This Mapping Document is one of a number which present the recent and historical energy performance of gas and electric storage, instantaneous and heat pump water heaters for a number of individual countries. The performance of products at the national level will subsequently be compared against products from other countries in a Benchmarking Document.

These comparisons of product performance made in this Mapping Document are based on both a delivered energy and on primary energy basis. The generic methodology used for product comparisons is detailed in “Water Heaters - Overall Approach to the Analysis - IEA 4E” and the methodology used for delivered to primary energy conversions is detailed in “Water Heater Energy and Fuel Conversion Factors”. All documents related to water heaters developed under the 4E Mapping and Benchmarking activities can be found at http://mappingandbenchmarking.iea-4e.org/matrix?type=product&id=18.
The information and analysis contained within this summary document is developed to inform policy makers. Whilst the information analysed was supplied by representatives of National Governments, a number of assumptions, simplifications and transformations have been made in order to present information that is easily understood by policy makers, and to enable comparisons with other countries. Therefore, information should only be used as guidance in general policy – it may not be sufficiently detailed nor robust for use in setting specific performance requirements. Details of information sources and assumption, simplification and transformations are contained within the document.

Key notes on Graph (see notes section 1)

- Regulatory information shown preceeds the introduction of the new revised DoE test procedure (effective July 2015) and is based on Energy Factor values.
- Detailed scope of individual product regulations changes slightly over time.
The information and analysis contained within this summary document is developed to inform policy makers. Whilst the information analysed was supplied by representatives of National Governments, a number of assumptions, simplifications and transformations have been made in order to present information that is easily understood by policy makers, and to enable comparisons with other countries. Therefore, information should only be used as guidance in general policy - it may not be sufficiently detailed nor robust for use in setting specific performance requirements. Details of information sources and assumption, simplification and transformations are contained within the document.

**Water Heater Daily Energy Consumption (as declared)**

Comparison of the energy performance of all types of water heaters in 2015 against national regulatory and voluntary performance requirements.

*(Basis: Delivered energy as declared under local test conditions.)*

Key notes on Graph (see notes sections 1 & 2)

- Information shown preceeds the introduction of the new revised DoE test procedure (effective July 2015) and is based on Energy Factor values.
- The scales of the x-axes (volume) are different on the two sides of the graph.
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**Water Heater Daily Energy Consumption (equivalent service)**

**Comparison of energy performance of all types of water heaters in 2015.**
*(Basis: Delivered energy use with identical local daily draw-off profiles.)*

![Graph showing water heater daily energy consumption](image)

**Key notes on Graph (see notes sections 1 & 2)**

- Information shown preceeds the introduction of the new revised DoE test procedure (effective July 2015) and is based on Energy Factor values.
- The scales of the x-axes (volume) are different on the two sides of the graph.

**Graph Details**
- USA DOE Gas Storage 2015
- USA Department of Energy Electric Storage 2015
- USA ENERGY STAR Gas Storage 2015
- USA ENERGY STAR Electric Storage 2015
- USA CEC Gas Storage 2015
- USA CEC Electric Storage 2015
- USA CEC Gas Instantaneous 2015
- USA CEC Electric Instantaneous 2015
- USA DOE Heat Pump 2015
- USA ENERGY STAR Heat Pump 2015
- USA CEC Heat Pump 2015

**Issue date:** 14 February 2017
Water Heater Daily Consumption (equivalent service – primary energy)

Comparison of energy performance of all types of water heaters in 2015.  
(Basis: Primary energy use with identical local daily draw-off profiles.)

Key notes on Graph (see notes sections 1 & 2)

- Information shown proceeds the introduction of the new revised DoE test procedure (effective July 2015) and is based on Energy Factor values.
- The scales of the x-axes (volume) are different on the two sides of the graph.
- The energy consumption of models shown are converted to equivalent primary energy values using estimated total losses (as listed in the 2012 IEA World Energy Balance data) of: gas: 1.2%, electricity: 60.9%.

