



Report of the Review of South Australia's Water Heater Installation Requirements

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Department for Manufacturing,
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1 EXECUTIVE SUMMARY

South Australia's current Water Heater Installation Requirements commenced in July 2008, with the full Requirements applying from July 2009.

Under the Requirements, plumbers are required in many situations to install low-emission water heaters, such as high efficiency gas, solar or electric heat pump systems.

The Requirements apply to water heaters installed in new homes and established homes, such as when an existing water heater is replaced. Operational water heaters do not need to be replaced.

As part of its approval of this measure, Cabinet requested that a review be conducted after the Requirements had been operational for three years. A review process was commenced in mid-2012.

To inform the review, a number of consultation and research processes were undertaken, including

- release of an Options Paper in November 2012
- commissioning the University of South Australia to carry out field studies of water heater performance
- commissioning economic modelling
- conducting in-house scenario specific modelling

Consultation and research outputs were then used to inform a Directions Paper which was released in August 2013.

Submissions in response to the Directions Paper were subsequently received from the plumbing sector, manufacturers, industry bodies, community organisations, and agencies of the South Australian and Commonwealth Governments. Section 4 of this report contains a summary of submissions received.

Broadly, submissions received were supportive of the proposed directions, with certain specific concerns noted by a number of respondents. Some concerns raised, common to a number of submissions, were considered to have merit and in response DMITRE now puts forward recommendations which incorporate limited changes to the policy outlined in the Directions Paper.

In consideration of the research and consultation processes undertaken, this report recommends changes to the Requirements. These changes will maintain progress in the transition towards low emission water heaters and deliver a substantial contribution to South Australia's Strategic Plan target relating to residential energy efficiency, while:

- simplifying the Requirements in response to feedback that they can be difficult for plumbers and the community to understand
- reducing up-front costs for households which may not have sufficient hot water demand to benefit from the lifetime running cost savings of low emission water heaters
- reducing incentives for less scrupulous installers to bypass the Requirements to undercut those who do comply
- maintaining the viability of existing South Australian water heater manufacturers

The recommended changes will significantly simplify the Requirements and provide a greater number of options, especially for smaller households, to comply without incurring unreasonably high up front installation costs.

The key elements of the recommendations are:

- to retain the current requirement for all water heaters installed in new houses to be low-emission types
- to require water heaters installed in houses with an existing reticulated gas connection to be a low-emission type. Such homes have the widest choice of low-emission options including water heaters in the lower cost bracket
- to allow the installation of small or medium size electric water heaters in houses which are not connected to reticulated gas. Larger systems installed in such houses are required to be low-emission types

The final policy recommendations are summarised on the following page.

Water Heaters for New Class 1 Homes, Alterations and Additions

Low emission water heaters are required

Water Heaters for Existing Class 1 Homes

Operational water heaters or those requiring repairs are not required to be replaced.

Where a water heater is replaced or a new water heater installed, the new water heater must comply with the following requirements:

Where the house has an existing reticulated gas connection:

- a low emission water heater must be installed

Where the house does not have an existing reticulated gas connection, the following types of water heater (only) may be installed:

- a low-emission water heater (see below for details), or
- an electric storage water heater with a rated hot water delivery of no greater than 250 litres, or
- an electric instantaneous water heater, having a water storage capacity no greater than one litre and total electrical input no greater than 15.0 kW

Applicability

The Requirements will apply throughout South Australia

Low Emission Water Heaters

Solar and heat pump water heaters must be eligible for a minimum number of STCs (Small scale Technology Certificates, also known as RECs) and gas water heaters must meet minimum energy star ratings.

Exemptions include:

- Secondary electric storage water heaters of up to 55 litres rated hot water delivery, which do not serve a bathroom, are permitted.
- Temporary electric storage water heaters of up to 55 litres rated hot water delivery are permitted for a maximum of 60 days, pending installation of a complying water heater.
- Replacement of a single faulty component of an existing solar or heat pump water heater is permitted, for example a compressor or a storage tank.
- Installation of an electric or gas gravity fed water heater, located in a roof void, of up to and including 250 litres rated delivery, is permitted.
- Warranty replacements are permitted.
- Specific exemptions may be granted by the Technical Regulator, on a case by case basis, where extraordinary technical difficulties can be demonstrated.

