Addendum to the Space Heating Comparison Methodology: Public Consultation

November 2024

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# 1.0 Introduction

This addendum supplements and modifies the Space Heating Comparison Methodology: Public Consultation paper. It:

* summarises the results of the public consultation process
* clarifies updates to the comparison methodology based on the comments received
* communicates next steps.

# 2.0 Public consultation summary

The Australian Government Department of Climate Change, Energy, the Environment and Water publicly consulted on the Space Heating Comparison Methodology: Public Consultation paper from 28 August 2024 date to 27 September 2024. The department received 8 public submissions including from industry associations, manufacturers and suppliers, and academia:

* Alan Pears
* Australian Gas Infrastructure Group
* Australian Home Heating Association
* CDB Group
* Consumer Electronics Suppliers Association
* Daikin Australia
* Gas Appliance Manufacturers Association of Australia
* STIEBEL ELTRON.

Stakeholder messages included:

* specific suggestions to improve the technical accuracy of the proposed comparison methodology
* specific suggestions to improve the presentation of information in the consultation paper
* general statements about the usefulness of the comparison methodology and information resources to inform consumers and help them to choose the most suitable heating systems for their needs.

Table 1 below provides an overview of how the department has responded to specific suggestions for improving the comparison methodology or the presentation of information in the consultation paper.

Table 1: Response to public stakeholder comments on the comparison methodology

|  |  |  |
| --- | --- | --- |
| **Item** | **Summary of stakeholder comment** | **Response** |
| 1 | Solid fuel heatersSuggested correction to Appendix 4: No commercially available wood heater has a maximum heat output of only 2kW. | See section 3.1 below. |
| 2 | Solid fuel heatersSuggested correction to Appendix: Solid fuel heaters are not more efficient at high burn rates. Solid fuel heaters operate most efficiently at low burn rates, where less heat is lost up the flue and more energy is transferred into the living space. | See section 3.2 below. |
| 3 | Solid fuel heatersSuggested correction to the Heating Seasonal Performance Factor (HSPF) figures in Figure 5: To better reflect actual performance, the calculated HSPF for a 7kW output solid fuel heater (Heater Unit 14) with a medium burn rate efficiency of 63% (see Appendix 4) should align closer to this nominal value. However, the HSPF values for Hot, Average, and Cold zones are 0.57, 0.60, and 0.61, respectively—significantly lower than the expected nominal efficiency. | See section 3.3 below. |
| 4 | GeneralSeeking confirmation of next steps, process and timings. | See ‘4.0 Next steps’ section below. |

# 3.0 Updates to the comparison methodology

## 3.1 Solid fuel heaters – remove 2kW wood heater example

Table 5 and Appendix 4 of the consultation paper included an example of a 2kW wood heater for comparison purposes. But it is agreed that small capacity solid-fuel heaters are not commercially available, and this example product is deleted.

In Table 5 of the Comparison Methodology, delete Heater Unit 6, and update the numbering of Heater Units 7-20 to reduce by 1. Correspondingly, in Appendix 4, delete Heater Unit 6, and update the numbering of Heater Units 7-20 to reduce by 1. Complete versions of the updated Table 5 and affected parts of Appendix 4 are included below in section 3.4

## 3.2 Solid fuel heaters – correction to reflect that low burn rates are more efficient than high burn rates

For the purposes of testing the comparison methodology for solid fuel heaters, the possibility of both increasing and decreasing efficiency with burn rate were considered. It is agreed that it is more typical that low burn rates are more efficient than high burn rates. The efficiency data for Heater Unit 13 (previously 14) is therefore updated to be 66% at high burn rate, 70% and medium burn rate, and 71% at low burn rate, and the calculated results updated in both Appendix 4 and Table 5.

The decrease in high burn rate efficiency from 67% to 66% results in a small increase in the full capacity rated input power and a small decrease in the full capacity rated efficiency. The increases in the medium and low burn rates efficiencies significantly decrease the annual energy use (and HSEC) and increase the HSPF for all zones. In **Appendix 4, Solid fuel combustion heaters, Test Data**, update the rows for Heater Unit 13 (previously 14) as shown below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **High Burn Rate: Maximum Heat Output = Full Capacity (kW)** | **High Burn Rate: Thermal Efficiency** | **High Burn Rate: Electrical Energy Consumption (kW)** | **Medium Burn Rate: Heat Output = "Half" Capacity (kW)** | **Medium Burn Rate: Thermal Efficiency** | **Medium Burn Rate: Electrical Energy Consumption (kW)** |
| 13 ~~14~~ | 7 | 66% ~~67%~~ | 0.14 | 5.6 | 70% ~~63%~~ | 0.056 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Heater Unit** | **Low Burn Rate: Heat Output = Min Capacity (kW)** | **Low Burn Rate: Thermal Efficiency** | **Low Burn Rate: Electrical Energy Consumption (kW)** | **Standby: Electrical Energy Consumption (W)** |
| 13 ~~14~~ | 4.2 | 71% ~~60%~~ | 0.028 | 5 |

