for these cleaner fuel switching activities?

ESIA supports the updating of conversion factors so that there is a unique conversion factor for each fuel type, as stated in the consultation paper. This will not only recognise and incentivise innovative and unexpected market activity but draw attention to the breadth and depth of the scheme's vison for achieving energy savings across all energy types.

Two key principle points to consider that would enable benefits to be effectively counted when switching to cleaner fuels:

- normalise each fuel type to convert to a MWh equivalent; and
- ensure that all fuels have the appropriate emissions factor, and this should be marginal and forward looking, particularly where deeming is involved.

That is, consider appropriate formulae for the baseline and upgrade.

The ESIA recommends that this topic be considered in a separate paper with further discussion with the NSW Government.

22. What would be the likely scale of uptake of cleaner fuel switching activities? Please consider the number, size, and cost of projects.

It is difficult to determine the opportunity until it is known how the benefits of fuel switching are to be valued. (Refer to Q21.)

23. Under what circumstances should the NSW Government consider extending scheme liability beyond the electricity sector?

Increase the target commensurately if the scheme liability is extended beyond the electricity sector. Transport has strong links with the electricity sector currently and could provide significant energy saving opportunities.

Public transport systems especially could provide significant savings with targeted support.

The purpose of a peak demand reduction scheme (page 25)

24. How can the scheme's certificates best capture capacity, timing, duration and availability factor?

The ESIA advocates an approach that keeps the metric simple and relates it directly to peak electricity demand in NSW. For example, demand reduction during a period between 5pm and 9pm on hot days in summer. *(Refer to the case study below.)*

Base this period on data-based evidence, considering changes over time such as the level of rooftop solar PV as well as longer term climatic factors including climate change. The approach to changing the relevant timeframe should be transparent and the data should be made publicly available.

The ESIA believes that it is not appropriate to consider wholesale electricity price levels as these can be set by a range of factors including generator bidding behaviour as well as transmissions and generator outages.

Focus needs to be on ensuring that activities are supported that can reduce demand on the system when peaks are likely to occur.

Case study – peak demand NSW and Vic summer 2019-20

The two charts below (based on the accompanying table) illustrate that peak demand in NSW last summer occurred on Saturday 1 February 2020 at 5.30 pm where metered demand amounted to 13,744 MW. Roof-top PV generation pushed the period of the peak to later in the day. In the future, the amount of roof-top PV will increase, and the peak demand period is likely to be even later. A peak demand period of between 5pm to 9pm would seem appropriate.

Chart 2 – Metered demand NSW and Vic Summer 2019-20 (MW)

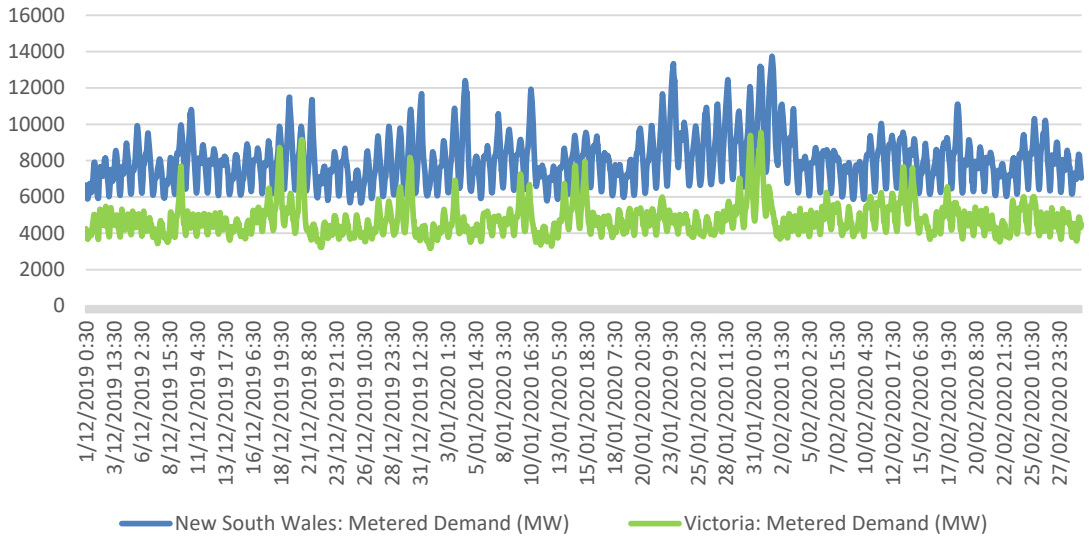
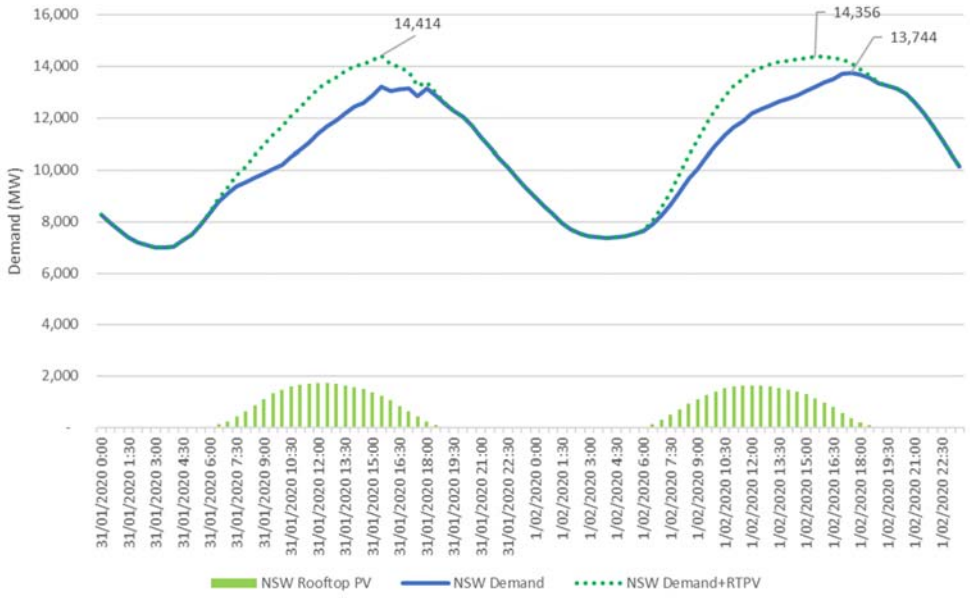


