

Consultation on:

Proposed Demand Response Capabilities for
Selected Appliances in South Australia

and

Proposed Amendments to Local Energy Performance
Requirements for Water Heaters

Glossary

AEMO	Australian Energy Market Operator
DER	Distributed energy resources
DR	Demand response
DRED	Demand response enabling device
DRIS	Decision regulation impact statement
DRM	Demand response mode (as defined in AS/NZS 4755)
IEC	International Electrotechnical Commission
GEMS	Greenhouse and energy minimum standards
MEPS	Minimum energy performance standards
SAE	Society of Automotive Engineers

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1. Background

Minimum net demand is an emerging challenge in South Australia. With the rapid uptake of solar panels in recent years, together with consumers energy needs being met by their own distributed energy resources (DER), the result, at times, is low energy demand from the grid. October 2020 saw a record minimum operational demand of 300 MW.

The Australian Energy Market Operator (AEMO) has been analysing low demand conditions and has made recommendations which seek to respond to the minimum net demand challenge.

To AEMO's knowledge, South Australia is the first gigawatt scale power system in the world to approach operation with such high proportions of demand met by DER, such as solar generation on homes and businesses.

One of the challenges identified by AEMO is ensuring there is sufficient demand on the power system to run it securely. This challenge is most significant when South Australia is operating as an island. Whilst the likelihood of a separation event, concurrent with high distributed solar generation output and a severe fault, is low, if they do coincide AEMO may not have the ability to operate South Australia in a secure state.

AEMO has also observed that the gap between peak summer demand and average demand continues to widen, despite operational consumption growth being in decline. This decreasing load factor contributes to inefficient investment in network capacity and higher wholesale electricity prices, which are passed on to all consumers in their electricity bills. Extreme demand on the grid also increases the risks of shortages and blackouts.

Appliances with demand response (DR) capabilities can be used to increase daytime operational demand in response to commercial financial incentives or in an emergency circumstance. In addition, DR capable appliances, particularly air conditioners, can be used to address periods of peak summer demand.

In November 2019, Energy Ministers agreed to introduce DR capability requirements for air conditioners, electric vehicle chargers, pool pump controllers and electric resistive storage water heaters, as recommended in the Energy Ministers' Equipment Energy Efficiency Committee Decision Regulation Impact Statement (DRIS): 'Smart' Demand Response Capabilities for Selected Appliances, October 2019.

The DRIS noted that some jurisdictions with imminent network issues requiring more controllable devices in the system may consider an earlier implementation using local regulation.

While South Australia supports a national approach to implementation of DR capable appliances, national progress does not match the growing significance of minimum demand and peak demand challenges in South Australia.

This consultation paper seeks stakeholder views on proposals for early implementation of a modification of the Energy Ministers' decision in South Australia.

The consultation paper has been informed by two consultancies:

- *Demand Response Capabilities for Selected Appliances – South Australia Specific Analysis, May 2020 (GWA Paper)*

George Wilkenfeld and Associates modelled the costs and benefits of various policy options for local demand response requirements for electric water heaters, air conditioners, electric vehicle chargers and pool pump controllers.

- *Review of Residential Sector Hot Water Requirements for South Australia, September 2020 (EES Paper)*

Energy Efficient Strategies, with George Wilkenfeld and Associates and Common Capital, modelled the costs and benefits of various policy options for demand response requirements for electric resistive water heaters.

The proposals in this paper also align with key commitments from the government's 'South Australia's Energy Solution: A secure transition to affordable renewable energy, June 2020'.

2. Proposed Technical Standard

It is proposed to adopt public, non-proprietary standards for DR capability for selected appliances offered for sale in South Australia. The selected products are air conditioners, electric vehicle chargers, pool pump controllers and electric storage water heaters.

The AS/NZS 4755 framework is proposed as the technical standard to support the DR capability requirement.

There are two categories of electrical product within the AS/NZS4755 framework; those conforming to AS/NZS4755.3, and those conforming to AS4755.2.

AS/NZS 4755.3 products can be activated via a demand response enabling device (DRED) or DRED-like device. AS 4755.2 products do not have a separate DRED and the essential communications and other functions of the DRED are supported within the electrical product itself. The same electrical product could conform to both.