2 BACKGROUND

SA's current water heater installation Requirements commenced in July 2008 following Cabinet approval on 10 December 2007 (ref: MEN07/006CS). As part of this approval, Cabinet requested that a review be conducted after the Requirements had been operational for three years.

Under the Requirements, plumbers are required in many situations to install low-emission water heaters, such as high efficiency gas, solar or electric heat pump systems, when installing new or replacement water heaters. The Requirements apply to new homes and to established homes when their existing water heaters are replaced.

The Requirements were initially implemented, for established homes, by an SA Water Direction issued under the *Waterworks Act 1932*, with SA Water responsible for compliance.

Requirements well received for new homes

For new homes the Requirements were established through the Building Code of Australia, with local government responsible for compliance.

The Requirements for new homes have been generally accepted and DMITRE is not aware of any significant concerns raised by home builders or purchasers, or of issues with non-compliance.

Water heater selection for new homes is not usually a time critical matter and customers have time to research the market and consider purchase and running costs of the various low emission options.

The pressures of possible higher up-front costs are also less significant within the context of a house construction budget. In addition, many home builders favour the compact nature of continuous flow gas fired water heaters, while developers often use the energy efficiency of low emission water heaters as a marketing feature, so overall there appears to be little or no resistance to the Requirements.

Some compliance concerns for existing homes

Water heater replacements for existing homes however, are typically 'grudge purchases' which are unplanned and urgent in nature, which in some cases can lead to attempts by householders or plumbers to circumvent the Requirements.

Over time it became apparent that the *Waterworks Act 1932* and associated regulations limited the scope of SA Water compliance activities. For example, SA Water regulators did not have powers to request documentation from plumbers.

The effect of this was that SA Water's compliance activities were largely limited to on-site audits carried out when plumbing contractors would register plumbing installations through SA Water's inspection booking system.

The Plumbing Industry Association of South Australia has expressed concerns that plumbers not complying with the Requirements are undercutting those who do and has requested greater compliance activities to address this.

In January 2013, the new *Water Industry Act 2012* replaced the legislation governing the operations of SA Water and responsibility for plumbing regulation was subsequently transferred to the Office of the Technical Regulator. Under the *Water Industry Act 2012*, the Technical Regulator has broader powers, including those to request documentation.

The Technical Regulator reports that significant progress is now being made in improving plumbing compliance. Regular information and awareness sessions are also being delivered to the plumbing industry.

The recommended changes to the Requirements in this Report will assist in achieving improved compliance by removing a number of provisions which have previously been identified as loopholes.

In addition, the recommendation to give more homes the option of installing small to medium electric water heaters will provide low cost replacement options for small and medium sized households, which will greatly reduce the impetus to circumvent the Requirements to reduce up front cost.

Lack of progress toward a national phase out

In December 2009, the Ministerial Council on Energy (MCE) agreed to implement a phase-out of greenhouse intensive water heaters in Class 1 dwellings, commencing with a partial phase-out in 2010 and moving to a full phase-out in 2012. Whilst MCE agreed to this policy, it was the responsibility of states and territories to implement the Requirements through their own laws.

To date, there has been little progress towards national harmonisation, although most jurisdictions have adopted the Requirements for low emission water heaters in new dwellings.

Given the current lack of consistency in national requirements, there are no imperatives to adjust the South Australian Requirements for the purposes of harmonisation.

Water heaters in public housing

At the time the Requirements were being developed, the then Department for Families and Communities sought an exemption from the full Requirements for its existing public housing portfolio, citing funding pressures.

No exemption was sought for new public housing, which was constructed to comply with the Requirements from the outset. Cabinet approved the requested exemption and requested that the three-year review consider DFC's capacity to fund compliance beyond July 2012.

DMITRE commenced discussions with Housing SA in September 2011, asking them to review their policies in the light of the Cabinet request. Subsequently, Housing SA advised its intention to fully comply with the Requirements for existing housing from within their existing maintenance budget from mid-2012. In July 2012, Housing SA issued maintenance instruction MNT027 to their contractors, requiring all water heater replacements to comply with the Requirements from that time.