Chart 3 – Metered demand NSW 2019-20: 31 Jan and 1 Feb 2020 (MW)



Actual data from the NEM Review over peak hours for Friday 31 January and Saturday 1 February 2020 are included in the following table, with peak times highlight for each day: at 3.30pm and 5.30pm respectively.

Table 1 – Data: Metered demand NSW 2019-20: 31 Jan and 1 Feb 2020 (MW)

	Friday 31-Jan-20			Saturday 1-Feb-20		
MW	Demand	Rooftop PV	Demand+ RTPV	Demand	Rooftop PV	Demand+ RTPV
11:30	11,053	1,703	12,756	11,883	1,634	13,517
12:00	11,398	1,722	13,120	12,165	1,642	13,807
12:30	11,673	1,712	13,385	12,331	1,622	13,953
13:00	11,903	1,680	13,583	12,483	1,581	14,064
13:30	12,183	1,634	13,817	12,642	1,520	14,162
14:00	12,441	1,576	14,017	12,742	1,474	14,216
14:30	12,583	1,500	14,083	12,865	1,393	14,258
15:00	12,861	1,366	14,227	13,029	1,279	14,308
15:30	13,189	1,225	14,414	13,213	1,143	14,356
16:00	13,035	1,045	14,080	13,380	973	14,353
16:30	13,119	840	13,959	13,507	785	14,292
17:00	13,130	625	13,755	13,695	573	14,268
17:30	12,830	415	13,245	13,744	365	14,109
18:00	13,122	231	13,353	13,682	197	13,879
18:30	12,869	103	12,972	13,540	84	13,624
19:00	12,552	25	12,577	13,336	19	13,355
19:30	12,261	0	12,261	13,224	0	13,224
20:00	12,035	-	12,035	13,121	-	13,121
20:30	11,711	-	11,711	12,928	-	12,928
21:00	11,231	-	11,231	12,619	-	12,619
21:30	10,883	-	10,883	12,181	-	12,181

25. Who is best placed to manage the financial risk that capacity is not made available when needed?

There is little or no risk in the case of permanent demand reduction. Regarding non-permanent demand reduction such as load switching and load management, PERCs should only be available where there is a demand reduction contract in place with a Demand Response Market Participant (DRMP) or electricity retailer. The number of years of deemed years of savings should reflect the length of contract. PERCs could then be created for the subsequent period where the Accredited Person (AP) demonstrates that the demand reduction was initiated in the prior period.
The DRMP will be motivated to dispatch the demand reduction in response to high electricity prices.

As the DRMP provisions which come into effect in October 2021 only apply to large customers, the only mechanism to respond to high prices for smaller demand reduction will be through the customer's retailer. There may well be a potential conflict of interest as a number of market participants also control peaking gas and hydro generators: they may not be incentivised to dispatch demand reduction compared to other resources that they own. There may be a role for the NSW Government to coordinate and provide a price signal for these demand reductions until the DRMP provisions are also available to smaller customers.

Eligible peak demand reduction activities (pages 31–32)

26. Are there other activities the NSW Government should consider for inclusion in the peak demand reduction scheme?

Provide flexibility to allow new and services to demonstrate demand reduction potential.