The demand response modes (DRM) defined in the AS/NZS4755 framework are:

- DRM 0 – Disconnect, if equipped with a disconnection device
- DRM 1 – No load, or minimum load
- DRM 2 – Restrict load to no greater than 50% of a reference value
- DRM 3 – Restrict load to no greater than 75% of a reference value
- DRM 4 – Commence operation or increase load
- DRM 5 – No discharge of energy to grid
- DRM 6 – Restrict discharge to no greater than 50% of a reference value
- DRM 7 – Restrict discharge to no greater than 75% of a reference value
- DRM 8 – Commence or increase discharge of energy to the grid.

3. Air Conditioners

Air conditioners provide a space conditioning service to improve the thermal comfort of an indoor space. Depending on the size and type of the appliance, air conditioners can be high users of energy and can therefore also impact peak demand.

What is the Energy Ministers' decision on demand response capabilities for air conditioners?

Standards

Energy Ministers have agreed that air conditioners must comply with any of the following standards:

- AS/NZS 4755.3.1:2014; or
- AS/NZS 4755.2 (when published); or
- The equivalent of the superseded AS/NZS 4755.3.1:2012 (for a limited period of 2 years from the Determination). This option will no longer be available for products registered after 30 June 2025.

Demand Response modes

All air conditioner types subject to the Minimum Energy Performance Standards (MEPS) (excluding portable air conditioners), up to a cooling capacity of 19kW inclusive, registered after 30 June 2023 must comply with DRM1, DRM2 and DRM3.

A Greenhouse and Energy Minimum Standard (GEMS) Determination to give effect to the above is to be made by 1 July 2021.

What are the other options that have been considered for South Australia?

The GWA Report considered the following options for South Australia and assessed the cost and benefit of each (the costs and benefits against which the options were assessed are contained in Appendix 1):

Base Case – Agreed Energy Ministers' timeline and requirements (as stated above).

Option 1 – Implement the recommendations agreed by Energy Ministers two years earlier than the nationally agreed schedule, from 1 July 2021.

Option 2 – Option 1, but with higher performance requirements, including requiring a full range of DRMs, and permitting compliance via AS/NZS 4755.2 (wireless) only.

Option 3 – Implement according to the Energy Ministers' schedule, but with higher performance requirements (as in Option 2).

Under a medium activation rate, the cost benefit analysis found the following:

Option	Total Benefits (\$M)	Costs (\$M)	Net Benefits (\$M)	Benefit / Cost Ratio
Base Case	\$70	\$30	\$40.4	2.36
Option 1	\$95.2	\$44.3	\$50.9	2.1
Option 2	\$95.2	\$44.9	\$50.2	2.1
Option 3	\$70.1	\$27.4	\$42.7	2.6

The GWA Report found that there is a risk of significant reduction in air conditioner model choice for consumers in South Australia, with some suppliers withdrawing from the market until the Energy Ministers' decision comes into effect. The risk of this occurring under Option 1 is considered moderate, under Option 2 high and under Option 3 low.

In addition, the analysis found that under both Options 1 and 2 there is a risk of increased average sales prices of air conditioners in South Australia while under Option 3 this risk is low.

Option 3 will effectively bring forward the Base Case in South Australia, which permits a transition from DRED-based options in 2023 to a wireless based only (e.g. remote) requirement in 2025. Option 3 would require the wireless-only option from 2023, and thereby reduce the ‘activation’ costs for demand response service providers.

Implementation of the Energy Ministers’ decision would be carried out using the *Greenhouse and Energy Minimum Standards Act 2012* (GEMS Act). Under this Act, products registered before a compliance date will remain on the register for five years from the date of registration. Therefore, it could take up to five years from the date of implementation before the last non-compliant model is removed from the register. An air conditioner registered on 30 June 2023 (immediately before the Energy Ministers’ commencement date of 1 July 2023) could remain on the market until 30 June 2028.

Early adoption of the Energy Ministers’ decision under options 1 and 2 can be implemented by requiring that air conditioners supplied in South Australia after 1 July 2021, comply with the DR standards. This requirement can be implemented through local regulations that make compliance a condition of supply rather than registration and prevent the sale of non-compliant models from 1 July 2021.

Under option 3, air conditioners sold in South Australia will be registered under the GEMS Act in accordance with the Ministers’ decision and, in addition, will need to comply with the local supply regulations from 1 July 2023. This means that all air conditioners in South Australia will need to comply with the DR standards from this date.

What is the preferred option and proposed timeline?

Option 3 is the preferred option with compliance to commence from **1 July 2023**, with AS/NZS 4755.2 and DRMs 1,2 and 3 (when published) for all air conditioner types that are subject to GEMS (excluding portable air conditioners), up to a cooling capacity of 19kW inclusive.