Implementation of the proposed changes to the current Requirements would assist Housing SA in meeting their obligations by allowing a greater choice of replacement water heaters in many situations.

3 REVIEW OF THE REQUIREMENTS

The submission that Cabinet considered on 10 December 2007 stated that the review of the Requirements would consider:

- The need for and nature of any ongoing compliance activities;
- Harmonisation with national policies; and
- The former Department for Families and Communities (DFC)'s capacity to fund compliance in existing dwellings owned within Housing SA's portfolio beyond July 2012.

The Review was undertaken by the Energy Markets and Programs Division of the Department for Manufacturing, Innovation, Trade, Resources and Energy (DMITRE). Key elements of the Review process were as follows:

- In October 2012, the Energy Markets and Programs Division of DMITRE issued an Options Paper to inform stakeholders of the upcoming review and seek feedback on a range of options proposed for changes to the Requirements, with 12 submissions received.
- In July 2012, DMITRE commissioned the University of South Australia to carry out field studies of 12 existing water heaters installed in domestic dwellings, covering the 6 main water heater technologies. The purpose of the study was to improve available data on water and energy usage, energy efficiency, and user experience in 'real life' situations. Access to supplementary data from an existing ongoing study of solar water heaters at the Lochiel Park development was also negotiated as part of the commission.
- In January 2013, DMITRE commissioned George Wilkenfeld and Associates to carry out economic modelling of the policy changes proposed in the Options Paper.
- In April 2013, DMITRE carried out further scenario specific economic modelling to determine initial cost and lifetime cost impacts of the proposed changes on various sectors of the community, taking into account varying household size and hot water demand.
- In August 2013, a Directions Paper was released which included refined policy options informed by responses to the Options Paper and by the further research and modelling. Eighteen submissions were received as part of the Directions Paper consultations.

Subsequent to the release of the Directions Paper, a number of meetings and telephone consultations were held with stakeholders, including those requested by various stakeholders.

Changes were made to the policy proposals in response to feedback from stakeholders. These were subsequently discussed with key stakeholders.

4 CONSULTATIONS

This Review Report has been informed by stakeholder consultations over 2012 and 2013, including the release for comment of an Options Paper in October 2012 and a Direction Paper in August 2013. Twelve submissions were received on the Options Paper and eighteen submissions on the Directions Paper.

DMITRE approached a number of key stakeholders prior to release of the Options Paper to seek initial feedback on the Requirements. Initial meetings were then held and further discussions were held with most of the key stakeholders at other times throughout the review process.

The subsequent Directions Paper included an invitation for stakeholders to contact DMITRE for further discussions, resulting in meetings, either in person or by telephone, with 10 respondents to the Paper. In addition, key stakeholders were contacted to discuss the variations to the Proposed Directions as outlined in this Report.

Whilst DMITRE was able to accommodate many stakeholder comments, it was unable to agree to a request by the Plumbing Industry Association (PIA) to establish requirements to gather data on details of who electric water heaters are sold to. Whilst the proposal would significantly assist with enforcing compliance with the Requirements, DMITRE considers such an imposition on water heater wholesalers and retailers as excessive. Other recommendations in this report are designed to reduce the incentive for non-compliance, reducing the need for the PIA's proposal. DMITRE has advised the PIA of this position.

The key issues listed overleaf were raised in the submissions to the Directions Paper. These submissions are available online (except where noted otherwise) at www.sa.gov.au/energy/waterheaters.

Table 1: Stakeholder comments to the Directions Paper.