27. What is the size and cost of the peak demand reduction opportunity available in New South Wales?

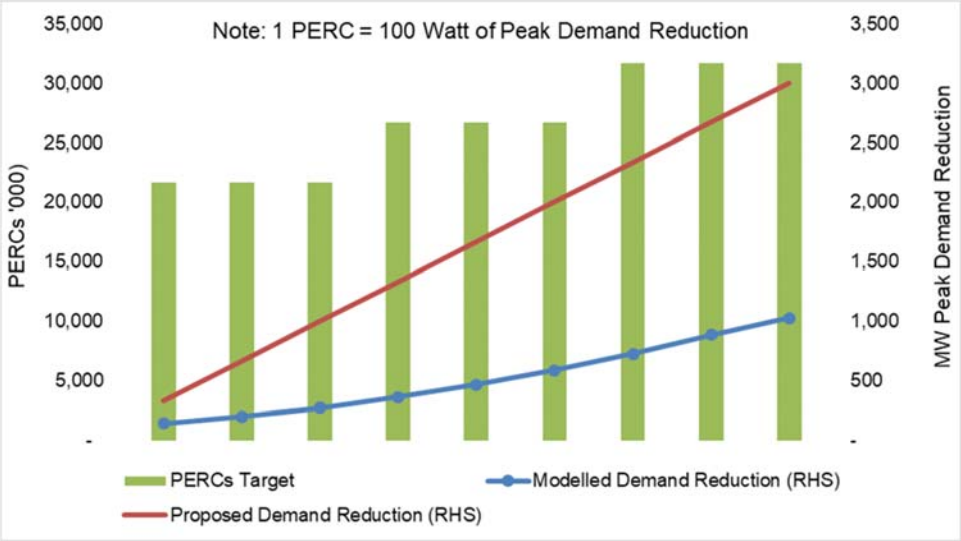
The ESIA recommends that the PDRS targets could be three times greater than proposed: could be three times greater than proposed, ie 3,000MW of reduction by 2030.

Chart 4 below illustrates how the target would increase from 2021-2030. For simplicity, a Peak Energy Reduction Certificate (PERC) target is used based on the following assumptions: a PERC = 100 Watts of peak demand reduction, permanent reduction gets 10 years of deeming, and non-permanent gets three years at a time, with a split of 50:50.

The modelled demand reduction of 1,029MW by 2030 is very conservative and does not appear to reflect the significant pool of opportunity from HVAC and refrigeration, nor the does it incorporate the NSW Government's 300,000 batteries by 2030 policy.

(For more discussion on target considerations: Refer to Appendix 1 – Proposed NSW PDRS targets: ESIA recommendations, notably 3e.)

Chart 4: ESIA proposed PERC target and peak demand reduction by 2030



28. Are there alternative ways in which the peak demand scheme could complement national schemes?

Peak demand reduction also reduces the need to invest in network augmentation and there is an opportunity for activities supported by the NSW PDRS to also contribute to network demand reductions under the Demand Management Incentive Scheme (DMIS) provisions regulated by the Australian Energy Regulator. The ESIA notes, however, that these provisions have been ineffective to date to supporting demand reduction activities in NSW.

29. What are the key issues, and potential mitigation measures, the NSW Government should consider on consumer protection?

No comment.

30. Which calculation methods should be developed first?

Those contributing most to the peak: HVAC and refrigeration.

31. Should location-based multipliers or activities that are specific to certain locations be considered?

Yes, but not initially and they should apply where there are moves to integrate with network demand reduction.

Establishing liability for the scheme (page 34)

32. What are your views on the proposed approach to scheme liability? Please align your response with the topics above.

Retailers should be the liable parties. To keep it simple, liability could be allocated to each retailer based on their liable electricity load, the same as for the ESS.

33. What would be the implications for the available dependable peak demand reduction capacity in New South Wales if the scheme allows carry forward?

As PERCs can only be created once the peak demand reduction activities have occurred, we believe that the same provisions for carry forward are reasonable as currently apply in the ESS.

Peak demand reduction certificates (page 35)

34. What qualifications should certificate providers be required to have?

For simplicity, keep it the same as for the ESS.

35. Should certificates expire every compliance year or should they be transferable to future compliance years? What implications would your preferred approach have for ensuring dependable peak demand reduction capacity in New South Wales?

Should be bankable, the same as the ESS, as this approach works well.

Achieving excellence in administration and regulation (page 37)

36. What is working well with the administration and regulation of the ESS? What features would you want to see continuing, and potentially replicated for the peak demand reduction scheme?

(Refer to ESIA Submission to ESS Statutory Review, 20 May 2020, also to separate documentation provided to Government on this topic, and to ESIA contribution to an independent review of the administration and compliance of the NSW ESS conducted by KPMG during June 2020.)

Development, implementation and review of rules (page 38)

37. Should the annual Rule review and three-year major Rule review process for the ESS and new peak scheme be changed or is it working effectively? Please provide an explanation for your response.

No comment.

38. Would the above ideas help make the Safeguard more customer-centric? Do you have other suggestions?

No comment.

Scheme participants and service providers (page 39)

39. What improvements could be made to the administration and regulation of the ESS that would encourage the creation of effective energy saving activities? Please provide an explanation for your response, including an indication of your key priorities.

(Refer to answer to Q39.)

40. Who should be responsible for developing the capability of service providers to deliver effective activities, the Scheme Administrator or the Department?

(Refer to answer to Q39.)

41. What is the best way to develop the capabilities of service providers?

(Refer to answer to Q39.)

Administrators and regulators (page 41)

42. What are your views on the options to enhance the compliance and enforcement framework of the ESS?

(Refer to answer to Q39.)

43. Are the current provisions for the NCAT review of decisions by the Scheme Regulator and Administrator sufficient? Please provide an explanation for your response.

(Refer to answer to Q39.)

Government (page 41)

44. What key performance indicators and service standards should be considered for the Scheme Regulator and Administrator?