4. Electric Vehicle Chargers

Electric vehicle chargers support the uptake of electric vehicles in South Australia by enabling consumers to charge their vehicles at home.

The South Australian Government is very supportive of electric vehicles and recently announced an Electric Vehicle Action Plan which will include a charging network and a plan to electrify the South Australian government Fleet.

What is the Energy Ministers’ decision on demand response capabilities for electric vehicle chargers?

Standards

Energy Ministers have agreed that controllers capable of managing the charging and/or discharging to the grid of electric vehicles, that are intended for residential applications and capable of charging at the Society of Automotive Engineers (SAE) Level 2 or International Electrotechnical Commission (IEC) Mode 3, must comply with any of the following standards:

- AS/NZS 4755.3.4 (when published); or
- AS/NZS 4755.2 (when published); or

- An equivalent international standard, if an Equipment Energy Efficiency Committee (E3) technical working group determines by mid-2022 that there is one that provides equivalent capabilities to AS 4755.

Demand Response modes

All electric vehicle chargers supplied or offered for supply from 1 July 2026 must comply with DRMs 0,1,2,3,4,5 and 8 (6 and 7 optional), or the equivalents in the other approved standard.

A GEMS Determination to give effect to the above will be made by 1 July 2024.

What is the other option considered for South Australia?

The GWA Report considered an alternate option for South Australia and assessed the cost and benefits (the costs and benefits assessed are contained in Appendix 1):

Base Case – Agreed Energy Ministers’ timeline and requirements (as stated above).

Alternate Option – implementing DR requirements in South Australia two years earlier than the base case, where controllers capable of managing the charging and/or discharging to the grid of electric vehicles, that are intended for residential applications and capable of charging at SAE Level 2 or IEC Mode 3, must comply with any of the following standards:

- AS/NZS 4755.3.4 (when published); or
- AS/NZS 4755.2 (when published); or
- An equivalent international standard, if the South Australian Office of the Technical Regulator determines that there is one that provides equivalent capabilities to AS 4755.

All electric vehicle chargers supplied or offered for supply from 1 July 2024 must comply with DRMs 0,1,2,3,4,5 and 8 (6 and 7 optional), or the equivalent in the other approved standard.

Under a medium activation rate, the cost benefit analysis found the following:

Option	Total Benefits (\$M)	Costs (\$M)	Net Benefits (\$M)	Benefit / Cost Ratio
Base Case	\$41.2	\$14	\$27.2	2.9
Alternate Option	\$40.2	\$12.7	\$27.6	3.2

The GWA Report found that there is a low risk of supplier withdrawal from the South Australian market under the early commencement scenario.

What is the preferred option and proposed timeline?

The alternate option is the preferred option for all electric vehicle chargers supplied or offered for supply from **1 July 2024** to comply with AS/NZS 4755.3.4 (when published), or AS/NZS 4755.2 (when published) or an equivalent international standard if determined by the South Australian Office of the Technical Regulator.

Compliance with 4755 DRMs 0, 1, 2, 3, 4, 5 and 8 will be required, or any equivalent DRMs in an international standard approved by the South Australian Office of the Technical Regulator.

5. Pool Pump Controllers

Swimming pool pump controllers aid with the maintenance of pools and control of essential functions like filtration, sanitisation and heating. A DR capability for pool pump controllers would contribute to reducing network summer maximum demand, because it is estimated that around half of pumps are on during peak events. A DR capability will also allow pumps to be switched on at times when there is excess solar PV generation

What is the Energy Ministers' decision on demand response capabilities for pool pump controllers?

Standards

Energy Ministers have agreed that devices controlling swimming pool pump-units (as defined in AS/NZS 4755.3.2:2014) must comply with either of the following standards:

- AS/NZS 4755.3.2:2014; or
- AS/NZS 4755.2 (when published)

Demand Response modes

All pool pump controllers supplied or offered for supply from 1 July 2024 must comply with DRM1 (with other DRMs optional).

All pool pump controllers supplied or offered for supply from 1 July 2026 must comply with DRM1, DRM2 and DRM4.

A GEMS Determination to give effect to the above will be made by 1 July 2022.

What are the other options that have been considered for South Australia?

The GWA Report considered the following options for South Australia and assessed the cost and benefit of each (the costs and benefits against which the options were assessed are contained in Appendix 1):

Base Case – Agreed Energy Ministers' timeline and requirements (as stated above).