---

Comparison of energy performance of storage and heat pump water heaters over time. *(Basis: Product weighted averages of values with identical local daily draw-off profiles.)*

### Key notes on Graph (see notes sections 1 & 2)
- Information shown precedes the introduction of the new revised DoE test procedure (effective July 2015) and is based on Energy Factor values.
- For volume analysis, averages shown are for by volume ranges and assume products remain on the market for 3 years from the year of the registration.

---

**Storage and Heat-pump Water Heater Daily Energy Consumption over time and by volume**

**Gas Storage**

**Electric Storage**

**Heat Pump**

**VOLUME ANALYSIS**

- Up to 100 litres
- 100-150 litres
- 150-200 litres
- 200-250 litres
- 250-300 litres
- 300-400 litres

---

**Issue date: DATE**

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**Instantaneous Water Heater Daily Energy Consumption over time and by flow rate**

Comparison of energy performance of instantaneous water heaters over time.  
**(Basis: Product weighted averages of values with identical local daily ‘draw off’ profiles.)**

---

**FLOW RATE ANALYSIS**

Gas Instantaneous

**Key notes on Graph**  
(see notes sections 1 & 2)

- Information shown preceeds the introduction of the new revised DoE test procedure (effective July 2015) and is based on Energy Factor values.
- For flow rate analysis, averages shown are for by flow rate ranges and assume products remain on the market for 3 years from the year of registration.
Major Policy Interventions (See notes Section 3)

Manufacturers have been required to comply with the Department of Energy (DOE) energy conservation standards for residential water heaters since 1990. These minimum standards were revised and extended in 2004 and again in 2015\(^2\).

In addition to these mandatory requirements, certification to a premium (ENERGY STAR) performance level is also open to qualified products. The required test procedure aligns in almost all respects with the federal standard. However required levels of performance are higher than the mandatory minimum, heat pump water heaters are included (defined as via a high electrical storage water heater performance requirement), plus additional requirements must be met such as performance guarantee periods.

Mandatory labelling of domestic water heaters is also required (EnergyGuide Label) with ENERGY STAR qualified products also able to display the logo.

Federal Policy is supported by numerous state and utility initiatives aimed at promoting high efficiency water heater units.

Cultural Issues (See Notes Section 4)

No information supplied
Key notes on data, analysis and additional information

1  Regulatory Framework

The US water heater standard is 10CFR430 (2015) published for the US Department of Energy. 10CFR430 is updated annually (or more recently on a continuous basis). The standard covers numerous product types, with Appendix E to Subpart B of Part 430 outlining the Uniform Test Method for Measuring the Energy Consumption of Water Heaters.

On 11 July 2014, the US DOE released a revised test procedure for residential and commercial water heaters. The effective date of this rule is 13 July 2015. Compliance will be mandatory starting one year after the publication in the Federal Register of a mathematical conversion factor which convert from the existing efficiency ratings to efficiency ratings under the test procedure adopted by this final rule. These mathematical conversion factors for translating efficiency ratings (Energy Factor - EF) using the original test method to the ratings under the amended test method (Uniform Energy Factor - UEF) were published on 14 April 2015 as a Notice of Proposed Rule. The proposal also includes revised efficiency standards (MEPS levels) for different products in terms of UEF.

However, all data used in this analysis is based on declarations prior to the introduction of the new test methodology and therefore the following descriptive sections are based on the test method in force at the beginning of 2014. A summary description of the changes included in the July 2014 test methodology is provided in Appendix 1 of this document.

1.1  Regulatory Scope

Instantaneous water heaters having a volume of less than 2 US gallons (7.5 litres).

Gas and electric water heaters with storage tanks below 2 gallons (7.6 L) and above 20 gallons (76 L). Maximum volumes are 100 gallons (380 L) for gas-fired water heaters, 120 gallons (450 L) for electric resistance and heat pump storage water heaters, and oil-fired water heaters with storage volumes less than or equal to 50 gallons (190 L).

Heat pump water heaters are considered electric storage water heaters and are subject to energy conservation standards, along with the associated test procedure.