(Refer to answer to Q39.)

45. What else can the NSW Government do to ensure the continuous improvement of the ESS?

Ensure that major decision makers have expertise in the private sector on the demand side, including a sound understanding of how market-based certificate schemes work in Australia.

Appendix A – Proposed NSW PDRS targets – ESIA recommendations

Summary

1. **The targets outlined in the consultation paper fall well short of maximising the potential NPV to the NSW community from a PDRS.**

Recommendation 1
The ESIA recommends that the NSW Government:

a) in its further research and modelling should examine the NPV to the community of setting higher targets than those outlined in the consultation paper and
b) select target levels for the combined PDRS and ESS based on the highest NPV at a discount rate consistent with the current low interest rate environment and the recommendations of economist Nicholas Stern.

2. **The NSW Government's analysis underestimates the net benefits of the PDRS and ESS expansion by not considering impacts beyond 2030.**

Recommendation 2
The ESIA recommends that the NSW Government in its further research and modelling needs to examine the NPV of PDRS targets and enlarged ESS targets to at least 2040, not just to 2030.

3. **PDRS targets significantly greater than those outlined in the consultation paper can be readily achieved.**

a) AEMO's battery projections are inconsistent with NSW Government policy commitment

b) Internet enabled smart appliance controls can be rolled out far faster than assumed by the E3 program

c) There is a range of other activities that could significantly reduce peak demand beyond batteries and smart appliance controls

Recommendation 3

The ESIA recommends that the NSW Government draws upon a far broader set of information on the available scope of peak demand reduction opportunities, and the speed with which they might be rolled out than what is detailed in E3 program's RIS on appliance demand response capabilities and AEMO's projection of battery systems.

d) Keep the cost of the participation in peak demand reduction markets manageable for small energy customers

Recommendation 4

The ESIA would like to assist the NSW Government in designing a model for drawing upon demand response enabled equipment in a way that supports a secure energy system while avoiding the transaction costs involved in meeting AEMO's dispatch system requirements, and avoiding forcing customers to switch electricity retailers.

Full Version

Introduction

The NSW Government's analysis examining the costs and benefits of a new Peak Demand Reduction Scheme (PDRS) provides a very compelling case for its introduction as well as an expansion of the existing Energy Savings Scheme (ESS). This indicates that the introduction of the PDRS coupled with the expansions of the ESS will deliver $2 in benefit to the community for every $1 of cost.

Yet a review of this analysis suggests that the NSW community would be substantially better-off if the PDRS and ESS targets were to be substantially higher than the indicative targets outlined in the consultation paper.

This is based on three issues we have identified:

1. **The cost benefit analysis reveals that the level of the indicative targets falls well short of levels likely to maximise the Net Present Value (NPV) of the PDRS**. While $2 of benefit for every $1 of cost represents a very high return, further benefits could be captured for the NSW community that significantly exceed their costs.
2. **Even though the cost benefit analysis suggests benefits well above costs it still substantially underestimates likely benefits because it fails to consider impacts of the scheme beyond 2030**, even though the useful lifetime of most energy saving activities supported by the scheme will extend well into the 2030s and possibly even into the 2040s.
3. **Peak demand reductions significantly greater than the indicative target can be readily achieved**. The sources of information that the consultation paper indicates have informed the PSRS target are excessively pessimistic and not informed by evidence of past successes in market-based energy savings certificate schemes.

These three points are expanded upon in the subsequent headings.

We also highlight the need for the government to ensure the PDRS is designed in such a way that households and small businesses can participate in providing demand reductions while avoiding the high transaction costs imposed under current electricity market structures.

1) The targets outlined in the consultation paper fall well short of maximising the potential NPV to the NSW community from a PDRS.

According to the NSW Treasury Guide to Cost Benefit Analysis, the government should apply a social discount rate of 7% to determining whether the scale of policy interventions is worthwhile. While we do not have the full information available to fully evaluate the timing of costs and benefits from the PDRS, the information that is available suggests the current targets fail to capture the full scale of demand reductions that deliver net benefits exceeding the 7% discount rate.

Table 3.5 from the ACIL Allen modelling report indicates a balance of cost and benefits for the average residential electricity consumer equivalent to a 68% annual return over 2021 to 2030 from the combined PDRS and ESS.

This understates the likely return to energy consumers given the ACIL modelling omits the avoided network losses and expenditure from the scheme, which the NSW Government estimates delivers a further $315 million benefit to 2030.

While achieving a 68% annual return is an excellent outcome, the government is effectively selling consumers short by not setting a higher set of targets that would deliver additional financial gains at returns that may not be quite so high, but will still significantly exceed the social discount rate of 7%.

We also note that the 7% discount rate itself is an excessively high hurdle rate for evaluating government climate and energy policy interventions. The interest rates applying on debt to low risk borrowers are far below 7% and expected to remain at low levels for some time to come. Of note is that such a discount rate is higher than the Weighted Average Cost of Capital (WACC) for private sector operators looking to build new power generation supply according to ACIL Allen's modelling prepared for the consultation paper (they estimate a WACC of 4.2%). Perhaps most importantly, the work of Cambridge economist Nicholas Stern has shown that such interest rates are not appropriate in evaluating government policy measures aligned with reducing the risk of dangerous climate change.