Stakeholder	Major comments
Paul King Plumbing	<ul style="list-style-type: none"> The proposals limit replacement water heater options for the Adelaide Hills, which are largely non-gas reticulated and where some solar and heat pump water heaters do not perform well. Many Adelaide hills dwellers rely on in-roof 250 litre electric water heaters and it is difficult and expensive to replace these with units limited to a maximum 170 litre capacity.
Plumbing Industry Association of SA (Inc)	<ul style="list-style-type: none"> Will support all proposed directions if sales of electric water heaters are controlled. 170 litre limit would encourage deliberate under sizing. Removing geographical restrictions would promote avoidance in country areas.
ELWA Pty Ltd (SA electric instantaneous water heater manufacturer)	<ul style="list-style-type: none"> 9kW input limit unreasonable for electric instantaneous water heaters (EIWH). EIWH can supply 120 and 200 litre demand categories. Policy should encourage EIWH which can provide energy savings of 40 to 60% over electric storage types.
Aqua Heat with Grammal (SA water heater manufacturers)	<ul style="list-style-type: none"> 170 litre limit would make continued manufacturing in SA unviable, their business is predominantly 250 litre gravity fed in-roof units. 40 litres/person/day hot water may be enough for white collar workers but consumption higher for blue collar workers, houses with teenagers, etc. Impracticable to replace in-roof 250 litre units with smaller in-roof
Stiebel Eltron Australia (Water heater importer and distributor)	<ul style="list-style-type: none"> STC ratings discriminate against heat pump water heaters (HPWH), should base compliance on % reduction in energy consumption. Recommend introduction of more flexible controlled tariff structures to allow greater applicability of HPWH. The proposed 9kW limit is inadequate for EIWH. LPG fuel costs used in modelling are too low.
GWA Group (Australian water heater and household goods manufacturer)	<ul style="list-style-type: none"> Gas has "high running costs" (<i>but no evidence provided</i>). Renewable energy growth favours electric WH as long term low emissions solution, also can be used to store renewable energy. Vehemently oppose 170 litre provision and removing geographical criteria; will force consumers to day rate tariffs or expensive LPG. Directions continue to encourage imported instantaneous gas WH which threatens local manufacturing and waste water.
DCSI – Housing SA (Inter-agency submission not published on sa.gov.au)	<ul style="list-style-type: none"> Greenhouse intensity of SA electricity supply is falling and emissions attributable to electric WH becoming much less of an issue as this trend continues. Policy should allow ESWH up to 250 litres. Heat pumps are not appropriate replacements in cold areas and don't work well when connected to off peak supplies.
Envestra (with input from APA Group)	<ul style="list-style-type: none"> Gas is lowest cost alternative "where used with other gas appliances" Generally support directions, except 5.2.2 allowing certain electric WH, will reduce network gas loads creating upward pressure on pricing and reducing impetus to extend network. Modelling ignores tendency of households to connect subsequent gas appliances once a gas connection is installed, so reducing effective gas tariff and total household energy cost.
Rinnai Australia	<ul style="list-style-type: none"> A very brief submission: Rinnai consulted with GEA and supports their submission. LPG modelling should include a set of calculations which do not include bottle hire, to be consistent with natural gas modelling.

Table 1: Stakeholder comments to the Directions Paper.

Stakeholder	Major comments
Clean Energy Council	<ul style="list-style-type: none"> Note that most of their points as submitted to 2012 Options Paper appear to have been adopted. Support all proposed directions but urge caution re energy prices as Natural Gas wholesale price predicted to increase by up to 300% within the next 5 years.
SA Council of Social Services	<ul style="list-style-type: none"> Support simplification of the Requirements Affordability the key issue, SACOSS research suggests significant numbers of their customers going without HW because they can't afford to replace failed WHs. Notes the convergence of GHG emissions intensity of gas and electricity in SA has reduced greenhouse impact of electric WH. Expect gas costs to increase significantly in future years. Notes ABS Home Expenditure Survey indicates average energy expenses 25% higher in dual energy households than all electric.
Zip Industries (Manufacturer - electric instantaneous)	<ul style="list-style-type: none"> The proposed 9kW limit is inadequate for EIWH. Larger units are effective and more efficient than electric storage (ESWH) <i>(All EIWH manufacturers have noted that three phase electricity supply is necessary for most applications but is rare in Class 1)</i>
Gas Energy Australia	<ul style="list-style-type: none"> Contend LPG operating costs lower than electricity and competitive with Natural Gas. LPG is cheaper in winter months than modelling values due to lower export demand during the Northern summer. Modelling should include LPG without rental costs, 76% of households using LPG indoors do not use it for WH and could therefore add WH without incurring rental costs.
Uniting Communities	<ul style="list-style-type: none"> Initial cost of replacement a key issue, many low income households can't raise the money at short notice, more finance options needed.
Blackwells Plumbing Service	<ul style="list-style-type: none"> <i>(A Bordertown firm)</i> Should retain geographical exemptions, local water supplies are very hard and cause problems with some heat pumps, solar and continuous flow types. 170 litre ESWH not big enough for a "family of four".
Australian Sun Energy (solar specialist) with MicroHeat (Manufacturer – electric inst.)	<ul style="list-style-type: none"> Generally support proposed directions Paper somewhat biased towards gas industry, LPG consumption for WH is a real logistical issue at about 60 litres per month. Overall, gas is not more efficient than electricity. Policy should encourage technological improvements. MicroHeat IEWH is very advanced and efficient, has excellent temperature control. 9kW limit for EIWHs is inadequate for whole of house applications
Commonwealth Department of Resources Energy and Tourism (Inter-agency submission not published on sa.gov.au)	<ul style="list-style-type: none"> Urges DMITRE to maintain a strong policy requiring low emission water heaters to be installed in most circumstances. EIWH can reduce greenhouse emissions as they don't have the storage losses of ESWH, but proposed 9kW limit may be too restrictive. Upfront costs for low emission systems are not as high as indicated in Directions Paper. Larger ESWH on day rate could deliver many times their rated capacity and should only be allowed if connected to off-peak tariff.
Dr Catherine Pye	<ul style="list-style-type: none"> Climate change is a critical issue. Urges installation of solar water heaters to be made mandatory for all new homes and replacements to reduce greenhouse emissions.