Option 1 – Implement the recommendations agreed by Energy Ministers two years earlier than the nationally agreed schedule.

Option 2 – Option 1, but with higher performance requirements, including requiring a full range of DRMs, and permitting compliance via AS/NZS 4755.2 (wireless) only.

Option 3 – Implement according to the Energy Ministers' schedule, but with higher performance requirements (as in Option 2).

Under a medium activation rate, the cost benefit analysis found the following:

Option	Total Benefits (\$M)	Costs (\$M)	Net Benefits (\$M)	Benefit / Cost Ratio
Base Case	\$11	\$5	\$6.8	2.5
Option 1	\$15.8	\$6.1	\$9.7	2.6
Option 2	\$15.8	\$6.4	\$9.4	2.5

Option 3	\$11.3	\$4.2	\$7.0	2.7
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The GWA Report found that there is a moderate risk of withdrawal of products from the South Australian market under Options 1 and 2. Importantly, this product withdrawal may have significant consequences for pool owners as there are no readily available pool pump controller alternatives that integrate the management of pumping, sanitising and (in many cases) water heating. Further, it is unclear whether there are pool pump controller products currently in the market that are compliant with the DR standard.

It is envisaged manufacturers will develop, certify and register products from scratch, with little advantage of a phased introduction of stringency requirements, as per the Energy Ministers' decision. It is likely, most manufacturers will develop products with the full suite of DRM capabilities from the commencement of the Energy Ministers' requirements.

The implementation of Option 3 presents a low risk as it would effectively require the full suite of DRM requirements from 2024 instead of 2026.

What is the preferred option and proposed timeline?

Option 3 is the preferred option with compliance to commence **from 1 July 2024** with AS 4755.2, DRMs 1,2 and 4 for all devices controlling swimming pool pump-units as defined in AS/NZS 4755.3.2:2014.

6. Electric Resistive Storage Water Heaters

There has been a steady decline in the share of electric resistive storage water heaters as a percentage of water heater stock in New South Wales, Victoria, South Australia and the Australian Capital Territory over recent years. In South Australia this declining trend has been influenced by regulatory requirements that were introduced in 2009, specifying that, in many situations, low emission, high efficiency water heaters need to be installed. The objective of these requirements is:

“To stimulate a transition to low emission water heater technology in the residential sector, while ensuring that households are not burdened with unacceptable costs associated with the transition”.

Electric resistive storage water heaters are not deemed to be low emission, high efficiency heaters under these requirements and therefore, in most circumstances, are prohibited in South Australia. They are, however, permitted in:

- Established Class 1 houses¹ that are not connected to the gas network provided that the capacity of the water heater is below 250 litres
- New Class 1 houses that comply with the 'Verification Method for an Electric Resistance Storage Water Heater Supplied by On-Site Renewables'
- Class 2 dwellings² and other non-residential building classes

¹ Detached and attached dwellings such as row terraces and town houses

² Flats and apartments

With the emerging minimum demand challenge faced by South Australia and a significant reduction in greenhouse gas intensity of the South Australian electricity grid since the water heater requirements first commenced, it is an opportune time to consider whether these requirements are still necessary. Water heating typically uses around 25 per cent of a household's energy use and therefore the use of electric resistive storage water heaters with DR capabilities, presents an opportunity to introduce flexible energy demand into South Australia's energy system.

Energy Ministers' Decision on demand response capabilities for electric water heaters

Energy Ministers have agreed that all electric water heaters registered in Australia from 2023, must have specified DR capability. This decision only mandates DRM1 (emergency load shedding).

Review of South Australian Requirements

In recognition of the demand response opportunities that electric hot water heaters can provide and noting that South Australia's electricity generation is now over 50 per cent renewables, Energy Efficient Strategies (EES) was engaged to review the existing hot water requirements in the context of the following revised objective:

"The South Australian water heater requirements aim to improve energy productivity for households and the broader energy system".

This productivity objective recognises:

- energy efficiency benefits
- demand response benefit opportunities in the wholesale energy market
- benefits to all consumers from use of electric resistive water heaters as energy storage during times of excess solar PV export.

The scope of the review included three potential options for future electric water heater requirements:

Option 1 – no requirements

Option 2 – requirements for electric water heaters with DR capability (various sub-options were also examined including DRM1 (load shedding) only, DRM1 and DRM4 (increase load), minimum tank size, accelerated timetable, timetable as per Energy Ministers' decision

Option 3 – requirements for electric heaters with DR capability and on-site roof top solar PV.