In **Appendix 4, Calculation Results**, update the rows for Heater Unit 13 (previously 14) as shown below:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Full Capacity: Rated Capacity (kW)** | **Full Capacity: Rated Capacity at 2degC (kW)** | **Full Capacity: Rated Input Power (kW)** | **Full Capacity: Rated Efficiency** | **Standby, Pia (W)** | **Heating Season Total Load: HSTL\_hot (kWh/y)** | **Heating Season Total Load: HSTL\_avg (kWh/y)** | **Heating Season Total Load: HSTL\_cold (kWh/y)** |
| 13 ~~14~~ | Solid Fuel Heater | 7 | 7 | 10.75 ~~10.59~~ | 65.1% ~~66.1%~~ | 5 | 587 | 3801 | 9141 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Heating Season Energy Consumption: HSEC \_hot (kWh/y)** | **Heating Season Energy Consumption: HSEC \_avg (kWh/y)** | **Heating Season Energy Consumption: HSEC \_cold (kWh/y)** | **Inactive Energy Consumption: IAEC \_hot (kWh/y)** | **Inactive Energy Consumption: IAEC \_average (kWh/y)** | **Inactive Energy Consumption: IAEC \_cold (kWh/y)** |
| 13 ~~14~~ | Solid Fuel Heater | 831 ~~983~~ | 5399 ~~6308~~ | 13069 ~~14965~~ | 42.4 | 37.3 | 30.5 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Annual Energy Use: Hot (kWh/y)** | **Annual Energy Use: Average (kWh/y)** | **Annual Energy Use: Cold (kWh/y)** | **Overall Product Efficiency: HSPF \_hot** | **Overall Product Efficiency: HSPF \_average** | **Overall Product Efficiency: HSPF \_cold** |
| 13 ~~14~~ | Solid Fuel Heater | 874 ~~1025~~ | 5437 ~~6346~~ | 13100 ~~14996~~ | 0.67 ~~0.57~~ | 0.70 ~~0.60~~ | 0.70 ~~0.61~~ |

In **Table 5** update the row for Heater Unit 13 (previously 14) as shown below:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Characteristics** | **Size** | **Full Capacity: Rated Capaci­ty (kW)** | **Full Capacity: Rated Input Power [[1]](#footnote-2)(kW)** | **Full Capacity: Rated Efficien­cy** | **Annual Energy Use: Hot (kWh****/y)** | **Annual Energy Use: Average (kWh/y)** | **Annual Energy Use: Cold (kWh/y)** | **Overall Product Efficiency: HSPF\_****hot** | **Overall Product Efficiency: HSPF\_****avg** | **Overall Product Efficiency: HSPF\_****Cold** |
| 13 ~~14~~ | Solid Fuel Heater | Fixed, Adjustable Air Control, 3 data points | Medium | 7 | 10.75 ~~10.59~~ | 65.1% ~~66.1%~~ | 874 ~~1025~~ | 5437 ~~6346~~ | 13100 ~~14996~~ | 0.67 ~~0.57~~ | 0.70 ~~0.60~~ | 0.70 ~~0.61~~ |

Complete versions of the updated Table 5 and affected parts Appendix 4 are included below in section 3.4.

## 3.3 Solid fuel heaters – correction to example HSPF figures

For the purposes of testing the comparison methodology, a standby electricity consumption of 5W was implemented for heater unit 13 (previously 14), along with decreasing efficiency at lower burn rates. It is agreed that it is more typical to have no standby electricity consumption of solid fuel heaters, and to have increasing efficiency at lower burn rates. The efficiency data for heater unit 13 (previously 14) is therefore updated to be 66% at high burn rate, 70% and medium burn rate, and 71% at low burn rate, and the standby electricity consumption set to 0. The calculated results are updated in both Appendix 4 and Table 5, resulting in HSPF values of 71% for the hot zone, 70% for the average zone and 70% for the cold zone.

