

## A Variety of Savings Opportunities for RV Manufacturer

The **Industrial Assessment Center (IAC)** at **West Virginia University (WVU)** discovered opportunities to decrease energy usage and enhance corporate competitiveness for Airstream, a manufacturing facility located in Ohio. The assessment team focused on the manufacturing process as well as the energy utilities feeding the processes. The recommendations at this facility may serve as a template for potential savings at similar plants.



Airstream trailers and RVs are easily identified by their unique, shiny streamlined exterior.  
*Photo from Airstream.*

### Company Background

The Airstream manufacturing facility located in Jackson Center, OH is a leading provider of Recreational Vehicles (RVs) such as travel trailers, touring coaches. More than 100,000 Airstream RVs have been sold worldwide.

### Summary

As a result of the assessment, recommendations were made for improvement in several specific areas. Opportunities for saving energy were identified with respect to utilizing higher efficiency lamps, reducing outside air intake for the forced air heaters, performing vibration analysis, eliminating compressed air leaks, installing energy recovery ventilators to recover heat from exhaust, adjusting air to fuel ratio for the forced air heaters, replacing old boiler with a new efficient one, recovering waste heat from air compressor and reducing the compressor pressure set point. Eight of

the ten recommendations made by the team were implemented, resulting in the reduction of energy consumption by 100,170 kWh of electricity and 2,590 MMBtu of natural gas per year; an annual cost saving of \$29,710.

### Energy Conservation Analysis

In general, the management and employees of Airstream are “energy conservation” oriented, and follow many good practices to save energy. For example, the plant uses a high volume low pressure paint system, T5 fluorescent lighting, synthetic lubricant for air compressors, and variable frequency drives on compressor motors. The assessment team was pleased with the level of energy efficiency awareness amongst plant personnel and worked on identifying other ways to save energy by discussing energy efficiency opportunities. The recommendations identified by the team were also discussed at the end of the day and the company’s personnel were encouraged to contact and interface with the WVU IAC for further discussion and/or clarification required with respect to

the implementation of the assessment recommendations.

### Benefits at a Glance

- The implemented measures will result in annual cost savings of \$29,710.
- Average Payback is 1.4 years.
- Implemented recommendations will reduce carbon dioxide emissions by 513,409 pounds.

### Lighting Replacements

The assessment team suggested T5 ganged fluorescent luminaries with reflectors in the place of Metal Halide (MH) fixtures, and T8 fluorescent bulbs with reflectors in the place of T12 bulbs. The plant personnel realized the value in the efficient usage of lighting with occupancy sensors. The light levels are estimated to be better than those currently utilized and hence are expected to contribute towards a productive workforce, while simultaneously saving energy.

Upgrading lighting with electronic ballasts, reflectors in the plant areas, and occupancy sensors in the office areas has increased the efficiency of the lighting system. In effect, these suggestions have significantly reduced energy usage.

**Compressed Air Savings**

Compressed air is a significant energy consumer in the facility. Recovering waste heat from compressor, reducing compressed air pressure, and repairing compressed air leaks reduced the demand for compressed air in the plant,

thereby reducing the energy usage of the compressed air system.

**Process Equipment**

The air to fuel ratio of the natural gas forced air heaters has been adjusted to increase the efficiency and reduce fuel consumption. Replacing the existing boiler with a new one has also improved the efficiency. Reducing outside air intake of forced air heaters and installing energy recovery ventilators has further reduced the energy required during the heating season.

**Assessment Savings Tabulated**

The following table presents the annual cost savings that will occur at the Airstream facility due to the implemented recommendations. Energy conservation opportunities identified in the assessment that were implemented will reduce annual electrical usage by 100,170 kWh, and natural gas usage by 2,590 MMBtu per year. This translates into an annual cost savings of \$29,710 and an annual reduction in CO2 emissions of 513,409 pounds.

**Implemented Recommendations**

Assessment Recommendations	Annual Resource Savings	Total Annual Savings	Capital Costs	Simple Payback
Replace the T12 bulbs with T8 and install occupancy sensors	70,960 kWh/yr	\$8,880	\$16,720	1.9 years
Replace MH with T5 ganged fluorescent luminaries	12,240 kWh/yr	\$1,570	\$3,910	2.5 years
Repair Compressed Air Leaks	19,160 kWh/yr	\$2,450	\$360	0.2 years
Recover waste heat	100 MMBtu/yr	\$700	\$1,080	1.5 years
Reduce outside air intake of forced air heaters	1,580 MMBtu/yr	\$10,880	\$5,000	0.5 years
Install Energy Recovery ventilators	-2,190 kWh/yr 350 MMBtu/yr	\$2,050	\$10,000	4.9 years
Adjust the Air to Fuel Ratio	360 MMBtu/yr	\$1,810	\$500	0.3 years
Replace old water boiler with efficient boiler	200 MMBtu/yr	\$1,370	\$5,170	3.8 years
<b>Total</b>	100,170 kWh/yr 2,590 MMBtu/yr	\$29,710	\$42,740	1.4 years