



## ***Boiler Upgrades Save Money & Energy: GM Marion & Orion***

General Motors Corporation (GM), one of the world's largest automakers, traces its roots back to 1908. With its global headquarters in Detroit, Michigan, GM employs 202,000 people worldwide and produces cars and trucks in 30 countries.

An active partner in the U.S. EPA's ENERGY STAR program, GM received the ENERGY STAR Partner of Year Award for Excellence in Energy Management in 2002 and has goals to reduce energy use by 25% and greenhouse gas (GHG) emissions by 21% over 10 years across facilities worldwide. From 2000 to 2010 GM reduced energy use by 44% and cut GHG emissions by 42%.

Many of GM's manufacturing plants built in the 1970's and 80's used coal-fired boilers to provide steam for production processes and heating. Today only three of GM's 40 U.S. manufacturing facilities remain capable of firing coal. Most plants have been converted to direct-fired gas heaters or boilers that use either natural gas or landfill gas.

GM's Marion and Orion facilities illustrate the financial and environmental benefits of upgrading boilers away from firing coal. GM's Stamping Plant in Marion, Indiana originally used three coal-fired boilers primarily for facility heating. In 2001, a number of energy efficiency measures were launched beginning with converting one of the site's coal boilers to natural gas. This conversion allowed the boiler to operate more efficiently with lower turn down during reduced summer steam loads. Next, steam loads were reduced by converting the hot water system to gas-fired heaters and sealing up the building. This reduced peak steam loads and enabled summer shut down of steam. These load reductions permitted a second boiler to be idled, and the remaining boiler was also converted to gas which reduced labor and maintenance costs while eliminating the need for future environmental controls.

At GM's Orion, Michigan Assembly plant, the availability of landfill gas enabled the company to convert one of its coal boilers to use this fuel. Switching to landfill gas helped the plant operate its steam system more efficiently resulting in a 50% reduction in coal and over \$1 million per year saved. Additionally, carbon dioxide, sulfur dioxide, and nitrogen oxide emissions were significantly reduced.

### **Savings:**

- ✓ Reduced fuel costs
- ✓ Lowered overall fuel, manpower, and maintenance costs.
- ✓ Eliminated 225,000 metric tons in CO<sub>2</sub> emissions, a 45% reduction, from 2003-2010, for both plants.
- ✓ Reduced NO<sub>x</sub>, SO<sub>x</sub>, and particulate emissions and lowered control costs.

### **Additional Benefits:**

- ✓ Increased energy efficiency through lower turn down during reduced summer steam loads.
- ✓ Displaced fossil fuel use with a renewable energy source, landfill gas.
- ✓ Eliminated need for ash disposal when boilers were converted from coal.