The efficiency changes implemented according to section 3.2 of this paper above, significantly decreased the annual energy use and increased the HSPF for all zones, bringing them close to the medium burn rate efficiency. Setting the standby electricity consumption to zero further decreases annual energy use, and in the hot zone this has a significant impact on HSPF, increasing the HSPF\_hot to 71%. There is no significant change in the HSPF for the average and cold zones.

In **Appendix 4, Solid fuel combustion heaters, Test Data**, further update the rows for Heater Unit 13 (previously 14) as highlighted below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **High Burn Rate: Maximum Heat Output = Full Capacity (kW)** | **High Burn Rate: Thermal Efficiency** | **High Burn Rate: Electrical Energy Consumption (kW)** | **Medium Burn Rate: Heat Output = "Half" Capacity (kW)** | **Medium Burn Rate: Thermal Efficiency** | **Medium Burn Rate: Electrical Energy Consumption (kW)** |
| 13 ~~14~~ | 7 | 66% ~~67%~~ | 0.14 | 5.6 | 70% ~~63%~~ | 0.056 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Heater Unit** | **Low Burn Rate: Heat Output = Min Capacity (kW)** | **Low Burn Rate: Thermal Efficiency** | **Low Burn Rate: Electrical Energy Consumption (kW)** | **Standby: Electrical Energy Consumption (W)** |
| 13 ~~14~~ | 4.2 | 71% ~~60%~~ | 0.028 | 0 ~~5~~ |

In **Appendix 4, Calculation Results**, further update the rows for Heater Unit 13 (previously 14) as highlighted below:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Full Capacity: Rated Capacity (kW)** | **Full Capacity: Rated Capacity at 2degC (kW)** | **Full Capacity: Rated Input Power (kW)** | **Full Capacity: Rated Efficiency** | **Standby, Pia (W)** | **Heating Season Total Load: HSTL\_hot (kWh/y)** | **Heating Season Total Load: HSTL\_avg (kWh/y)** | **Heating Season Total Load: HSTL\_cold (kWh/y)** |
| 13 ~~14~~ | Solid Fuel Heater | 7 | 7 | 10.75 ~~10.59~~ | 65.1% ~~66.1%~~ | 0 ~~5~~ | 587 | 3801 | 9141 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Heating Season Energy Consumption: HSEC \_hot (kWh/y)** | **Heating Season Energy Consumption: HSEC \_avg (kWh/y)** | **Heating Season Energy Consumption: HSEC \_cold (kWh/y)** | **Inactive Energy Consumption: IAEC \_hot (kWh/y)** | **Inactive Energy Consumption: IAEC \_average (kWh/y)** | **Inactive Energy Consumption: IAEC \_cold (kWh/y)** |
| 13 ~~14~~ | Solid Fuel Heater | 831 ~~983~~ | 5399 ~~6308~~ | 13069 ~~14965~~ | 0 ~~42.4~~ | 0 ~~37.3~~ | 0 ~~30.5~~ |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Annual Energy Use: Hot (kWh/y)** | **Annual Energy Use: Average (kWh/y)** | **Annual Energy Use: Cold (kWh/y)** | **Overall Product Efficiency: HSPF \_hot** | **Overall Product Efficiency: HSPF \_average** | **Overall Product Efficiency: HSPF \_cold** |
| 13 ~~14~~ | Solid Fuel Heater | 831 ~~874~~ ~~1025~~ | 5399 ~~5437~~ ~~6346~~ | 13069 ~~13100~~ ~~14996~~ | 0.71 ~~0.67~~ ~~0.57~~ | 0.70 ~~0.60~~ | 0.70 ~~0.61~~ |

In **Table 5** further update the row for Heater Unit 13 (previously 14) as highlighted below:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Characteristics** | **Size** | **Full Capacity: Rated Capaci­ty (kW)** | **Full Capacity: Rated Input Power [[2]](#footnote-3)(kW)** | **Full Capacity: Rated Efficien­cy** | **Annual Energy Use: Hot (kWh****/y)** | **Annual Energy Use: Average (kWh/y)** | **Annual Energy Use: Cold (kWh/y)** | **Overall Product Efficiency: HSPF\_****hot** | **Overall Product Efficiency: HSPF\_****avg** | **Overall Product Efficiency: HSPF\_****cold** |
| 13 ~~14~~ | Solid Fuel Heater | Fixed, Adjustable Air Control, 3 data points | Medium | 7 | 10.75 ~~10.59~~ | 65.1% ~~66.1%~~ | 831 ~~874~~ ~~1025~~ | 5399 ~~5437~~ ~~6346~~ | 13069 ~~14996~~ | 0.71 ~~0.67~~ ~~0.57~~ | 0.70 ~~0.60~~ | 0.70 ~~0.61~~ |

Complete versions of the updated Table 5 and affected parts of Appendix 4 are included below in section 3.4.

