

**Table 6. Water Heater Carbon Emissions Comparison Summary**

<b>Water Heater CO<sub>2</sub> Emissions Comparison</b>			
<b>Water Heating System</b>	<b>CO<sub>2</sub> lbs per MMBtu input<sup>51</sup></b>	<b>Heating System Efficiency<sup>52</sup></b>	<b>CO<sub>2</sub> lbs per MMBtu output</b>
<b>Natural Gas</b>			
Atmospheric	117	61%	192
Power Damper	117	67%	175
Direct Power Vented	117	82%	143
<b>Electric, using GRE's 2016 average CO<sub>2</sub> intensity values (1,607 lbs/MWh)<sup>53</sup></b>			
Marathon 85 gallon	471	93%	506
Marathon 105 gallon	471	95%	496
HTP 80 gallon	471	94%	501
<b>Electric, using GRE's 2032 projected average CO<sub>2</sub> intensity (1,428 lbs/MWh)<sup>54</sup></b>			
Marathon 85 gallon	419	93%	450
Marathon 105 gallon	419	95%	441
HTP 80 gallon	419	94%	445
<b>Electric, using MISO North's 2016 average CO<sub>2</sub> intensity (<del>372</del> 1,117 lbs/MWh)<sup>55</sup></b>			
Marathon 85 gallon	<del>109</del> 327	93%	<del>117</del> 352
Marathon 105 gallon	<del>109</del> 327	95%	<del>115</del> 345
HTP 80 gallon	<del>109</del> 327	94%	<del>116</del> 348

<sup>51</sup> Natural gas CO<sub>2</sub> lbs per MMBtu input taken from Energy Information Administration website: <https://www.eia.gov/tools/faqs/faq.php?id=73&t=11>. Electric CO<sub>2</sub> lbs per MMBtu input = (CO<sub>2</sub> lbs/MWh) \* (1 MWh/1,000 kWh) \* (1 kWh/3,412 Btu) \* (1,000,000 Btu/1 MMBtu).

<sup>52</sup> Heating system efficiencies found from manufacturer websites.

<sup>53</sup> Great River Energy's Response to CEO IR No. 12, Table 3 (July 10, 2017).

<sup>54</sup> *Id.* Table 4.

<sup>55</sup> MISO Market Reports, Historical Generation Fuel Mix, 2016 available at <https://www.misoenergy.org/Library/MarketReports/Pages/MarketReports.aspx>.