1.2  Summary of Required Test

The US regulations set out a uniform test method for all water heater types. In summary, this includes a draw-off test that has 6 equal volumes totalling 64.3 US gallons (243.4 litres) with each draw being 10.7 US gallons (40.6 litres) at one hour intervals. The nominal ambient temperature is 19.7°C (67.5°F), the nominal cold water temperature is 14.4°C (58°F), and the nominal hot water temperature is 57.2°C (135°F). Hence the resulting temperature difference for heat loss determination is 37.5K, with the heating energy load of the drawn hot water defined by the temperature rise of 42.8K.

---

3 Refer to https://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/27
The recovery efficiency is determined from the first draw of the draw-off test for all water heater types, the exception being that the recovery efficiency for electric water heaters with immersed heating elements which are assumed to be 98% efficient (not measured).

Where a water heater has storage capacity, the standby or heat loss (called Hourly Standby Losses) is calculated following the completion of recovery to storage temperature following the last draw-off to the end of the 24 test period.

Additional tests are also required, for example the first hour delivery test which provides a measure of the volume of water heater that the particular storage water heater is able to supply over relatively short periods of time. A maximum gallons per minute test for instantaneous water heaters provides a measure of the ability of the water heater to deliver quantities of hot water with a given period.

The testing requirements for heat pump units are somewhat more complex and readers are recommended to review the test method directly.

1.3 Performance Requirements and Labelling

1.3.1 Mandatory and Voluntary Performance Requirements

The 2015 Rulemaking Notice⁵ states:

“Manufacturers have been required to comply with the Department of Energy (DOE) energy conservation standards for residential water heaters since 1990. Residential water heaters are products that utilize oil, gas, or electricity to heat potable water for use upon demand for activities such as washing dishes or clothes, or bathing. Residential water heaters include storage type units that store heated water in an insulated tank and instantaneous type units that heat water on demand.

In addition to these mandatory requirements, certification to a premium (ENERGY STAR) performance level is also open to qualified products. The required test procedure aligns in almost all respects with the federal standard. However required levels of performance are higher than the mandatory minimum plus additional requirements must be met such as performance guarantee periods. The specific historic mandatory and ENERGY STAR performance requirements (to 2015) are shown in Table 1.

---

⁵ https://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/27
Table 1: Current and Historic Mandatory and Voluntary Performance Requirements for Gas and Electric Storage, Instantaneous and Heat Pump Water Heaters

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<td>80%</td>
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<td>0.30 + 27/Vm (%/hr)</td>
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<td></td>
<td>Q/800 + 110(Vr)^1/2 (Btu/hr)</td>
<td></td>
<td>80%</td>
<td></td>
<td></td>
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<td>Mandatory</td>
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<td></td>
<td>Q/800 + 110(Vr)^1/2 (Btu/hr)</td>
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<td>78%</td>
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<td></td>
<td>80%</td>
<td></td>
</tr>
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<td>Mandatory</td>
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<td></td>
<td></td>
<td></td>
<td>80%</td>
<td></td>
</tr>
<tr>
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<td></td>
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<td>29-Oct-03</td>
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<td>≤100 Gallons</td>
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<td>16-Apr-15</td>
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<td>Heat-Pump (Air)</td>
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<td>≤120 Gallons</td>
<td>≤24Amps</td>
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<td>1 Gallon/ 4000Btu input</td>
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<td>≥50,000 Btu/h</td>
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<td>≥20 Gallons</td>
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<td>16-Apr-15</td>
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<td>Gas Storage (Domestic)</td>
<td>&gt; 55 gallons</td>
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<td>EF ≥ 0.960–(0.0003*Vₛ)</td>
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Issue date: 14 February 2017
### United States of America

#### Domestic Water Heaters

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**Issue date: 14 February 2017**

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<td>≥20 Gallons</td>
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<td>16-Apr-15</td>
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<td>EF ≥ 1.06 - (0.00168*Vs)</td>
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1.3.2 Mandatory and Voluntary Labelling Requirements

Mandatory “Energyguide” labelling of domestic water heaters is also required under federal regulation (16CFR305) as shown in Figure 1. However, this label will be revised to align with the new UEF test procedure.

Figure 1: Mandatory EnergyGuide Label for Water Heaters

Qualified products may also display the ENERGY STAR label.

