**Recover Heat from Boiler Blowdown**

Heat can be recovered from boiler blowdown by using a heat exchanger to preheat boiler makeup water. Any boiler with continuous blowdown exceeding 5% of the steam rate is a good candidate for the introduction of blowdown waste heat recovery. Larger energy savings occur with high-pressure boilers. The following table shows the potential for heat recovery from boiler blowdown.

### Example

In a plant where the fuel cost is $3.00/MBtu, a continuous blowdown rate of 3200 pounds per hour (lbs/hr) is maintained to avoid the buildup of high concentrations of dissolved solids. What are the annual savings if a makeup water heat exchanger is installed that recovers 90% of the blowdown energy losses? The 82% efficient boiler produces 50,000 lbs/hr of 150-psig steam. It operates for 8000 hours per year. The blowdown ratio is:

\[
\text{Blowdown Ratio} = \frac{3200}{3200 + 50,000} = 6.0\%
\]

From the table, the heat recoverable corresponding to a 6% blowdown ratio with a 150-psig boiler operating pressure is 1.7 MBtu/hr. Since the table is based on a steam production rate of 100,000 lbs/hour, the annual savings for this plant are:

\[
\text{Annual Energy Savings} = \frac{1.67 \text{ MBtu/hr} \times (50,000 \text{ lbs/hr}/100,000 \text{ lbs/hr}) \times 8000 \text{ hrs/yr}}{0.82} = 8146 \text{ MBtu}
\]

\[
\text{Annual Cost Savings} = 8146 \text{ MBtu/year} \times $3.00/\text{Mbtu} = $24,438
\]

### Suggested Actions

If there is a continuous blowdown system in place, consider installing a heat recovery system. If there is a non-continuous blowdown system, then consider the option of converting it to a continuous blowdown system coupled with heat recovery.
The Office of Industrial Technologies (OIT), through partnerships with industry, government, and non-governmental organizations, develops and delivers advanced energy efficiency, renewable energy, and pollution prevention technologies for industrial applications. OIT is part of the U.S. Department of Energy’s Office of Energy Efficiency and Renewable Energy.

OIT encourages industry-wide efforts to boost resource productivity through a strategy called Industries of the Future (IOF). IOF focuses on the following nine energy and resource intensive industries:

- Agriculture
- Chemicals
- Glass
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- Forest Products
- Metal Casting
- Petroleum

To help industries begin to save energy, reduce costs, and cut pollution right away, OIT offers a comprehensive portfolio of emerging technology, practices, tools, information, and resources in a variety of application areas, such as motor systems, steam systems, compressed air systems, and combined heat and power systems. Likewise, OIT’s Industrial Assessment Centers (IAC), located throughout the U.S., offer energy, waste, and productivity assessments to small and medium-sized manufacturers. Users can take advantage of the abundant resources, such as software, fact sheets, training materials, etc. available from OIT.

**Motor Systems** — helps industry increase productivity and reliability through energy-efficient electric motor-driven systems.

**Documents** -
- Buying an Energy-Efficient Electric Motor
- Optimizing Your Motor-Driven System
- Energy Management for Motor Driven Systems
- Improving Pumping System Performance: A Sourcebook for Industry

**Software** –
- MotorMaster+ 3.0 and training CD
- ASDMaster
- Pumping System Assessment Tool

**Training** –
- MotorMaster+ 3.0 Software
- Adjustable Speed Drive Application
- Pumping System Optimization
- Pumping System Assessment Tool


**Steam Systems** — helps industry enhance productivity, increase profits, and reduce emissions through better steam system management.

**Documents** –
- Energy Efficiency Handbook
- Plant Services Article - The Steam Challenge
- Energy Manager Article - Steaming Ahead
- Oak Ridge National Laboratory’s Insulation Guidelines
- 1998 IETC Steam Session Papers

**Case Studies** –
- Georgia Pacific Achieves 6-Month Payback
- Bethlehem Steel Showcase Demonstration

**Software** –
- 3EPlus Software for Determining Optimal Insulation Thickness

Access the Web site at [www.oit.doe.gov/steam](http://www.oit.doe.gov/steam).

**Compressed Air Systems** — dedicated to improving the efficiency and performance of industrial compressed air systems.

**Documents** –
- Improving Compressed Air System Performance: A Sourcebook for Industry

**Training** –
- Fundamentals of Compressed Air Systems
  (For schedule and location, call (800) 862-2086)

Access the Web site at [www.knowpressure.org](http://www.knowpressure.org).

**Industrial Assessment Centers** — enable small and medium-sized manufacturers to have comprehensive industrial assessments performed at no cost to the manufacturer.

**Documents** –
- IAC Database


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