5 FINDINGS AND RECOMENDATIONS

Most of the findings and recommendations follow from the proposals in the Directions Paper. Some amendments to the Directions Paper proposals reflect views of stakeholders through the consultation process and policy development work over the course of the review.

The recommended changes to the Requirements retain the overall objectives, while ensuring that specific groups in the community are not financially disadvantaged, and that the plumbing industry and the community are better able to understand and comply with the Requirements.

Connection to gas a key criterion

Under the recommended changes an existing connection to reticulated gas becomes a key criterion.

Houses where reticulated gas is already connected will be required to install low emission water heaters. Such houses have access to the greatest range of options at low upfront cost, which have low lifetime and energy costs. While most householders, in such houses, are expected to opt for gas storage or continuous flow water heaters, they are also able to install other low emission types if they prefer.

Safeguarding smaller households

Houses without an existing reticulated gas connection may install an electric water heater of up to, and including, 250 litres rated hot water delivery, or an electric instantaneous water heater of up to 15kW input capacity.

This change recognises the comparatively high upfront cost of solar and heat pump water heaters and gives households with low to moderate hot water demand, the option to install a system with low up front cost.

Economic modelling indicated that for households without an existing reticulated gas connection, converting to a gas water heater can lead to higher lifetime costs, mainly due to the need for such households to pay an additional supply charge for reticulated gas. A similar outcome is expected for LPG water heating in homes currently not using LPG.

Further, where such households have a relatively low demand for hot water the higher up-front costs for a low-emission system such as a solar or heat pump system are unlikely to be recouped over the life of the system. DMITRE's modelling indicates that hot water demand of 120 litres per day or above would be sufficient to deliver lifetime benefits from converting from an electric to low-emission hot water system.

Responding to concerns about the 170 litre limit

Based on this modelling, DMITRE proposed in the Directions Paper that, in houses without reticulated gas, water heaters over 170 litres would need to be low-emission. Stakeholder feedback questioned whether this capacity would be sufficient to service a typical family.

Accordingly, DMITRE recommends that systems over 250 litres need to be low-emission types and will seek to promote the benefits of low-emission systems to medium sized households.

The capacity limits will encourage households with higher hot water demand to install low emissions systems which are expected to, over time, pay back the higher upfront cost with lower energy costs. A number of energy retailers and water heater installers have for some time been offering terms, free gas connection and other inducements to reduce upfront costs of low emission systems which can assist householders with affordability.

A number of other minor changes are recommended to make the Requirements easier to understand and implement. These are detailed below.

RECOMMENDATION 1: CONTINUE THE REQUIREMENTS

It is recommended that the Government continues the South Australian Water Heater Installation Requirements with amendments as set out below.

