

# Ohma

OIL HEAT ■ MANUFACTURERS ■ ASSOCIATION

## TECHNICAL UPDATE

### ELECTRIC-TO-OIL CONVERSIONS REDUCE GREENHOUSE GASES BY 50%

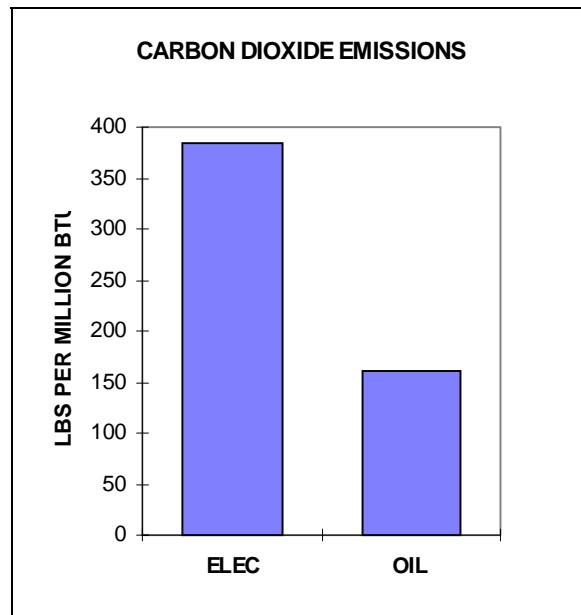
By John E. Batey, PE

Homes that are heated by electricity can lower emissions of carbon dioxide into the atmosphere by **50% by switching to oil heating equipment**. Carbon Dioxide is believed to produce undesired global warming. The reduction with oil equipment equals 12 tons per year for each house that is converted from electric heat and hot water. Simply replacing an electric water heater with an oil powered unit can lower carbon dioxide release by 2 tons per year. Additional benefits of switching to oil include: (1) much lower heating cost (less than one-half to one-third of electric heating cost), (2) Excellent paybacks for homeowners that are typically less than 2 to 3 years, and (3) Lower emissions of other air pollutants.

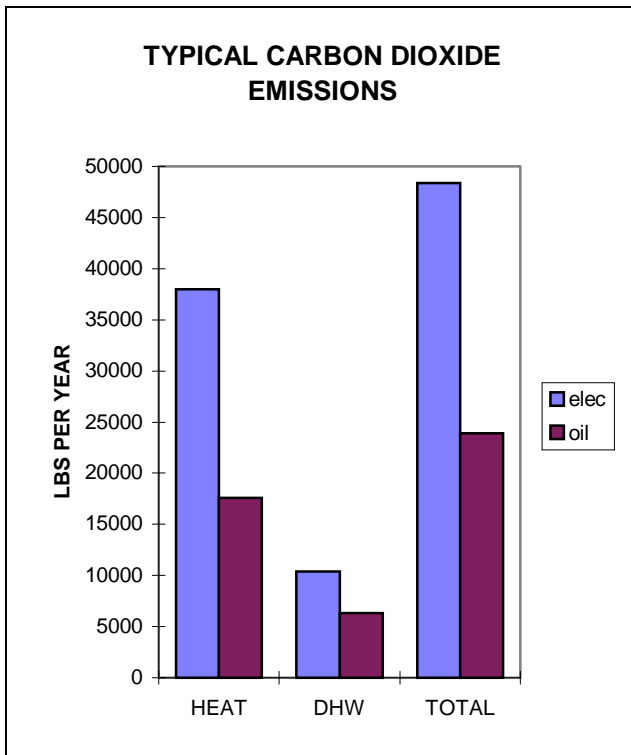
Carbon dioxide is a gas that can build up in the atmosphere and it may contribute to global warming by absorbing the sun's energy and trapping it in the earth's atmosphere. Global warming by accumulation of greenhouse gases can produce many adverse environmental effects including climate changes.

The chart on the right compares the emissions of carbon dioxide by electric power plants and by home oil burners. Electric power plant emissions are lbs per million BTU of electric output ignoring transmission and distribution energy losses (ref 1). Home oil burner emissions are lbs per million BTU of fuel consumed (ref 2).