## 3.4 Solid fuel heaters – Revised Tables

*Table 5: Summary of example space heating comparison methodology outputs, by product size, technology type and climate zone*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Characteristics** | **Size** | **Full Capacity: Rated Capaci­ty (kW)** | **Full Capacity: Rated Input Power [[3]](#footnote-4)(kW)** | **Full Capacity: Rated Efficien­cy** | **Annual Energy Use: Hot (kWh****/y)** | **Annual Energy Use: Average (kWh/y)** | **Annual Energy Use: Cold (kWh/y)** | **Overall Product Efficiency: HSPF\_****hot** | **Overall Product Efficiency: HSPF\_****avg** | **Overall Product Efficiency: HSPF\_****cold** |
| 1 | Air Conditioner[[4]](#footnote-5)\* (Non-ducted) | Avg GEMS Register 1.75-2.25kW non-ducted | Small | 2  | 0.5 | 426% | 47 | 292 | 742 | 4.06 | 3.80 | 3.55 |
| 2 | Electric Resistance | Portable, Thermostatic control | Small | 2 | 2 | 100% | 181 | 1098 | 2619 | 0.93 | 0.99 | 1.00 |
| 3 | Electric Resistance | Portable, Two-setting, No thermostatic control | Small | 2 | 2 | 100% | 189 | 1152 | 2749 | 0.89 | 0.94 | 0.95 |
| 4 | Electric Resistance | Portable, One-setting, No thermostatic control | Small | 2 | 2 | 100% | 198 | 1207 | 2880 | 0.85 | 0.90 | 0.91 |
| 5 | Gas Space Heater | Portable, Thermostatic Control, 2 data points | Small | 2 | 2.5 | 80.6% | 203 | 1311 | 3159 | 0.83 | 0.83 | 0.83 |
| ~~6~~ | ~~Solid Fuel Heater~~ | ~~Fixed, Adjustable Air Control, 3 data points~~ | ~~Small~~ | ~~2~~ | ~~3.03~~ | ~~66.1%~~ | ~~281~~ | ~~1802~~ | ~~4276~~ | ~~0.60~~ | ~~0.60~~ | ~~0.61~~ |
| 6 ~~7~~ | Gas Decorative App. | Fixed, Thermostatic Control, 2 data points | Small | 2 | 4.4 | 45.8% | 358 | 2310 | 5561 | 0.47 | 0.47 | 0.47 |
| 7 ~~8~~ | Air Conditioner\* (Non-ducted) | Avg GEMS Register 6.5-7.5kW non-ducted | Medium | 7 | 1.8 | 390% | 135 | 918 | 2499 | 4.8 | 4.2 | 3.7 |
| 8 ~~9~~ | Ducted Air Conditioner\* | Avg GEMS Register 6.5-7.5kW ducted | Medium | 7 | 1.8 | 388% | 165 | 1009 | 2689 | 4.4 | 3.9 | 3.4 |
| 9 ~~10~~ | Electric Resistance | Multiple Portable (e.g. 2.4kW + 2.4kW + 2.2kW), Thermostatic Control | Medium | 7 | 7 | 100% | 627 | 3837 | 9160 | 0.94 | 0.99 | 1.00 |
| 10 ~~11~~ | Electric Resistance | Multiple Fixed (e.g. 3kW + 4kW), Thermostatic Control | Medium | 7 | 7 | 100% | 715 | 3913 | 9215 | 0.82 | 0.97 | 0.99 |
| 11 ~~12~~ | Gas Space Heater | Fixed, Thermostatic Control, 2 data points | Medium | 7 | 8.9 | 78.6% | 750 | 4824 | 11576 | 0.78 | 0.79 | 0.79 |
| 12 ~~13~~ | Ducted Gas | Fixed, Thermostatic Control, 3 data points | Medium | 7 | 9.33 | 75.0% | 787 | 4942 | 11884 | 0.75 | 0.77 | 0.77 |
| 13 ~~14~~ | Solid Fuel Heater | Fixed, Adjustable Air Control, 3 data points | Medium | 7 | 10.75 ~~10.59~~ | 65.1% ~~66.1%~~ | 831 ~~874~~ ~~1025~~ | 5399 ~~5437~~ ~~6346~~ | 13069 ~~14996~~ | 0.71 ~~0.67~~ ~~0.57~~ | 0.70 ~~0.60~~ | 0.70 ~~0.61~~ |
| 14 ~~15~~ | Air Conditioner\* (Non-ducted) | Avg GEMS Register 11-13kW non-ducted | Large | 12  | 2.9 | 391% | 248 | 1563 | 4253 | 5.0 | 4.3 | 3.7 |
| 15 ~~16~~ | Ducted Air Conditioner\* | Avg GEMS Register 11-13kW ducted | Large | 12  | 3.0 | 392% | 274 | 1684 | 4494 | 4.5 | 4.0 | 3.5 |
| 16 ~~17~~ | Electric Resistance | Multiple Fixed (e.g. 4kW + 4kW + 4kW), Thermostatic Control | Large | 12 | 12 | 100% | 1134 | 6628 | 15731 | 0.89 | 0.98 | 1.00 |
| 17 ~~18~~ | Gas Space Heater | Multiple Fixed (e.g. 6kW + 6kW), Thermostatic Control, 2 data points | Large | 12 | 15.3 | 78.6% | 1282 | 8267 | 19841 | 0.79 | 0.79 | 0.79 |
| 18 ~~19~~ | Ducted Gas | Fixed, Thermostatic Control, 3 data points | Large | 12 | 15.75 | 75.0% | 1299 | 8315 | 20036 | 0.76 | 0.77 | 0.77 |
| 19 ~~20~~ | Solid Fuel Heater | Fixed, Adjustable Air Control, 3 data points | Large | 12 | 18.46 | 65.0% | 1343 | 8761 | 21399 | 0.75 | 0.74 | 0.73 |