Overall, the Review has found that the Requirements have achieved their objective of promoting a transition to low emission water heaters and making a substantial contribution to South Australia's Strategic Plan target relating to residential energy efficiency. (BIS Shrapnel surveys show a marked reduction in the market penetration of electric storage water heaters and corresponding increase in low emission types in the home appliance market, while installation of low emission water heaters for new homes has become almost universal.)

A number of changes to the Requirements are recommended to simplify the Requirements, improve compliance, and improve the affordability of installing complying water heaters for households with small to medium hot water demand. Stakeholder discussions with local water heater manufacturers have indicated that the changes will also provide a positive signal that local manufacturing will not be negatively impacted.

RECOMMENDATION 2: NEW CLASS 1 DWELLINGS

It is recommended that the Government retains the current SA Variations to the National Construction Code energy provisions for 'water heater in a hot water supply system' (NCC Vol 2, Section 3.12.5.6).

Water heater installations carried out as part of any building work requiring development approval must comply with the Australian National Construction Code, which in some cases contains variations specific to particular states or territories.

DMITRE has worked with the Department for Planning, Transport and Infrastructure (DPTI) to implement minor changes to the current SA variation, which will take effect from May 2014. These changes are for clarification purposes and will have no material effect on the current Requirements for new homes.

DPTI has advised that the Australian Building Codes Board (ABCB) plans to move the water heater provisions into National Construction Code Volume Three, the National Plumbing Code, in 2014. Changes to the water heater provisions are also proposed, and DMITRE will monitor the ongoing National Construction Code change process to determine the compatibility of the revisions with South Australia's Water Heater Installation Requirements.

RECOMMENDATION 3: EXISTING CLASS 1 DWELLINGS – CONNECTED TO RETICULATED GAS

It is recommended that for existing Class 1 dwellings connected to reticulated gas, the Government permit only low emission water heaters to be installed.

Feedback from the consultation process, supported by research outcomes and economic analysis, indicates that installing a low emissions water heater in a household with low hot water demand, instead of an electric system, may not deliver lifetime benefits. For households with medium to large hot water demand, lifetime benefits are more likely to be realised as energy cost savings are more substantial.

A substantial barrier to the economical replacement of electric water heaters with low emission types occurs where a household does not have an existing connection to reticulated gas. Even if a gas connection can be

arranged at modest (or zero) cost, there can be additional costs associated with the provision of gas piping within the property.

Further, where gas is connected solely for the purpose of water heating, the householder can experience higher effective running costs compared with a home that already uses gas for other purposes. This is because in the household using gas for the first time, the additional running costs for the water heater will be the sum of the gas usage and gas supply charges. A home with existing gas appliances already pays the supply charge, so the additional running costs of the water heater will only be the usage charges.

In addition, there are limited options for low emissions systems other than gas water heaters that are suited to households with lower hot water demand. While lifetime costs for households with lower hot water demand do not vary greatly between different system types, they are highest for gas water heaters in non-gas connected households. Solar and heat pump water heaters can have competitive lifetime costs, but at a significantly higher up-front cost.

The policy recommendations for water heaters installed in existing dwellings take these factors into account. Where a gas connection exists at the property, gas fired water heating has competitive installation cost and typically the lowest lifetime cost. (Natural gas is currently connected to approximately 58% of SA households).

Where gas is not connected, economic analysis indicates that connecting it specifically for water heating may result in gas fired water heaters having a high life cycle cost compared to other systems, due to supply charges. It is therefore difficult to impose a requirement to install low emission systems where the lowest initial cost alternative may be likely to have a higher lifetime cost.

As with the current situation, there would be no requirement to replace a working water heater.

RECOMMENDATION 4: EXISTING CLASS 1 DWELLINGS – NOT CONNECTED TO RETICULATED GAS

It is recommended that, for existing Class 1 dwellings NOT connected to reticulated gas, the Government permit the following systems to be installed:

- **a low emission water heater**
- **an electric storage water heater of up to and including 250 litres rated hot water delivery**
- **an electric instantaneous water heater of no greater than 1 litre storage capacity and 15.0kW total electrical input**

A number of research outputs indicate that current household hot water consumption per person is lower than the quantity typically used in economic and energy modelling. This finding is consistent with the increasingly widespread use of low flow tapware and shower heads, cold water clothes washing, and the use of dishwashers with inbuilt water heating. In particular, households having low hot water consumption may find that most low emission water heater types will not provide a lifetime payback. Correspondingly, the contribution to greenhouse emissions associated with water heating in low demand households is comparatively small.