A full outline of the tasks completed as part of the EES review is provided in Appendix 2.

Findings of Review

EES found that South Australia's existing water heater requirements have helped consumers reduce hot water costs and greenhouse gas emissions, but parts of the policy are now obsolete. South Australia's electricity generation is now over 50 per cent renewables, and likely to reach 100 per cent by 2030.

The introduction of SA Power Network's Time of Use (Solar Sponge) tariff presents an opportunity to make larger electric storage water heater systems very cost effective if controlled to operate in the specified tariff windows. The lower capital costs for electric resistive storage water heaters offer lifetime advantages when operated on the Solar Sponge tariff.

Considering these opportunities, EES found that there may be a rationale for policies to drive targeted use of electric storage, particularly where it is connected to the Solar Sponge tariff or a Virtual Power Plant using DRM4 or other technology.

In terms of DR capabilities, EES found that:

- **DRM1 activation** has the capacity to reduce load by 10 MW by 2030, predominantly from small electric hot water heaters. The potential benefits of DRM1 to avoid emergency load shedding are likely to be worth around \$10,000 per megawatt hour for around 20 hours per year (NPV of benefits to 2030 of up to \$5 million in the high activation scenario). In addition, there are network benefits from the deferral of transmission network and distribution network upgrades with an NPV of benefits to 2030 of up to \$15 million under a high activation scenario.
- **DRM4 activation** has the capacity to deliver more than 100 MW of additional load to the South Australian network, mainly from large electric hot water heaters. The potential benefits for DRM4 will accrue from arbitrage if a service provider can shift energy consumption from a period where wholesale prices are higher to a period when prices are lower. An initial estimate of potential earnings for a service provider is an NPV of benefits to 2030 of up to \$10 million in the high activation scenario.

EES also considered the market share for electric water heaters and found that it is currently declining with options 1 and 2 not affecting this decline to a significant extent. Option 3, however, would reduce electric resistive water heaters market share considerably as it would restrict those who can install electric heaters mainly to customers with existing solar PV

Preferred Option and proposed timeline

The preferred option for South Australia is for early adoption of the Energy Ministers' decision and inclusion of a DRM4 capability requirement of target heaters:

- To require compliance with either AS/NZS 4755.3.3:2014, DRM1 or AS 4755.2, DRM1 (when published), for electric heaters of 50 to 710 litres (inclusive) nominal capacity that are subject to GEMS (excluding heat exchange water heaters) from **1 July 2021**.
- To require compliance with AS 4755.2, DRMs 1 and 4 (when published), for electric heaters of 160 to 710 litres (inclusive) nominal capacity subject to GEMS (excluding heat exchange water heaters) from **1 July 2023**.

However, under South Australia's current low emission, high efficiency water heater requirements, implementation of this preferred option will be of reduced value as the DR opportunities can only apply in limited circumstances where electric water heaters are permitted.

Therefore, in recognition of the energy market benefits, it is proposed that the existing requirements be removed to allow electric water heaters with DR capabilities to be installed in South Australia, including:

- Removing or amending the current National Construction Code Volume 3 restriction on installation of electric resistive storage water heaters in Class 1 and Class 10 buildings connected to a reticulated gas supply.
- Removing or amending the current tank limit of 250 litres for electric in Class 1 and Class 10 buildings that are not connected to a reticulated gas supply.

Further information on the proposed implementation pathway is provided in section 7.2.

7. Proposed Implementation Pathway

7.1. Air conditioners, Electric Vehicle Chargers, Pool Pump Controllers

It is proposed that the *Energy Products (Safety and Efficiency) Act 2000* (the Act) will be used to create an offence for offering for sale air conditioners, electric vehicle chargers and pool pump controllers, that do not comply with an energy performance standard relating to DR capability.

Before any of the relevant appliances can be sold, it will be necessary for an application to be made to the South Australian Office of the Technical Regulator for a certificate of registration to indicate compliance with the energy performance standard relating to DR capability.

The relevant provisions of the Act that will apply to the implementation pathway are:

- Section 5 provides that the Governor may by proclamation declare a standard or part of a standard with or without modification to be an energy performance standard.
- Section 6A(1) makes it an offence for a trader to sell an energy product of a class to which this subsection applies unless it is registered so as to indicate its compliance with applicable energy performance standards. The maximum penalty for noncompliance of 6A(1) is \$5 000. An expiation fee of \$315 is applicable.
- Section 3(1) provides that 'sell' a product includes let the product on hire, advertise the product for sale or hire, display or provide for inspection a sample of a product that is for sale or hire and offer or expose the product for sale or hire.