Recommendation 1
The ESIA recommends that the NSW Government:

c) in its further research and modelling should examine the NPV to the community of setting higher targets than those outlined in the consultation paper and

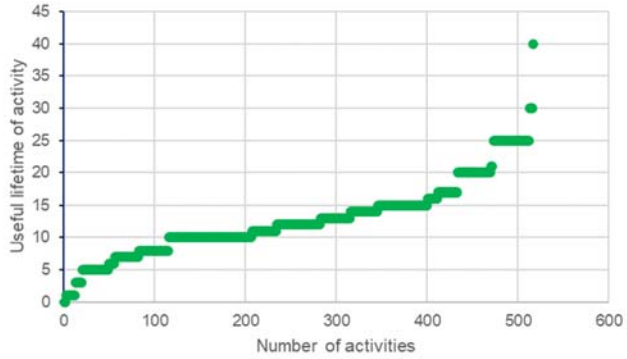
d) select target levels for the combined PDRS and ESS based on the highest NPV at a discount rate consistent with the current low interest rate environment and the recommendations of economist Nicholas Stern.

2) The NSW Government's analysis underestimates the net benefits of the PDRS and ESS expansion by not considering impacts beyond 2030.

The cost-benefit analysis as it presently stands underestimates the benefits flowing to the community from the PDRS and ESS by truncating the analysis to just 2030. This acts to capture most or possibly all of the costs (which will tend to be incurred upfront when the energy and demand reduction interventions are undertaken) yet excludes a large proportion of the likely benefits flowing from interventions which are likely to last well beyond 2030.

Figure 1 plots all the energy-saving activities identified in the NSW Government's Energy Efficiency Opportunity List[7] relative to their useful lifetime. It illustrates that 402 out of the 517 activities have useful lifetimes equal to or exceeding 10 years. A total of 90% have lifetimes equal to or exceeding seven years.

Figure 1 – Distribution of energy saving activities' useful lifetime



[7] https://energy.nsw.gov.au/government-and-regulation/consultation/energy-security-target-safeguard (Excel spreadsheet accessed 6 June 2020)

Source: The NSW Government's Energy Efficiency Opportunity List (accessed 6 June 2020)

Given much of the scaling up of the targets in the PDRS and ESS are weighted toward the last half of this decade, this means the bulk of the activities will only need to be implemented in the last five years of the schemes. These are then likely to still be operational and capable of delivering overall energy savings and peak demand reductions across the 2030s.

In relation to the PDRS, the experience from Ergon and Energex's PeakSmart program suggests that once customers are contracted into demand response, they are likely to remain involved for the long-term. The program has found that consumers have barely noticed or not noticed at all when air conditioners have been cycled down or off. This suggests the discomfort experienced by participants has been minimal and they should be willing to continue to participate in exchange for payment. This is backed up by the fact that Energex reports a drop-out rate of less than 0.2% of about 100,000 air conditioners enrolled since the beginning of the PeakSmart program[8].

The modelling by ACIL-Allen of the PDRS and expansion of the ESS indicates that the value of reduced consumption induced by the schemes is greatest in the years when Vales Point and Gladstone Power Stations are expected to close (2028 and 2029). This is because the PDRS and enlarged ESS help to mitigate the expected electricity price rises from the exit of these plants. Yet by not analysing the impacts beyond 2030, the cost benefit analysis misses the potential for the two schemes to also help mitigate likely power price rises caused by the closure of Eraring Power Station in 2032 and Bayswater in 2035. These are the two largest power stations in the National Electricity Market and substantially larger than combined capacity of Vales Point and Gladstone Power Stations. Furthermore, the progressive closure of Yallourn Power Station in Victoria over 2029 to 2032 will likely also enhance the importance and value of the PDRS and enlarged ESS over the 2030s.

Recommendation 2
The ESIA recommends that the NSW Government in its further research and modelling needs to examine the NPV of PDRS targets and enlarged ESS targets to at least 2040, not just to 2030.

3) PDRS targets significantly greater than those outlined in the consultation paper can be readily achieved.

The NSW Government's consultation paper states that the indicative PDRS targets (Refer to Table 1 below) were informed by:

- AEMO's projections of battery systems; and
- modelling of the E3 program's Regulatory Impact Statement (RIS) for smart demand response capabilities of air-conditioners, water heaters, pool pumps and electric vehicle chargers.

Both sources of information are likely to underestimate the speed and scale with which demand reduction activities can be rolled out. Furthermore, there is an array of other options that could deliver significant peak demand reductions beyond battery systems and appliance controls. This suggests that significantly greater peak demand reductions are readily achievable than what has been outlined in the consultation paper.