Economic analysis indicates that a number of larger low emission water heaters have favourable lifetime costs compared to electric water heaters, where hot water demand is medium to large. It is therefore recommended that installation of electric water heaters having delivery greater than 250 litres would not be permitted.

It was proposed in the Directions Paper that this cut-off be set at 170 litres, as DMITRE's modelling indicated that low emission systems can deliver lifetime benefits for households using down to 120 litres per day.

While some stakeholders supported these research outputs, others questioned the ability of a 170 litre maximum capacity storage tank to adequately serve a medium sized household in all circumstances. In addition there were concerns that the most common water heater type installed within roof voids was 250 litres in capacity and that replacing it with a smaller alternative was technically complex and likely to invoke high installation costs.

In response to these concerns, DMITRE determined that it would be appropriate to set the maximum capacity of an electric storage water

heater permitted where there was no existing reticulated gas connection at 250 litres rated hot water delivery.

Correspondingly, consistent feedback was received from stakeholders involved with Electric Instantaneous Water Heaters (EIWH) that the capacity limit of 9kW proposed for this type of water heater in the Directions Paper would be insufficient to provide adequate hot water delivery for a shower.

DMITRE recognises the EIWH as an emerging technology in detached and semi-detached houses, inherently more efficient than electric storage, and effectively self-limiting in capacity due to the high electrical supply currents required. It was therefore considered appropriate to increase the capacity limit for instantaneous electric water heaters to 15kW, a level which can provide sufficient hot water delivery for a household with low hot water demand. It is noted however that a 15kW EIWH requires a 3 Phase electrical supply to operate and will therefore have limited practical application in most houses.

RECOMMENDATION 5: REMOVING THE GEOGRAPHICAL CRITERIA

It is recommended that the Government remove the current geographical criteria

Under the current Requirements, different rules apply to different parts of the state. These geographical criteria were initially included due to the limited availability of expertise with low emission water heater technology in regional and remote areas. It is likely that this is now much less the case.

The recommended requirements relating to houses with reticulated gas connections naturally apply only to gas reticulated areas, which includes most of metropolitan Adelaide and larger regional centres. The recommended requirements for other dwellings allow for electric systems of up to and including 250 litre rated hot water delivery. In effect, this allows nearly all households the option of a mature technology water heater which is familiar to most plumbers, so it is proposed that the recommended requirements will apply across South Australia.

RECOMMENDATION 6: REMOVING THE SA WATER CONNECTION REQUIREMENT

It is recommended that the Government remove the current limitation of the Requirements to properties connected to an SA Water supply.

This criterion was a consequence of the Requirements originally being regulated under the *Waterworks Act 1932*, which was administered by SA Water. Under the current *Water Industry Act 2012*, there is no need for this limitation.

RECOMMENDATION 7: REDUCING THE EXEMPTION FOR INTERNAL WATER HEATERS

It is recommended that the Government reduce the circumstances under which internal water heaters are exempted.

Given the recommendation to allow small to medium electric water heaters, and 3 Star gas water heaters if installed within the building (see Recommendation 9), in most instances water heaters installed within the house or roof space could be economically replaced. Where low emission water heaters are required, there are a number of types which can be installed internally, and externally flued options are available for many types of gas fired water heaters.

The remaining exception for internal water heaters relates to gravity fed water heater, installed in a roof space. Such water heaters can be technically difficult and expensive to relocate outside.

Accordingly, it is recommended that the installation of electric or gas gravity fed water heaters of up to and including 250 litres rated delivery be permitted when installed in a roof void.

RECOMMENDATION 8: REMOVING THE '3-METRE RULE'

It is recommended that the Government remove the current provision for proximity of a water heater to a neighbour's property to determine the type of water heater which can be installed ("3 metre rule").