An exemption will also be sought, if necessary, from any applicable mutual obligations under the *Mutual Recognition (South Australia) Act 1993* and the *Trans-Tasman Mutual Recognition (South Australia) Act 1999*. These exemptions relate to when an energy product is prohibited from sale because it is or is likely to become unsafe.

7.2. Electric Resistive Storage Water Heaters

Two pathways could be used to implement the preferred option in South Australia:

- As an *installation standard* via a South Australian variation to the Plumbing Code of Australia, under the *Water Industry Act 2012*. This is the mechanism currently used to establish the existing low emission, high efficiency water heater requirements. The next schedule revision to the plumbing code is due to be completed in mid-2022, however an earlier amendment may be considered for this purpose.
- As a *sales restriction* through the *Energy Products (Safety and Efficiency) Act 2000*. Section 5 provides that the Governor may by proclamation declare a standard or part of a standard with or without modification to be an energy performance standard. Section 6A(1) makes it an offence for a trader to sell an energy product of a class to which this subsection applies unless it is registered so as to indicate its compliance with applicable energy performance standards.

8. Consultation Timeline

The Department for Energy and Mining (DEM) invites comments on the proposed introduction in South Australia of technical standards for DR capability for air conditioners, electric resistive storage water heaters, pool pump controllers and electric vehicle chargers.

DEM also seeks comments on the proposed amendments to local energy performance requirements for water heaters in South Australia.

Comments will be open until 5PM (ACST) on April 9, 2021.

Stakeholders can provide written submissions by emailing dem.smartappliances@sa.gov.au

9. Appendix 1 – GWA Report Scope

The GWA Report was commissioned to analyse the following options:

- The impacts, costs and benefits of implementing the DR requirements in South Australia more rapidly than in the Base Case;
- The impacts, costs and benefits of implementing more stringent requirements in South Australia than in the Base Case; and
- A combination of the two.

The Report presents both a quantified analysis and a qualitative assessment of the risks.

Quantification of costs included:

- costs to product designers, manufacturers (local and overseas), retailers, and suppliers;
- costs to businesses with existing stock that may not meet the requirements;
- costs to consumers, including costs from reduced product availability and consumer choice;
- cost to the government to administer a local requirement, including registration and compliance costs
- costs of DR capable appliance connection(s) and activation(s); and
- costs of DR program participant servicing.

Quantification of benefits, included:

- opportunities for better managing periods when export of rooftop solar PV exceeds minimum demand;
- reducing wholesale electricity prices; and
- improved electricity network reliability and security.

10. Appendix 2 – EES Report Scope

The EES Report was commissioned to undertake the following tasks:

Task 1: Assess household penetration trends of electric resistive storage water heaters in South Australia (including data since 2009, compared to other jurisdictions).

Task 2: Quantify, against a business as usual (BaU) scenario, the net cost benefits (including direct cost benefits to householders, network cost saving benefits and wholesale electricity cost benefits) under the following three options:

- Option A: no restrictions on the installation of electric water heaters.
- Option B: no restrictions on the installation of electric water heaters that have specified DRM capability. The variants of this policy examined are:
 - Option B1 – DRM1 only electric water heaters, Energy Ministers' timetable
 - Option B2 – DRM1 only electric water heaters, accelerated timetable
 - Option B3 – DRM1 and DRM4 electric water heaters, Energy Ministers' timetable
 - Option B4 – DRM1 and DRM4 electric water heaters, accelerated timetable
 - Option B5 – DRM1 and DRM4 electric water heaters, accelerated timetable for a minimum tank size of >160 litres.
- Option C: Option B but only where a grid connected PV system is installed.

Task 3: Undertake a sensitivity analysis for each option, calculating the impact on costs, benefits and currently available models and sales of electric resistance water heaters by reducing in South Australia by 10%, 20% or 30%, the maximum allowable heat loss (kWh/24hrs) permitted under MEPS.

Task 4: Quantify direct cost benefits to householders, including capital, running and lifetime costs for a full range of replacement/installation scenarios and water heater systems, in new and established homes. Energy obtained from an existing on-site PV will be considered as 'free' energy in calculating energy consumption. This task covers a wide range of water heater system times and hot water demand.