[8] E3 Program (2019) Consultation Paper: 'Smart" Demand Response Capabilities for Selected Appliances – August 2019

Table 1 – Government proposed PDRS targets

Year	Peak demand reduction (MW)
2022	141
2023	200
2024	274
2025	362
2026	467
2027	588
2028	724
2029	887
2030	1029

e) AEMO's battery projections are inconsistent with NSW Government policy commitment

Firstly, AEMO's projections of battery systems under the fast change scenario are inconsistent with the Government's own target. The NSW Government announced in February 2019 that it would achieve the roll-out of 300,000 new battery systems by 2030 with a combined capacity of 3000MWh[9]. Yet AEMO's projections are for just 1,336.5MWh of battery capacity. One would expect that 3000MWh of battery capacity would have something close to 1500MW of peak export capability and this could be sustained for two hours which would address a large proportion of the extreme peak periods when wholesale power prices surge to several thousand dollars per hour. Assuming 75% of this capacity could be made available during these major peaks, this intervention alone would deliver almost the entire 2030 indicative PDRS target.

f) Internet enabled smart appliance controls can be rolled out far faster than assumed by the E3 program

Secondly, regarding the E3 program RIS for mandating appliance demand controls, it appears that analysis selected activation of demand response capabilities based not so much on the available historical evidence, but rather preferencing what that analysis termed 'conservative'. This appears to mean avoiding perceptions they might have overstated the benefits from mandating demand response capability. While such an approach may make it easier to defend the regulatory proposal from critics, it results in a systematic bias in the modelling that underestimates the amount of likely uptake of demand reductions. This is especially so under circumstances where the Government has established a dedicated competitive market for deploying technologies that reduce peak demand.

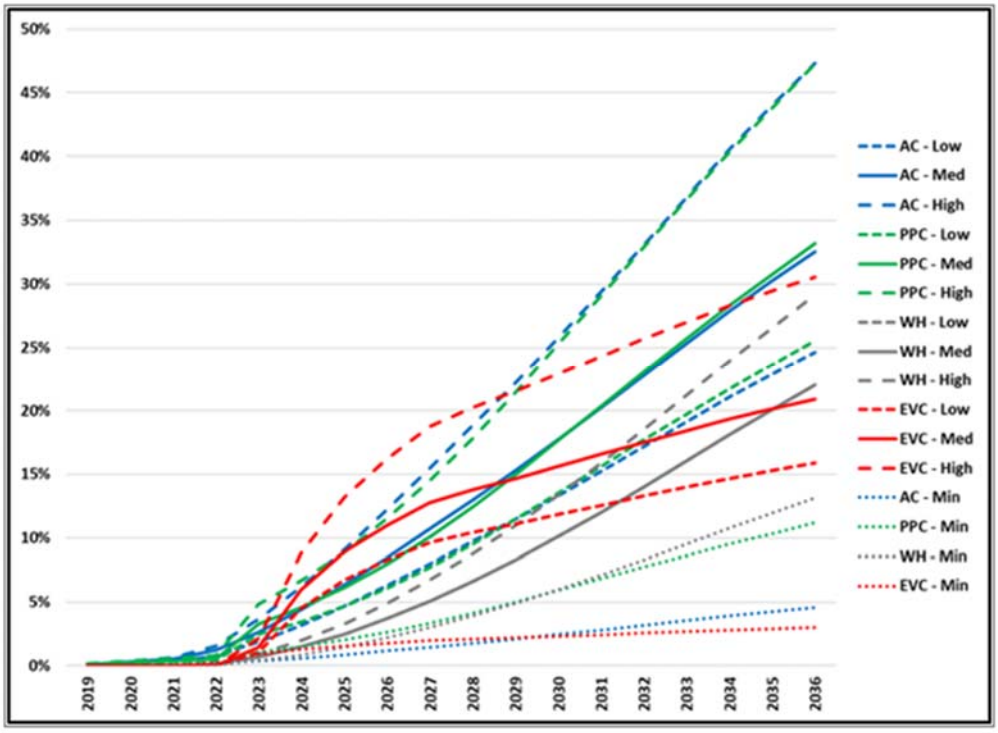
According to the E3 RIS, under what it termed the 'high' uptake scenario, it envisaged that Direct Load Control would deliver 1,437MW of routine demand reductions during summer in 2035 in NSW. This figure appears roughly in line with the kind of indicative targets outlined for the PDRS, where by 2030, 1029MW of peak demand reductions would be targeted. Based on national figures, the bulk of the E3 program's demand reductions (around 65%) would come from Air Conditioners (AC). Pool Pump Controllers (PPC) would make up 9%, Water Heaters (WH) another 8% and Electric Vehicle Chargers (EVC) 18%.

Figure 2 below details the E3 RIS's assumed proportion of AC, PPC, WH and EVC enrolled in provision of automated peak demand reductions under their high, medium, and low uptake

[9] See: NSW Liberal Party (2019) Helping households cut power bills with clean energy – February 2019, published here: https://nsw.liberal.org.au/Our-Plans/Policies/HELPING-HOUSEHOLDS-CUT-POWER-BILLS

scenarios. By 2036, 15 years after regulations to mandate demand response capability would be introduced, the RIS envisaged 47% of ACs and PPCs would be enrolled in demand response, 29% of WHs and just under 31% of EVCs in their high uptake scenario.

Figure 2 – Assumed proportion of stock participating in provision of automated demand response



Source: E3 Program (2019) Regulation Impact Statement for Decision: 'Smart" Demand Response Capabilities for Selected Appliances, p88 Figure 20: Projected activation rate (High, Medium, Low and Minimum) and Table 29: Projected High, Medium Low Activation Rates in 2036 [10]

Experience in roll-out of low-cost demand reduction technologies suggests this is likely to be a substantial underestimate.