**Appendix 4, Solid fuel combustion heaters**

**Product Type and HSEC Calculation Method:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Characteristics** | **HSEC Calculation Method** |
| ~~6~~ | ~~Solid Fuel Heater~~ | ~~Fixed, Adjustable Air Control, 3 data points~~ | ~~5~~ |
| 13 ~~14~~ | Solid Fuel Heater | Fixed, Adjustable Air Control, 3 data points | 5 |
| 19 ~~20~~ | Solid Fuel Heater | Fixed, Adjustable Air Control, 3 data points | 5 |

**Test Data:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **High Burn Rate: Maximum Heat Output = Full Capacity (kW)** | **High Burn Rate: Thermal Efficiency** | **High Burn Rate: Electrical Energy Consumption (kW)** | **Medium Burn Rate: Heat Output = "Half" Capacity (kW)** | **Medium Burn Rate: Thermal Efficiency** | **Medium Burn Rate: Electrical Energy Consumption (kW)** |
| ~~6~~ | ~~2~~ | ~~67%~~ | ~~0.04~~ | ~~1.6~~ | ~~63%~~ | ~~0.016~~ |
| 13 ~~14~~ | 7 | 66% ~~67%~~ | 0.14 | 5.6 | 70% ~~63%~~ | 0.056 |
| 19 ~~20~~ | 12 | 65% | 0 | 9.6 | 70% | 0 |

***Test Data, continued***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Heater Unit** | **Low Burn Rate: Heat Output = Min Capacity (kW)** | **Low Burn Rate: Thermal Efficiency** | **Low Burn Rate: Electrical Energy Consumption (kW)** | **Standby: Electrical Energy Consumption (W)** |
| ~~6~~ | ~~1.2~~ | ~~60%~~ | ~~0.008~~ | ~~0~~ |
| 13 ~~14~~ | 4.2 | 71% ~~60%~~ | 0.028 | 0 ~~5~~ |
| 19 ~~20~~ | 8.4 | 75% | 0 | 0 |

