GxTracker™ Carbon Offset Analysis

For systems that monitor individual heat pumps, the GxTracker™ data processing software computes both Cost and Carbon savings for the GSHP system. This Datasheet summarizes the methodology used to compute the **Carbon Offsets**.

Introduction: Because GSHP systems don't use fossil fuels as the primary fuel source, there is a significant potential to reduce carbon emissions associated with conventional use of fuel oil and natural gas. Heat pumps use electricity to move the thermal energy from and to the ground. As a result, the environmental benefit is the largest where the electricity used has a low carbon intensity.

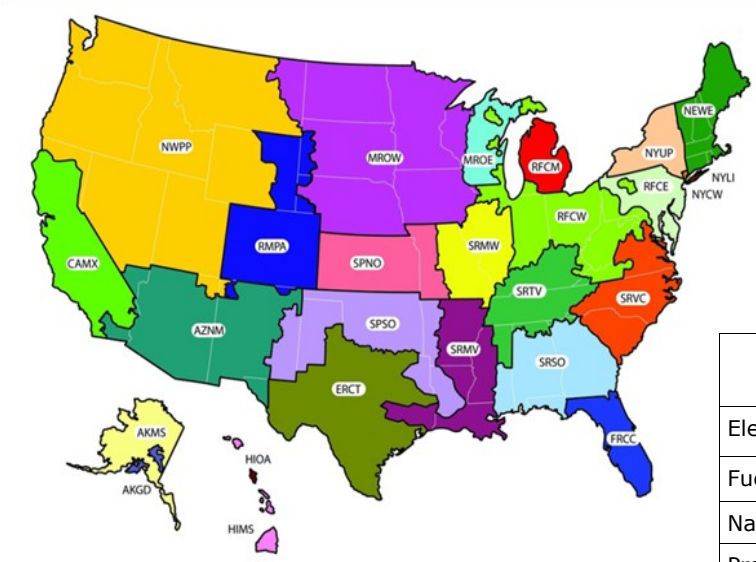
Your Carbon Savings

Carbon Offset (kg) for Durham NH #1 over 365 days starting March 17, 2012

Electric Heat	Fuel Oil	Natural Gas	Propane
3748	3337	1140	1963

eGRID: The carbon intensity of the U.S. electric grid varies significantly throughout the country and is lowest where a significant quantity of the electricity is produced from non-emitting sources (wind, hydro, nuclear). As the U.S. continues to reduce the carbon intensity of electricity, the environmental benefits of ground source heat pumps will continue to improve.

US EPA eGRID Regions



Carbon Intensity of Conventional Fuels

Fuel	Efficiency	Units	Emssions factor (kg CO2 / Unit)
Electricity	100%	kWh	Varies by state
Fuel Oil (#2)	90%	Gallon	11.34
Natural Gas	95%	Cubic foot	0.0574
Propane	92%	Gallon	6.30

Calculation:

$$\text{GSHP Operation [kWh]} \times \frac{\text{kg CO}_2}{\text{kWh}} \rightarrow \text{kg CO}_2 \text{ GSHP}$$

$$\text{Heating/Cooling Benefit [BTU]} \times \frac{\text{Fuel}_{\text{Equiv}}}{\text{BTU}} \times \frac{\text{kg CO}_2}{\text{Fuel}_{\text{Equiv}}} \rightarrow \text{kg CO}_2 \text{ Conventional Fuel}$$

Conversion to GSHP in New England: Carbon offsets in the New England region will be substantial as GSHP systems continue to replace fuel oil due to the relatively low carbon intensity of electrictiy in the region (0.38 kgCO2/kWh) and the high heating loads. A GSHP system in a well-insulated single family residence saves more than 3 metric tons of CO_2 per year relative to fuel oil. This is equivalent to increasing the fuel mileage on a vehicle travelling 12,000 miles per year from 21 mpg to more than 53 mpg, or reducing miles driven by more than 7,200 miles. The same GSHP system saves more than 1 metric ton of CO_2 compared to natural gas.