Within three years of Energex commencing its PeakSmart program to encourage consumers to purchase demand-response-enabled air conditioners, around 14% of new air conditioners sold in South-East Queensland were enrolled in the program. By the sixth year it was about 22%. Notably, this was achieved in the absence of any regulatory mandate for air conditioners to be demand-response-capable, while the NSW PDRS will operate for much of its life with this capability mandated.

Furthermore, there are good reasons to believe that the NSW PDRS will be far more effective in the roll-out of demand reduction technology than Energex's PeakSmart program. The NSW scheme will develop a competitive market open to a very wide number of participants, many of whom will be highly experienced and focused on the rapid roll-out of consumer-friendly electrical products that reduce energy demand and bills. By contrast, Energex is a monopoly business whose core business is the construction and maintenance of powerline equipment where its revenue is determined by its engagement with a government regulator, not end-

[10] https://www.energyrating.gov.au/document/regulation-impact-statement-decision-smart-demand-response-capabilities-selected-appliances (Accessed 6 June 2020)

consumers. In addition, while many participants in the NSW PDRS will derive most or a large proportion of their revenue from roll-out of demand-reducing technologies, Energex is highly conflicted given that peak demand reductions represent a small part of their overall revenues and ultimately the success of demand reduction technologies will come at the expense of their far larger and non-competitive business in transporting power. These same issues also hinder a wide range of peak demand reduction programs operating overseas such as in the United States, which operate under the control of monopoly regulated electricity utilities. Consequently, the NSW Government should expect to achieve faster and higher uptake rates from its PDRS than what has commonly been achievable under programs overseas that target peak demand reductions.

In many respects the roll-out of demand response controls could foreseeably follow a similar path and speed of roll-out as we have seen with LED technology under the Victorian Energy Upgrades (VEU) program and NSW ESS. Appliance control devices can be easily and rapidly installed by staff with reasonably simple training. In addition, much like what was achieved with LED lighting, suppliers of this control equipment can be expected to achieve large cost reductions over current retail market offerings via direct sourcing from contract manufacturers in China[11]. The appliance control equipment involves the same technologies as an array of other internet-enabled, computer communication devices produced by many manufacturers in China for tens of dollars. So, the cost of the control equipment is also likely to be comparable to the cost of a whole-of-household retrofit of LED replacing halogen downlights.

In the case of halogen downlight replacement, the E3 Program's 2016 Residential Lighting Survey found that 30% of homes surveyed in Victoria had their halogen downlights replaced by LEDs under the VEU program. However, certificate creation data suggests uptake may be closer to 15% of homes. Given 25% of homes nationwide had five or more halogen downlights according to the same E3 survey, the VEU program has managed to achieve uptake of 60% of the addressable stock as a lower bound. This was achieved largely in four years from 2013 to 2016.

There are two other factors that should make it easier for businesses to market appliance controls relative to halogen downlight replacement:

1. Air conditioners have achieved 70% penetration of households compared to just 25% for halogen downlights (at a density of five or more that are likely to make an installation visit worthwhile), suppliers of demand reduction controls will have an easier task in targeting suitable customer sites.
2. Homes with swimming pools are easy to identify via aerial imagery and there are software suppliers who can provide the addresses of homes with pools. This should make direct marketing of pool pump controls more straightforward than halogen downlights.

While the Victorian halogen replacement roll-out occurred on a free-of-charge basis, which is not allowed under the NSW program, households that sign onto demand response are likely to receive financial benefits for participating in demand response events that substantially exceed the minimum co-payment in just the first summer period. In addition, based on Powercor's positive experience with the roll-out of the Sensibo device, we expect suppliers of appliance control devices will incorporate mobile phone app capabilities that allow households to monitor and manage energy usage of their air conditioner and household temperature control

[11] Common Capital and Beletich Associates in their 2017 research evaluating the impacts of the NSW Government Energy Efficiency programs discovered that participants in both the NSW ESS and the VEU, by bypassing the traditional supply-chains for lighting equipment, developed business models to procure and roll out LED lighting technology at a fraction of the cost end consumers were being charged from the more established sources of supply. See: *NSW Lighting Market Impact Evaluation – Impacts of NSW Government Energy Efficiency Programs* – November 2017

anywhere via their mobile device. This means households are not simply being asked to cede control of their appliance to someone else. Instead they are receiving a device which enhances their own control over their energy costs and allows them to shift energy usage more easily into off-peak periods that are independent of the occasional peak demand response event.