**Appendix 4, Calculation Results:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Full Capacity: Rated Capacity (kW)** | **Full Capacity: Rated Capacity at 2degC (kW)** | **Full Capacity: Rated Input Power (kW)** | **Full Capacity: Rated Efficiency** | **Standby, Pia (W)** | **Heating Season Total Load: HSTL\_hot (kWh/y)** | **Heating Season Total Load: HSTL\_avg (kWh/y)** | **Heating Season Total Load: HSTL\_cold (kWh/y)** |
| 1 | AC[[5]](#footnote-6)◊ (Non-ducted) | 2 | 1.6, 2.5 | 0.5 | 426% | 2.4 | 168 | 1086 | 2612 |
| 2 | Electric Resistance | 2 | 2 | 2 | 100% | 5 | 168 | 1086 | 2612 |
| 3 | Electric Resistance | 2 | 2 | 2 | 100% | 5 | 168 | 1086 | 2612 |
| 4 | Electric Resistance | 2 | 2 | 2 | 100% | 5 | 168 | 1086 | 2612 |
| 5 | Gas Space Heater | 2 | 2 | 2.5 | 80.6% | 0.4 | 168 | 1086 | 2612 |
| ~~6~~ | ~~Solid Fuel Heater~~ | ~~2~~ | ~~2~~ | ~~3.03~~ | ~~66.1%~~ | ~~0~~ | ~~168~~ | ~~1086~~ | ~~2612~~ |
| 6 ~~7~~ | Gas Decorative App. | 2 | 2 | 4.4 | 45.8% | 0.4 | 168 | 1086 | 2612 |
| 7 ~~8~~ | AC◊(Non-ducted) | 7 | 5.7, 6.5 | 1.8 | 390% | 4.9 | 587 | 3801 | 9141 |
| 8 ~~9~~ | Ducted AC◊ | 7 | 5.7, 6.5 | 1.8 | 388% | 12.1 | 587 | 3801 | 9141 |
| 9 ~~10~~ | Electric Resistance | 7 | 7 | 7 | 100% | 15 | 587 | 3801 | 9141 |
| 10 ~~11~~ | Electric Resistance | 7 | 7 | 7 | 100% | 15 | 587 | 3801 | 9141 |
| 11 ~~12~~ | Gas Space Heater | 7 | 7 | 8.9 | 78.6% | 0.7 | 587 | 3801 | 9141 |
| 12 ~~13~~ | Ducted Gas | 7 | 7 | 9.33 | 75.0% | 5 | 587 | 3802 | 9142 |
| 13 ~~14~~ | Solid Fuel Heater | 7 | 7 | 10.75 ~~10.59~~ | 65.1% ~~66.1%~~ | 0 ~~5~~ | 587 | 3801 | 9141 |
| 14 ~~15~~ | AC◊(Non-ducted) | 12 | 9.8, 10.1 | 2.9 | 391% | 19.2 | 1007 | 6517 | 15670 |
| 15 ~~16~~ | Ducted AC◊ | 12 | 9.8, 10.0 | 3.0 | 392% | 20.7 | 1007 | 6517 | 15670 |
| 16 ~~17~~ | Electric Resistance | 12 | 12 | 12 | 100% | 15 | 1007 | 6517 | 15670 |
| 17 ~~18~~ | Gas Space Heater | 12 | 12 | 15.3 | 78.6% | 0.7 | 1007 | 6517 | 15669 |
| 18 ~~19~~ | Ducted Gas | 12 | 12 | 15.75 | 75.0% | 5 | 991 | 6416 | 15429 |
| 19 ~~20~~ | Solid Fuel Heater | 12 | 12 | 18.46 | 65.0% | 0 | 1007 | 6517 | 15670 |