This provision is supported by some manufacturers but not most other stakeholders. While this provision was established to avoid noise problems from heat pumps, it has the unintended consequence of allowing a loophole where the installation of low noise water heaters can be avoided.

In common with other equipment installation specialists, water heater installers have a responsibility to comply with all relevant codes and legislation. It is appropriate for them to be similarly aware of, and take responsibility for, compliance with the Environment Protection (Noise) Policy 2007 published by the Environment Protection Authority (SA).

RECOMMENDATION 9: RE-DEFINING 'LOW EMISSION' WATER HEATERS

It is recommended that the Government define low emission water heaters using deemed minimum STC values.

Currently, suppliers are required to demonstrate through testing and simulation that their water heaters do not exceed specified levels of greenhouse emissions per unit of delivered heat, to meet the Requirements. Alternatively, water heaters may be selected from a list of types deemed to meet the relevant emissions standard by means of type, Small-scale Technology Certificate (STC) values, or energy ratings.

Testing and simulation to determine a quantified greenhouse emissions level is a complex process and in practice, installers and other stakeholders rely on deemed values to determine compliance.

Given that STC values and published energy efficiency ratings are available for most low emission water heater types, it is appropriate to rely on these values to determine compliance. This will allow for reference to the Full Standard and Reduced Standard to be removed from the Requirements.

It is proposed that low emission water heaters would be defined as;

- a 5 star (or higher) rated gas fired continuous flow or storage water heater, or

- a 3 star (or higher) rated gas fired storage water heater, only if installed completely within a room, garage, or roof space, or
- an electric boosted solar, gas boosted solar or electric heat pump system that is deemed to meet the current Full Standard. For clarity, references to Renewable Energy Certificates (RECs) in the current Requirements refer equally to Small-scale Technology Certificates (STCs), or
- a wood fired water heater or solar water heater with wood fired boosting.

RECOMMENDATION 10: RETAINING LOW FLOW SHOWER HEAD REQUIREMENT

It is recommended that the Government retain the current requirement for low flow shower heads to be installed when new or replacement water heaters are installed.

The current Water Flow Rate Performance Standard requires that all shower outlets supplied by water heaters installed in Class 1 or Class 2 dwellings under the Requirements deliver a flow rate of no greater than nine litres per minute. The proposal to retain this provision was not opposed by any stakeholders during the consultation process.

Whether low emission or conventional electric water heaters are installed, reduced hot water demand is a significant contributor to reduced greenhouse emissions, energy cost and providing adequate hot water delivery.

RECOMMENDATION 11: ALLOWING TEMPORARY INSTALLATIONS

It is recommended that the Government allow for temporary water heater installations.

Allowing temporary replacements was proposed in the Directions Paper and was largely supported. The only one dissenting respondent was a manufacturer expressing concern that it could be used as a loophole for the temporary system to be simply left in place.

If a gas or some other low emission water heater is used to replace another type, it may not be possible to arrange prompt replacement. It is therefore reasonable to allow temporary installation of a non-complying unit.

Systems that would be allowed to be installed temporarily are low emission types (such as 5 star gas) or electric water heaters of up to 55 litres storage capacity. The limited ability of a small electric water heater to meet the demand of a medium to large household, and the associated high energy costs of running such a system on day rate electricity will act as a disincentive to retain it in service for an extended period.

RECOMMENDATION 12: ALLOWING PARTIAL REPLACEMENTS

It is recommended that the Government allow for partial replacements of solar or heat pump water heaters

Some major components of solar and heat pump water heaters typically have longer service lives than other components. Provision should be made to avoid unnecessary scrapping of low emission water heaters. For example, replacement of a storage tank would be allowed while retaining the solar collectors, or vice versa.

RECOMMENDATION 13: AN OPEN ACCESS WATER HEATER COMPARISON TOOL

It is recommended that the Government develop an open access water heater comparison tool

Evaluating the initial and running costs of the many options available for new and replacement water heaters is not straightforward, and householders and others would benefit from the availability of an on-line calculator to assist water heater selection. This proposal was well supported in responses to the Directions Paper. It is proposed to proceed with development of this tool, based on work commissioned by DMITRE currently underway by the University of South Australia.