2 Data Analysed and Specific Assumptions Made

The overall approach to the analysis undertaken in order to present the results shown in this mapping report is described in “Water Heaters - Overall Approach to the Analysis - IEA 4E”⁶. This report also describes in detail a number of general assumptions that were necessary for the dataset analysed. Details of each of the datasets presented in this mapping report and the specific assumptions made in order to process the data are presented below.

2.1 **US DOE**

2.1.1 **Source**

USA DoE data was downloaded from the USA DoE website's Compliance Certification Database\(^7\) in September 2015 and contained the following data:

<table>
<thead>
<tr>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas storage</td>
</tr>
<tr>
<td>Electric Storage</td>
</tr>
<tr>
<td>Heat Pump</td>
</tr>
</tbody>
</table>

2.1.2 **Limitations and specific assumptions made for this dataset**

It is unclear to what extent families of products are included in the data as either single or multiple entries. This will affect the estimates of weighted average values for TUEC and volume although the extent of the impact is unclear.

Some additional minor data manipulations were required to present the DoE data e.g. converting US gallons to litres, btuh to kW etc.

2.2 **US CEC**

2.2.1 **Source**

USA CEC data was downloaded from the California Energy Commission website's New Appliance Efficiency Database\(^8\) in September 2015 and contained the following data:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas storage</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>40</td>
<td>0</td>
<td>2</td>
<td>1369</td>
<td>333</td>
<td>502</td>
<td>181</td>
<td>510</td>
<td>149</td>
<td>74</td>
<td>455</td>
<td>588</td>
</tr>
<tr>
<td>Electric Storage</td>
<td>30</td>
<td>44</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>467</td>
<td>86</td>
<td>100</td>
<td>4</td>
<td>308</td>
<td>128</td>
<td>64</td>
<td>90</td>
<td>49</td>
</tr>
<tr>
<td>Gas Instantaneous</td>
<td>4</td>
<td>24</td>
<td>6</td>
<td>18</td>
<td>14</td>
<td>86</td>
<td>128</td>
<td>100</td>
<td>106</td>
<td>118</td>
<td>348</td>
<td>411</td>
<td>51</td>
<td>208</td>
<td>40</td>
</tr>
<tr>
<td>Electric Instantaneous</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>18</td>
<td>23</td>
<td>18</td>
<td>22</td>
<td>62</td>
</tr>
<tr>
<td>Heat Pump</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>16</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>57</td>
<td>23</td>
</tr>
</tbody>
</table>

In addition 16 gas storage and 23 gas instantaneous models were listed but not included in the analysis because either data was not complete or had been entered with errors.

2.2.2 **Limitations and specific assumptions made for this dataset**

It is unclear to what extent families of products are included in the data as either single or multiple entries. This will affect the estimates of weighted average values for TUEC and volume although the extent of the impact is unclear.

Some minor data manipulations were required to present the CEC data e.g. converting US gallons to litres, btuh to kW etc.

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\(^7\) [https://www.regulations.doe.gov/certification-data/](https://www.regulations.doe.gov/certification-data/)

\(^8\) [https://cacertappliances.energy.ca.gov/Pages/Search/AdvancedSearch.aspx](https://cacertappliances.energy.ca.gov/Pages/Search/AdvancedSearch.aspx)
2.3 **US ENERGY STAR**

2.3.1 **Source**

USA ENERGY STAR data was downloaded from the ENERGY STAR certified products database⁹ in September 2015 and contained the following data:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas storage</td>
<td>44</td>
<td>200</td>
<td>100</td>
<td>70</td>
<td>254</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>Gas Instantaneous</td>
<td>0</td>
<td>2</td>
<td>117</td>
<td>179</td>
<td>26</td>
<td>46</td>
<td>4</td>
</tr>
<tr>
<td>Heat Pump</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>22</td>
<td>55</td>
<td>46</td>
</tr>
</tbody>
</table>

2.3.2 **Limitations and specific assumptions made for this dataset**

ENERGY STAR lists a range of additional details about the qualifying products, in particular, rated input is listed on the ENERGY STAR database as well as some information about electrical connections and electricity consumption. Around 121 of the listed gas storage water heaters (just under one fifth) have electric connection for power assisted flues with an average energy consumption of 152 kWh per year. Electricity consumption of gas water heaters has been ignored for this analysis.