***Calculation Results, continued***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Heating Season Energy Consumption: HSEC \_hot (kWh/y)** | **Heating Season Energy Consumption: HSEC \_avg (kWh/y)** | **Heating Season Energy Consumption: HSEC \_cold (kWh/y)** | **Inactive Energy Consumption: IAEC \_hot (kWh/y)** | **Inactive Energy Consumption: IAEC \_average (kWh/y)** | **Inactive Energy Consumption: IAEC \_cold (kWh/y)** |
| 1 | AC[[6]](#footnote-7)^ (Non-ducted) | 41 | 286 | 736 | 6 | 6 | 5 |
| 2 | Electric Resistance | 168 | 1086 | 2607 | 13 | 12 | 12 |
| 3 | Electric Resistance | 176 | 1140 | 2737 | 13 | 12 | 12 |
| 4 | Electric Resistance | 185 | 1195 | 2867 | 13 | 12 | 12 |
| 5 | Gas Space Heater | 202 | 1310 | 3158 | 1.1 | 1.0 | 1.0 |
| ~~6~~ | ~~Solid Fuel Heater~~ | ~~281~~ | ~~1802~~ | ~~4276~~ | ~~0.0~~ | ~~0.0~~ | ~~0.0~~ |
| 6 ~~7~~ | Gas Decorative App. | 355 | 2307 | 5559 | 3.4 | 3.0 | 2.4 |
| 7 ~~8~~ | AC^ (Non-ducted) | 123 | 905 | 2488 | 12 | 13 | 11 |
| 8 ~~9~~ | Ducted AC^ | 135 | 977 | 2662 | 30 | 32 | 27 |
| 9 ~~10~~ | Electric Resistance | 587 | 3801 | 9123 | 40 | 36 | 37 |
| 10 ~~11~~ | Electric Resistance | 587 | 3801 | 9123 | 127 | 112 | 92 |
| 11 ~~12~~ | Gas Space Heater | 744 | 4819 | 11572 | 6 | 5 | 4 |
| 12 ~~13~~ | Ducted Gas | 745 | 4904 | 11853 | 42.4 | 37.3 | 30.5 |
| 13 ~~14~~ | Solid Fuel Heater | 831 ~~983~~ | 5399 ~~6308~~ | 13069 ~~14965~~ | 0 ~~42.4~~ | 0 ~~37.3~~ | 0 ~~30.5~~ |
| 14 ~~15~~ | AC^ (Non-ducted) | 200 | 1512 | 4211 | 48 | 51 | 43 |
| 15 ~~16~~ | Ducted AC^ | 223 | 1629 | 4448 | 52 | 55 | 46 |
| 16 ~~17~~ | Electric Resistance | 1007 | 6516 | 15640 | 127 | 112 | 92 |
| 17 ~~18~~ | Gas Space Heater | 1276 | 8261 | 19837 | 6 | 5 | 4 |
| 18 ~~19~~ | Ducted Gas | 1257 | 8278 | 20005 | 42.4 | 37.3 | 30.5 |
| 19 ~~20~~ | Solid Fuel Heater | 1343 | 8761 | 21399 | 0.0 | 0.0 | 0.0 |

***Calculation Results, continued***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Heater Unit** | **Technology Type** | **Annual Energy Use: Hot (kWh/y)** | **Annual Energy Use: Average (kWh/y)** | **Annual Energy Use: Cold (kWh/y)** | **Overall Product Efficiency: HSPF \_hot** | **Overall Product Efficiency: HSPF \_average** | **Overall Product Efficiency: HSPF \_cold** |
| 1 | AC^ (Non-ducted) | 47 | 292 | 742 | 4.06 | 3.80 | 3.55 |
| 2 | Electric Resistance | 181 | 1098 | 2619 | 0.93 | 0.99 | 1.00 |
| 3 | Electric Resistance | 189 | 1152 | 2749 | 0.89 | 0.94 | 0.95 |
| 4 | Electric Resistance | 198 | 1207 | 2880 | 0.85 | 0.90 | 0.91 |
| 5 | Gas Space Heater | 203 | 1311 | 3159 | 0.83 | 0.83 | 0.83 |
| ~~6~~ | ~~Solid Fuel Heater~~ | ~~281~~ | ~~1802~~ | ~~4276~~ | ~~0.60~~ | ~~0.60~~ | ~~0.61~~ |
| 6 ~~7~~ | Gas Decorative App. | 358 | 2310 | 5561 | 0.47 | 0.47 | 0.47 |
| 7 ~~8~~ | AC^ (Non-ducted) | 135 | 918 | 2499 | 4.8 | 4.2 | 3.7 |
| 8 ~~9~~ | Ducted AC^ | 165 | 1009 | 2689 | 4.4 | 3.9 | 3.4 |
| 9 ~~10~~ | Electric Resistance | 627 | 3837 | 9160 | 0.94 | 0.99 | 1.00 |
| 10 ~~11~~ | Electric Resistance | 715 | 3913 | 9215 | 0.82 | 0.97 | 0.99 |
| 11 ~~12~~ | Gas Space Heater | 750 | 4824 | 11576 | 0.78 | 0.79 | 0.79 |
| 12 ~~13~~ | Ducted Gas | 787 | 4942 | 11884 | 0.75 | 0.77 | 0.77 |
| 13 ~~14~~ | Solid Fuel Heater | 831 ~~874~~ ~~1025~~ | 5399 ~~5437~~ ~~6346~~ | 13069 ~~13100~~ ~~14996~~ | 0.71 ~~0.67~~ ~~0.57~~ | 0.70 ~~0.60~~ | 0.70 ~~0.61~~ |
| 14 ~~15~~ | AC^ (Non-ducted) | 248 | 1563 | 4253 | 5.0 | 4.3 | 3.7 |
| 15 ~~16~~ | Ducted AC^ | 274 | 1684 | 4494 | 4.5 | 4.0 | 3.5 |
| 16 ~~17~~ | Electric Resistance | 1134 | 6628 | 15731 | 0.89 | 0.98 | 1.00 |
| 17 ~~18~~ | Gas Space Heater | 1282 | 8267 | 19841 | 0.79 | 0.79 | 0.79 |
| 18 ~~19~~ | Ducted Gas | 1299 | 8315 | 20036 | 0.76 | 0.77 | 0.77 |
| 19 ~~20~~ | Solid Fuel Heater | 1343 | 8761 | 21399 | 0.75 | 0.74 | 0.73 |

# 4.0 Next steps

### Exploring policy options

There is no easy way for consumers to compare the energy performance of different heater types, such as air conditioners (heat pumps), gas space heaters and electric resistance heaters. The outputs of the comparison methodology could be used to communicate to consumers performance information about space heaters including their capacity, annual energy use, energy efficiency, running costs and greenhouse gas emissions. Accessible performance information would help consumers to choose the most suitable heating systems for their needs.

The department will be exploring options for enabling consumers to make easy energy performance comparisons of residential space heaters. Subject to appropriate approvals, including through the Equipment Energy Efficiency (E3) Program, the department may release a Regulation Impact Statement (RIS) for public comment and submissions in 2025. It would describe the policy problem to be resolved, why government action is needed, what policy options are being considered, what is the likely net benefit of each option, and who will be consulted and how.

### Complex heater types

Some work has been done, and is continuing, to develop methods for the more complex heater types, such as electric resistance underfloor heating systems (including directly under flooring, in-screed and in-slab) and hydronic (gas, electric resistance, solar or heat pump) heating systems. The Space Heating Comparison Methodology: Public Consultation paper focused on describing a comparison methodology that initially applies to the more common simple heater types.

Work will continue to develop calculation methods for more complex heaters, based on a similar approach to the calculation methods already developed for the simpler heaters. The department will consult with relevant stakeholders for these technologies as part of developing these product methods. Once ready, the product method papers for more complex heaters will be published for broader consultation.

### Get in touch

For enquiries about this work, please contact:

* for Australian stakeholders, the Australian Government Department of Climate Change, Energy the Environment and Water (DCCEEW), by emailing spaceheating@dcceew.gov.au.
* for New Zealand stakeholders, the Energy Efficiency and Conservation Authority (EECA) of New Zealand, by emailing star@eeca.govt.nz.
1. Note: Capacity, Input Power, Energy Use and Product Efficiency are all based on the total energy use (e.g. gas plus electricity for gas space heaters).  Input Power and Energy Use would also be separated out by fuel type in order to calculate running costs and greenhouse gas emissions. [↑](#footnote-ref-2)
2. Note: Capacity, Input Power, Energy Use and Product Efficiency are all based on the total energy use (e.g. gas plus electricity for gas space heaters).  Input Power and Energy Use would also be separated out by fuel type in order to calculate running costs and greenhouse gas emissions. [↑](#footnote-ref-3)
3. Note: Capacity, Input Power, Energy Use and Product Efficiency are all based on the total energy use (e.g. gas plus electricity for gas space heaters).  Input Power and Energy Use would also be separated out by fuel type in order to calculate running costs and greenhouse gas emissions. [↑](#footnote-ref-4)
4. \* Explanation of air conditioner values are provided in Appendix 4: Example data and results. [↑](#footnote-ref-5)
5. ◊ For air conditioners (AC), an average of the GEMS register data was used to define inputs; the two values of rated capacity at 2°C are the default value provided by the ACCM and the average of the GEMS data for this product size; the rated input power is defined at 7°C; and the rated efficiency is the average ACOP. [↑](#footnote-ref-6)
6. ^ For air conditioners (AC), an average of the GEMS register data was used to define inputs; inactive energy consumption was calculated from the 0.4 multiplied by the standby power (Pia) times inactive hours, as per the ACCM; HSEC was determined from Annual Energy Use minus Inactive Energy Consumption; and Overall Product Efficiency was calculated from the ratio of HSTL to HSEC. [↑](#footnote-ref-7)