Electric heating produces much higher emissions of carbon dioxide than oil heat because electric power plants burn fuels that produce more carbon than home oil burners. Also, only about one-third of the energy entering the power plant is converted to useful heat in your home. Therefore, more fuel must be burned in the electric power plant to produce the same useful heat which increases the emissions of all air pollutants including carbon dioxide.



Home energy use includes space heating and production of domestic hot water. Typical fuel use in homes in oil heated regions of the US is about 850 gallons of oil a year (118 million BTU per year), and USDOE calculations indicate an average energy use for domestic hot water of about 24 million BTU per year (ref 3). Based on these usage rates and using median heating equipment and water heater efficiencies (ref 4), the average reduction in carbon dioxide emissions by switching from electric to oil space heating and hot water can be determined.



The chart on the left summarizes these carbon dioxide reductions for a typical home. Electric heating releases 38,000 pounds of carbon dioxide a year, while oil heat produces only 17,600 pounds per year (per house). Similarly, for home water heaters, electric powered units produce 10,400 pounds per year and oil powered units produce 6,300 pounds of carbon dioxide a year.

Therefore, replacing electric space and water heating with oil powered equipment reduces emissions by 24,000 pounds or **12 tons a year** for each home that switches to oil. If only the electric hot water heater is converted to oil, this reduces carbon dioxide emissions into the atmosphere by **2 tons per year** (for each heater).

Clearly, oil powered space and water heaters offer an important opportunity for lowering emissions of greenhouse gases that can have a positive national impact. USDOE publications suggest that approximately 10 million electric heated homes are located in regions of the US where oil heat is a major energy source. If the space and water heating in all of these home were

converted to oil, the annual reduction in carbon dioxide emissions would be approximately **120 million tons a year**. This is a substantial reduction.

Homeowners realize other important benefits by switching from electric to oil heating equipment. Energy cost savings by converting from electric to oil heat and hot water for homes in the Northeast region can exceed \$3,500 a year. Average electric rates in the Northeast are in the range of \$0.12 to \$0.13 per kilowatt-hour. This is equivalent to oil at \$4.80 to \$5.28 a gallon, while average oil prices are now only about \$1.00 a gallon (ref 6). Switching from electric to oil heating produces a 20-year cost savings of more than \$70,000 for homeowners.

Short paybacks are required and the new oil equipment often pays for itself in about 2 years. Payback times as short as one year are possible for some homes depending on conversion costs and energy use. This is an excellent investment which allows homeowners to permanently reduce their energy use and heating costs.

Another important benefit of conversion to oil is reduced emissions of other air pollutants. These include: Nitrogen Oxides, Particulates, Carbon Monoxide, Hydrocarbons, and Sulfur Oxides. These emissions are also much lower with home oil burners than for electric heat. Homes heated by oil burners emit from **7.6 to 96 times less of each of these air pollutants** than electrically heated homes.

It is important that homeowners who now use electricity to produce space heating and hot water are advised of the many advantages of switching to home heating oil.

#### ADVANTAGES OF OIL HEATING

- **LOWER GREENHOUSE GAS EMISSIONS (12 tons per year)**
- **LOWER HEATING BILLS (Thousands of \$ a year)**
- **EXCELLENT PAYBACK (Within 2 years)**
- **LOWER EMISSIONS OF ALL AIR POLLUTANTS**

# **OMA Technical Update:**

## **ELECTRIC-TO-OIL CONVERSIONS REDUCE GREENHOUSE GASES BY 50%**

### **REFERENCES:**

1. US Department of Energy, Electric Power Annual, DOE/EIA-0348(95)/2.
2. US Environmental Protection Agency, Compilation of Air Pollutant Emissions Factors - Volume I: Stationary Point and Area Sources, Publication AP-42, October 1996.
3. Gas Appliance Manufacturers' Association, Consumer Directory of Certified Efficiency Ratings for Residential Heating and Water Heating Equipment, April 1997, and North American Manufacturing Company, North American Combustion Handbook, Second Edition, page 16.
4. Gas Appliance Manufacturers' Association, Consumer Directory of Certified Efficiency Ratings for Residential Heating and Water Heating Equipment, April 1997, page 112.
5. US Department of Energy, Household Energy Consumption and Expenditure - 1993, DOE/EIA-032(93), Table 5-14, October 1995.
6. US Department of Energy, Petroleum Marketing Monthly, DOE/EIA-0380(97/9), Table 18, September 1997.