ENERGY STAR do not qualify any electric resistance water heaters, only heat pumps and various solar configurations.

It is unclear to what extent families of products are included in the data as either single or multiple entries. This will affect the estimates of weighted average values for TUEC and volume although the extent of the impact is unclear.

Some minor data manipulations were required to present the ENERGY STAR data e.g. converting gallons to litres, kbtu/hr to kW etc.

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⁹ [https://www.energystar.gov/productfinder/product/certified-water-heaters/](https://www.energystar.gov/productfinder/product/certified-water-heaters/)
3 Notes on Policy
Refer to Notes Section 1

4 Notes on Cultural Issues
To be inserted
Appendix 1: July 2014 Update to US Uniform Test Method for Water Heaters

On 11 July 2014, the US DOE released a revised test procedures for residential and commercial water heaters. The effective date of this rule is 13 July 2015. Compliance will be mandatory starting one year after the publication in the Federal Register of a mathematical conversion factor to convert from the existing efficiency ratings to efficiency ratings under the test procedure adopted by this final rule.

The amendments modifies the test procedure to be more representative of conditions encountered in the field (including modifications to the test conditions and the draw patterns) and expands the scope of the test procedure to apply to certain commercial water heaters and certain residential water heaters that are not covered by the preceding test procedure. The revised definitions of non-residential water heaters are as follows:

- Gas-fired Storage: Rated input >105 kBtu/h; Rated storage volume >120 gallons.
- Oil-fired Storage: Rated input >140 kBtu/h; Rated storage volume >120 gallons.
- Electric Storage: Rated input >12 kW; Rated storage volume >120 gallons.
- Heat Pump with Storage: Rated input >12 kW; Rated current >24 A at a rated voltage of not greater than 250 V; Rated storage volume >120 gallons.
- Gas-fired Instantaneous: Rated input >200 kBtu/h; Rated storage volume >2 gallons.
- Electric Instantaneous: Rated input >58.6 kW; Rated storage volume >2 gallons.
- Oil-fired Instantaneous: Rated input >210 kBtu/h; Rated storage volume >2 gallons.

DOE establishes a definition of “residential-duty commercial water heater” at 10 CFR 431.102 that defines a “residential-duty commercial water heater” as any gas-fired, electric, or oil storage or instantaneous commercial water heater that meets the following conditions:

1. For models requiring electricity, uses single-phase external power supply;
2. Is not designed to provide outlet hot water at temperatures greater than 180 °F; and
3. Is not excluded by the specified limitations regarding rated input and storage volume for non-residential water heaters above.

Some clarification on the break point between storage and instantaneous systems for all fuel types has been included. In particular, instantaneous (tankless) units are defined as not more than one US gallon of hot water per energy input of 4,000 Btu/hour. This translates to a power input of more than 1172.3 W per US gallon which is more than 309.7 W/litre of stored volume.

The new test method will result in different Energy Factors for many products due to the different draw-off schedule during test. The energy factor under the new test method will be called a Uniform Energy Factor (UEF) as it now applies to a wider range of water heaters.

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11 This Notice of Proposed Rule was issued on 14 April 2015 and sets out a mathematical conversion factors for the purpose of translating efficiency ratings (Energy Factor - EF) for water heaters under the test method currently in effect to the ratings under the amended test method (Unified Energy Factor - UEF). The proposal also includes revised efficiency standards (MEPS levels) for different products in terms of UEF.
and to avoid confusion with the previous term. A Notice of Proposed Rule on 14 April 2015 set out a mathematical conversion factor for the purpose of translating efficiency ratings for water heaters under the test method currently in effect to the ratings under the amended test method promulgated by DOE in a final rule published on 11 July 2014. This sets out a proposed method to convert EF to UEF and also defined revised efficiency standards (MEPS levels) for different products in terms of UEF.

4.1.1 Electric Storage Water Heaters
An electric storage-type water heater uses electricity as the energy source, is designed to heat and store water at a thermostatically controlled temperature of less than 82°C, has a nominal input of 12 kW or less, and has a rated storage capacity of not less than 76 L nor more than 450 L.

4.1.2 Gas Storage Water Heaters
A gas storage-type water heater uses gas as the energy source, is designed to heat and store water at a thermostatically controlled temperature of less than 82°C, has a nominal input of 79 MJ per hour or less, and has a rated storage capacity of not less than 76 L nor more than 380 L.

Variables required to be measured, determined or declared for regulatory purposes:

- Static capacity;
- Hourly Standby Losses;
- Uniform Energy Factor;
- Annual energy consumption.

There are several significant changes under the new DOE test procedure that will impact on the estimated energy consumption of water heaters. In summary these are:

- Classification of water heaters into one of four sizes
- Setting a draw-off schedule depending on the size classification
- Adjustment of the stored hot water temperature from 135°F (57.2°C) down to 125°F (51.7°C).

The following table shows the key changes that impact on the overall energy consumption estimates for the old test procedure (to 2014) and the new test procedure (Federal Register Number: 2014-1565).

Table 2: Comparison of test conditions for water heaters in the USA

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Old °F</th>
<th>Old °C</th>
<th>New °F</th>
<th>New °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot water temperature</td>
<td>135</td>
<td>57.2</td>
<td>125</td>
<td>51.7</td>
</tr>
<tr>
<td>Cold water temperature</td>
<td>58</td>
<td>14.4</td>
<td>58</td>
<td>14.4</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>67.5</td>
<td>19.7</td>
<td>67.5</td>
<td>19.7</td>
</tr>
</tbody>
</table>
The information and analysis contained within this summary document is developed to inform policy makers. Whilst the information analysed was supplied by representatives of National Governments, a number of assumptions, simplifications and transformations have been made in order to present information that is easily understood by policy makers, and to enable comparisons with other countries. Therefore, information should only be used as guidance in general policy – it may not be sufficiently detailed nor robust for use in setting specific performance requirements. Details of information sources and assumption, simplification and transformations are contained within the document.

Issue date: 14 February 2017

The first hour rating test has been adjusted so that for storage systems only water within a 15°F temperature drop is counted towards the rating (from the nominal storage temperature of 125°F to an outlet temperature of 110°F or 43.3°C). Under the old test procedure with a storage temperature of 135°F, a 25°F temperature drop was specified.

For instantaneous water heaters the maximum flow rate is established while maintaining a temperature rise of 67°F (37.2°C) (nominal outlet temperature of 51.7°C). The reduction in outlet temperature under the new test procedure brings the outlet temperature into line for storage water heaters and instantaneous water heaters.

<table>
<thead>
<tr>
<th>Method - Size</th>
<th>Draws</th>
<th>Volume litres</th>
<th>Energy kWh/day</th>
<th>First hour rating by draw litres (storage)</th>
<th>Maximum gallons per min (litres) by draw (instantaneous)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old - All</td>
<td>6</td>
<td>243.4</td>
<td>12.11</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>New - Very Small</td>
<td>9</td>
<td>37.9</td>
<td>1.64</td>
<td>FHR&lt;68.1</td>
<td>GPM &lt; 1.7 (6.4 L)</td>
</tr>
<tr>
<td>New - Small</td>
<td>11</td>
<td>143.8</td>
<td>6.23</td>
<td>68.1≤FHR&lt;193.1</td>
<td>1.7 ≤ GPM &lt; 2.8 (10.6 L)</td>
</tr>
<tr>
<td>New - Medium</td>
<td>12</td>
<td>208.2</td>
<td>9.01</td>
<td>193.1≤FHR&lt;283.9</td>
<td>2.8 ≤ GPM &lt; 4 (15.1 L)</td>
</tr>
<tr>
<td>New - Large</td>
<td>14</td>
<td>318.0</td>
<td>13.76</td>
<td>FHR≥283.9</td>
<td>GPM ≥ 4 (15.1 L)</td>
</tr>
</tbody>
</table>

Table 3: Energy and classification of size under the old and new US test procedure