While inbuilt demand response capabilities for air conditioners, pool pumps, water heaters and electric vehicle chargers will only become mandatory from 2023, we do not envisage that this will be a material inhibitor to rapid roll-out of demand response controls because:

1. Demand response capabilities began being built into air-conditioners some time ago and are now widespread. Back in 2012 demand response capability was incorporated into 5% of air conditioner models and has since increased to 56% of models by 2018. Given most of the major manufacturers already commonly incorporate demand response capability in their air conditioners and the extra cost is so small (E3 program estimates just $10) we expect the vast majority of air conditioners are likely to meet the new standard a year or two in advance of when it becomes mandatory in 2023. By 2026 we estimate that there is likely to be around 2 million air conditioners in the NSW stock that are demand response capable.
2. It is already a de facto industry standard for electric vehicle chargers to incorporate internet-enabled controls and often stationary energy battery systems as well. As an example, Tesla, which has the highest market share of both the electric vehicle and stationary battery energy storage market incorporates internet-enabled remote-control capability as standard across all its products.
3. For the remaining stock of air conditioners and also the larger proportion of pool pumps and water heaters that don't have demand response capability, there are still options to retrofit them with controls to reduce their demand during peak periods. A range of devices are already available on the market with differing levels of sophistication which can be used to either remotely switch-off or turn-down an appliance's energy consumption via communication over the internet. While many of these devices may not provide the same degree of precise control over energy consumption as will be delivered by the mandatory standard, they can still be highly effective in lowering demand during peak periods, and their impact can be measured and evaluated.

All these above factors suggest that demand response controls on residential air conditioners, pool pumps, water heaters and electric vehicles in isolation could realistically deliver peak demand reductions of 1500MW by 2030. Indeed, given the already wide prevalence of demand response capability in residential air conditioners, this alone could realistically deliver close to 700MW of peak demand reductions by 2025[12].

g) There is a range of other activities that could significantly reduce peak demand beyond batteries and smart appliance controls

The available options for cost-effective peak demand reductions range far beyond the set of examples considered above.

In the residential sector, improvements to residential building thermal shell - as well as window shading - can deliver both large energy savings and significant reductions in air conditioner load during peak periods. To date, uptake under the ESS has been modest but the added incentive from Peak Demand Reduction Certificates (PERCs) could make a pivotal difference. Also, because air conditioners can often last longer than 15 years and energy efficiency of air conditioners has improved markedly over this period, there is significant scope of reductions in

[12] This is based on demand response capable air conditioners (ACs) representing 5% of 2012 sales rising steadily to 54% by 2018 and then remaining at this level to 2020 before steadily rising to reach 100% by 2023. This results in a stock of about two million demand response capable residential ACs in NSW by 2025. Assuming 60% are enrolled in demand response and deliver an average of 0.6kW of demand reductions (as achieved by Energex PeakSmart) at critical peak periods, then this will deliver 697MW of demand reduction.

peak demand by early retirement and replacement of old inefficient air conditioners with newer, energy efficient versions. (The input energy required for a given amount of cooling output has almost halved since 2000). Also, the availability of a peak demand reduction incentive should allow for far more attractive incentives to be offered to households to decommission old, inefficient 'second' fridges which often represent a significant load during hot peak demand periods.

In the commercial sector, refrigeration and building cooling represent significant options for load shifting. The experience when the Frequency Control Ancillary Services (FCAS) market was opened to demand response provides a salient lesson of the latent potential here. Within just 12 months, aggregated demand response had captured 10% of the contingency frequency control market. More intelligent controls, with judicious improvements to insulation and equipment, could provide large shifts of demand out of peak periods at reasonably modest capital costs based on the experiences of Sustainability Victoria's Buildings Tune-Up program.

Recommendation 3

The ESIA recommends that the NSW Government draws upon a far broader set of information on the available scope of peak demand reduction opportunities, and the speed with which they might be rolled out than what is detailed in E3 program's RIS on appliance demand response capabilities and AEMO's projection of battery systems.

h) Keep the cost of the participation in peak demand reduction markets manageable for small energy customers

Lastly, on the cost of the demand reduction programs, we note that the sources the Government has drawn upon appear to be informed by electricity company-based programs often participating under the onerous requirements of AEMO's dispatch system. These are likely to overstate the costs and difficulty of many options to reduce peak demand because they apply a big power station mentality and skillset that is not well suited to capturing a number of the peak demand reduction opportunities. Particularly in the residential and small and medium business sectors, where one is dealing with a very large number of small loads, AEMO's requirements to deliver very precise levels of megawatts of demand response impose transaction costs that substantially or completely undermine the financial viability of peak demand reductions. The level of precision AEMO requires for managing the dispatch and compensation of generators is simply not necessary to extract significant benefit from residential peak demand reduction interventions. We acknowledge that it is very important to avoid a situation where a very large number of loads are simultaneously and suddenly withdrawn with no notice provided to AEMO. Yet this can be readily avoided without the need to bid in demand reductions to AEMO's dispatching system.

Also, we are concerned that current structures of the market impose an unnecessary straitjacket, where for a customer to participate in demand reduction activities they will also often need to switch electricity retailer. This often leads to a cycle of bigger percentage discount counteroffers from the incumbent (or recently terminated) retailer. This is highly likely to confuse consumers, generate mistrust and excessively complicate what should be a straightforward decision over whether the customer is willing to allow someone to occasionally turn down an appliance in exchange for a monetary payment and/or potentially upgraded equipment.

Recommendation 4

The ESIA would like to assist the NSW Government in designing a model for drawing upon demand response enabled equipment in a way that supports a secure energy system while avoiding the transaction costs involved in meeting AEMO's dispatch system requirements, and avoiding forcing customers to switch electricity retailers.

For more information regarding this submission, please email comns@esia.asn.au

Notes: