Multiple heat pump water heater activities

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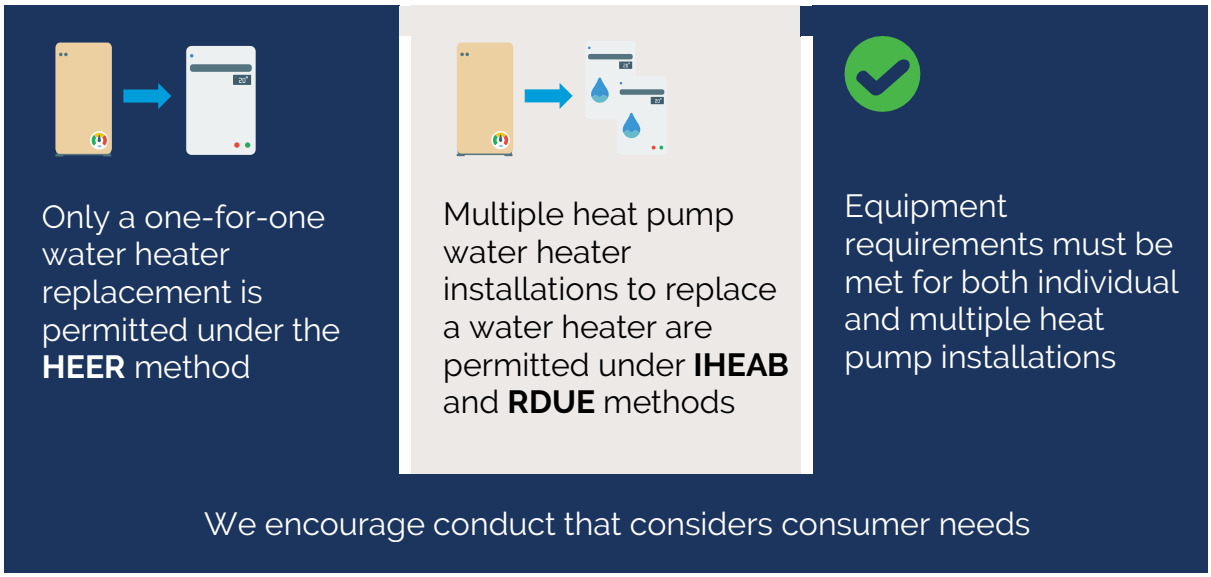

Only one-for-one water heater replacements are allowed under the HEER method in the Energy Savings Scheme (ESS)

You can only implement one-for-one water heater replacements under the Home Energy Efficiency Retrofit (**HEER**) method. Heat pump water heater **Activity Definitions D17** and **D19** do not permit the replacement of a single water heater at a residential or small business site with more than one heat pump water heater. Heat pump water heaters joined by manifold are not considered to be a single heat pump and are not permitted in the HEER method. Where more than one water heater is installed at a site, the evidence must clearly show the number of water heaters that were replaced.

Multiple heat pump water heaters may replace single water heaters under the IHEAB method in the ESS

You can replace one or more water heaters with one or more heat pump water heaters under the Installation of High Efficiency Appliances for Businesses (**IHEAB**) method **Activity Definition F16**. This means you can create certificates from the replacement of a single water heater with multiple heat pump water heaters, provided the replacement heat pumps meet the Equipment Requirements.

Multiple heat pump water heaters may be installed under the IHEAB method in the ESS

You can install one or more heat pump water heaters under IHEAB **Activity Definition F17**. This means you can create certificates from installing multiple heat pump water heaters, provided the installed heat pumps meet the Equipment Requirements.

Multiple heat pump water heaters may replace single water heaters under the RDUE method in the Peak Demand Reduction Scheme (PDRS)

You can replace one or more water heaters with one or more heat pump water heaters under the Reducing Demand Using Efficiency (**RDUE**) method **Activity Definition WH1**. This means you can create certificates from the replacement of a single water heater with multiple heat pump water heaters, provided the replacement heat pumps meet the Equipment Requirements.

Installed heat pump water heaters must meet Equipment Requirements

Heat pump water heaters installed under the ESS and PDRS must meet the Equipment Requirements in the relevant Activity Definitions to be eligible to create certificates. Equipment Requirements include achieving minimum annual energy savings of 60% when determined in accordance with the modelling procedure approved by the Scheme Administrator.

The Accepted Products List includes single and multiple units. You can install multiples of a single unit on the Accepted Products List provided that:

- it is accepted for use in Activity Definitions F16, F17 or WH1
- the multiple heat pump water heaters:
  - are joined in parallel;
  - are identical models; and
  - have balanced water flow.

Refer to the Accepted Products List in TESSA for a list of heat pump water heaters that meet the Equipment Requirements.

If you would like to install multiple heat pump units that don't meet these requirements – for example a combined system made up of a 100L and a 300L capacity heat pump – you may apply to have them included on the Accepted Products List. Products must be modelled in accordance with how they are intended to be installed. See Product acceptance for details.

We encourage conduct that considers consumer needs

We will investigate and act on consumer and industry information relating to heat pump water heater installations that don't meet the requirements of the ESS and PDRS Rules or that result in customer dissatisfaction.

As with any installation, if proposing configurations of more than one heat pump water heater, ACPs should consider the needs of the customer and factors such as noise, ventilation and physical footprint to ensure the implementation is fit for purpose.

We remind ACPs they must meet the Minimum Requirements of Conduct. This includes:

- providing details of the make, model and electrical characteristics of the equipment
- explaining and demonstrating equipment features
- ensuring the customer is satisfied with the heat pump as installed
- providing a mechanism for replacement of faulty equipment
- ensuring the original water heater is disposed of appropriately
- ensuring all representatives, including installers, identify the ACP in all communication and provide the customer with contact details.

Capacity factor in IHEAB

Electricity savings under Activity Definition F16 are capped at the capacity of the existing system. The capacity factor accounts for this cap. Where the capacity is the same or less than the existing capacity, the capacity factor is one. Where more capacity is installed, the capacity factor is determined by dividing the total rated capacity of the existing system (**WHCap**) by total rated capacity of the heat pumps installed (**HPCap**).

$$Capacity\ Factor\ = \frac{WHCap}{HPCap}$$

Note: **HPCap** is the Total Heat Pump Thermal Capacity value in the Accepted Products List, **not** the Total Thermal Capacity. Total Thermal Capacity represents the capacity of the heat pump and booster heaters. Where multiple heat pumps are installed HPCap will be the sum of Total Heat Pump Thermal Capacity for the individual units installed.

WHCap is the total thermal capacity of the equipment that is replaced and can be found on the nameplate of the replaced equipment. Note if more than one unit is replaced, WHCap is the sum of the total thermal capacity of the individual units that are replaced.

Ensure your implementation data upload is correct

Implementation data uploads for HEER method

Each water heater you replace at a residential or small business site is an implementation under the HEER method. If replacing more than one existing water heater at a site, you must enter a separate implementation line with a unique Implementation identifier for each water heater you replace. See example calculation 1 in **Attachment A,** which sets out how to calculate energy savings from the installation of a single heat pump water heater.

Implementation data uploads for IHEAB method

Where one existing water heater is replaced with multiple heat pump water heaters under the IHEAB method, you can sum the energy savings for each replacement heat pump water heater and enter the implementation as a single line item in the implementation data upload.

A similar approach can be used if you are replacing multiple existing systems with multiple heat pump water heaters – i.e. you can use a single line item in the implementation data upload. You can also use a separate line item in the implementation data upload for each water heater that is being replaced (e.g. if you are replacing 2 water heaters with 4 heat pump hot water heaters you could use 1 line item or 2 – but not 4).

See example calculation 2 in **Attachment A,** which sets out how to calculate energy savings from the installation of multiple heat pump water heaters.

Implementation data uploads for RDUE method

Where more than one existing water heater is replaced under the RDUE method, the capacity should be calculated across all heat pump water heaters installed – see example calculation 3 in **Attachment A**. The implementation should be one line item in the implementation data upload.

Attachment A Example calculations

This attachment provides example calculations for installation of single and multiple replacement water heaters under the HEER, IHEAB and RDUE methods. In each example the implementation is assumed to take place in climate zone HP3-AU (relevant data column headings in the Accepted Products List start with 'Zone 3').

1 HEER D17 energy savings calculations

Example calculations for replacing:

1. a single electric water heater with a heat pump water heater, or
2. two existing electric water heaters with 2 separate heat pump water heaters.

D17 Equation:

$$\textbf{\textit{Deemed Activity Electricity Savings}} = \textbf{\textit{Baseline A}} - \textbf{\textit{a x}} (\textbf{\textit{Bs}} + \textbf{\textit{Be}})$$

Inputs from ESS Rule

a = 2.320 (Activity Definition D17)

Baseline A = 50.76 MWh for medium System Size and 30.78 MWh for small System Size

Bs = 3.494

Be = 0

Calculations for each scenario

	Replacing one existing electric water heater with one heat pump	Replacing 2 existing electric water heaters with 2 heat pumps
System Size[a]	Medium	Medium
***Baseline A* value**	50.76 MWh	50.76 MWh
***Bs* value[a]**	3.494 GJ/year	3.494 GJ/year
***Be* value[a]**	0 GJ/year	0 GJ/year
Deemed Activity Electricity Savings	= 50.76 – 2.32 x (3.494 + 0) = 42.65 MWh	= 50.76 – 2.32 x (3.494 + 0) for each of the 2 Implementations = 85.31 MWh
Implementation Data rows	One row in the Implementation Data Sheet.	Two rows in the Implementation Data Sheet, one for each item of equipment replaced

a These values are specific to the equipment being installed and can be found in the Accepted Products List.

2 IHEAB F16 energy savings calculations

Example calculations for replacing an existing electric resistance water heater with:

1. a single heat pump water heater with no change to capacity,
2. three identical combined heat pump water heaters installed in parallel with no change to capacity, or
3. three identical combined heat pump water heaters that increase the capacity of the original water heater.

F16 Equation:

$$\boldsymbol{Deemed\ Activity\ Electricity\ Savings} = \sum_{\boldsymbol{systems}} [\boldsymbol{RefElec - HPElec}]\ \boldsymbol{x\ Capacity\ Factor\ x\ Lifetime/3.6}$$

Inputs for scenarios 1 and 2

Assumes that the heating capacity of the new heat pump water heaters is the same or less than the heating capacity of the original water heater.

Capacity Factor = 1

Lifetime = 12 years

Inputs for scenario 3

Assumes that the heating capacity of the 3 new heat pump water heaters is greater than the capacity of the original water heater.

Capacity Factor = WHCap/HPCap

Note: To calculate the correct HPCap value, use Total heat pump thermal capacity value in Accepted Product List for HPCap and multiply by the number of units installed.

Lifetime = 12 year

Increasing the capacity of the water heater system

In Scenario 3, the new equipment provides heating capacity above the capacity of the existing system, and the calculated Electricity Savings are capped to the size of the existing system. Depending on the configuration of the new system, you may be able to use Activity Definition F17 to calculate some of your savings. Refer to section 4 of our Water Heaters Fact Sheet for more information.

Calculations for each scenario

	Scenario 1 Single replacement heat pump	Scenario 2 Three heat pumps replacing one unit	Scenario 3 Three heat pumps with higher capacity replacing one unit
RefElec[a]	38.1525 GJ/year per unit	38.1525 GJ/year per unit	38.1525 GJ/year per unit
HPElec[a]	8.68 GJ/year per unit	8.68 GJ/year per unit	8.68 GJ/year per unit
WHCap[b]	*Assumed that the sum of the heating capacity of the new heat pump water heaters (HPCap) is the same or less than that of the original water heater (WHCap).*		8.54 kW
HPCap[c]			= 3.54 x 3 = 10.62 kW
Capacity Factor	Capacity Factor = 1	Capacity Factor = 1	Capacity Factor = WHCap / HPCap = 8.54 / 10.62 = 0.80
Deemed Activity Electricity Savings	= Σ [38.1525 – 8.68] x 1 x 12 / 3.6 = 98.2417 MWh	= Σ [38.1525 – 8.68] x 1 x 12 / 3.6 (sum for each new installed item of equipment) = [38.1525 – 8.68] x 1 x 12 / 3.6 + [38.1525 – 8.68] x 1 x 12 / 3.6 + [38.1525 – 8.68] x 1 x 12 / 3.6 = 294.7251 MWh	= Σ [38.1525 – 8.68] x 0.8 x 12 / 3.6 (sum for each new installed item of equipment) = [38.1525 – 8.68] x 0.8 x 12 / 3.6 + [38.1525 – 8.68] x 0.8 x 12 / 3.6 + [38.1525 – 8.68] x 0.8 x 12 / 3.6 = 235.78 MWh
Electricity Savings	= 98.24 MWh	= 294.73 MWh	= 235.78 MWh
Implementation Data rows	*Each scenario is considered a single Implementation. You can include them as single rows in your Implementation Data sheet. The replacement of multiple existing water heaters can also be considered a single implementation.*		

a. These values are specific to the equipment being installed and can be found in the Accepted Products List.
b. These values are taken from the nameplate of the existing water heater.
c. These values are specific to the new equipment being installed and **must** be taken from the Accepted Products List. When multiple heat pumps are being installed, you must use the total thermal capacity by adding the thermal capacity of the individual units.

3 RDUE WH1 peak demand savings capacity calculations

Example calculations for replacing a single electric resistance water heater with:

1. a single heat pump water heater, or
2. three identical heat pump water heaters.

Equations for Peak Demand Savings Capacity:

$$\begin{aligned}&\boldsymbol{Peak\ Demand\ Savings\ Capacity}\\&\quad=(\boldsymbol{Baseline\ Input\ Power\ x\ Baseline\ Peak\ Adjustment\ Factor}\\&\quad-\boldsymbol{Input\ Power\ x\ Peak\ Adjustment\ Factor})\ \boldsymbol{x\ Firmness\ Factor}\end{aligned}$$

Inputs from PDRS Rule

Baseline Input Power = 0.01 x ComPkLoad

Baseline Peak Adjustment Factor = 1 (Table A4)

Input Power = (100 – Annual Energy Savings %) x Baseline Input Power / 100 – *(no change to Annual Energy Savings % for multiple units)*

Peak Adjustment Factor = 0.77 (Table A4)

Firmness Factor = 1

Summer Peak Demand Reduction Duration = 6 hours

Lifetime = 12 years (from Activity Definition WH1)

Note: The Baseline Input Power and Input Power values are for all new units being installed. When calculating Baseline Input Power for multiple units, sum ComPkLoad for each new unit. ComPkLoad is the Peak Load (MJ/day) for the relevant climate zone, e.g. Zone 3 Peak Load in the Accepted Product List.

Calculations for each scenario

	Replacing with a single heat pump	Replacing with 3 combined heat pumps
ComPkLoad[a]	95.00 MJ/day per unit	95.00 MJ/day per unit
Annual Energy Savings %[a]	71.05	71.05
Calculating Baseline Input power	= 0.01 x 95.00 = 0.95 kW	= 0.01 x (95.00 + 95.00 + 95.00) *(sum for all new equipment)* = 2.85 kW
Calculating Input Power	= (100 – 71.05) x 0.95 / 100 = 0.275025 kW	= (100 – 71.05) x 2.85 / 100 = 0.825075 kW
Peak Demand Savings Capacity	= (0.95 x 1 – 0.275025 x 0.77) x 1 = 0.738231 kW	(2.85 x 1 – 0.825075 x 0.77) x 1 = 2.214692 kW
Peak Demand Reduction Capacity (Eqn 2a of Rule)	= 0.738231 x 6 x 12 = 53.15 kW	= 2.214692 x 6 x 12 = 159.46 kW
Implementation Data rows	*Each scenario is considered a single Implementation and should be included as a single row in your Implementation Data Sheet. (Where more than one water heater is replaced, you can include a single row for the implementation or a separate row for each water heater replaced.)*	

a. These values are specific to the equipment being installed and can be found in the Accepted Products List.