

Low Nox Boiler and Energy
Efficiency Conference

Natural Resources Canada

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Incentive Grants for Audits and Studies

Enbridge Pays

- Steam Plant Audits 2/3 up to Maximum \$ 5,000.
- Steam Trap Surveys 50% up to \$ 5,000.
- Insulation Surveys 50% up to \$ 5,000.
- Industrial HVAC Audits 50% up to \$ 5,000.
- Special Studies 50% up to \$ 5,000.



Incentive Grants for Capital Projects

- For Natural Gas Efficiency Projects Enbridge Pays
- A one-time incentive grant on the annual savings
- \$ 0.05 per Cubic Metre of Natural Gas Saved.
- Maximum Grant \$ 30,000 per Project.
- Financial Payback can not be less than 2 years.
- Projects Can be Bundled to include short and long payback projects.

The industrial steam saver program



- 1. THE STEAM PLANT PERFORMANCE TEST AND ASSESS**
ENBRIDGE PAYS 20% OF THE ASSESS COST, UP TO A MAXIMUM OF \$5,000.
 - A performance test and analysis of your boiler and steam system plant.
 - A detailed summary of your energy system energy losses.
 - Identification of energy savings projects, their costs and financial payback.
- 2. NEW BOILER INSTALLATIONS**
NEW ENBRIDGE GRANT PROVIDES A PACKAGE OF ENERGY EFFICIENCY FEATURES TO NEW BOILER PLANTS.
 - Enclosures, Blow Down Heat Recovery, Bleeding and Condensate Treatment.
- 3. THE STEAM TRAP SURVEY**
ENBRIDGE PAYS 50% OF THE SURVEY COST, UP TO A MAXIMUM OF \$500.
 - A survey and test of all your steam traps and a report which identifies savings.
- 4. THE BOILER COMBUSTION TUNE UP PROGRAM FOR LARGER PLANTS**
INCENTIVES FOR OVER A COMBUSTION TUNE UP THREE PER YEAR.
 - Includes fuel gases and nitrogen oxides.
 - Plants will receive 1000 cubic feet/ton/yr of \$50.
- 5. BYPASS AND ENERGY MANAGEMENT IN BOILER PLANTS**
 - Provides an incentive grant for bypass steam, hot air gas, water and electricity.
- 6. THE REGULATORY SURVEY**
ENBRIDGE PAYS 10% OF THE SURVEY COST, UP TO A MAXIMUM OF \$500.
 - A detailed boiler survey which identifies all on-plant components including gas, water, tanks and piping.
 - Savings and capital cost estimates are provided.



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Steam Saver Programs

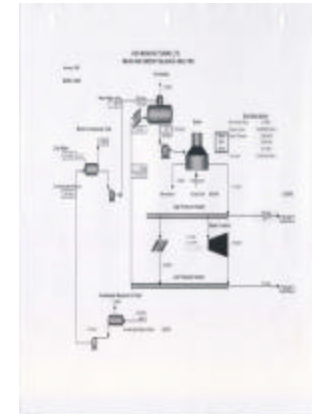
- 1. Steam Plant Performance Test and Audit**
- 2. New Boiler Installations**
- 3. The Steam Trap Survey**
- 4. Combustion Tune-up for Larger Boiler Plants**
- 5. Metering and Energy Management**
- 6. The Insulation Survey**



Steam Plant Performance test and Audit

Executive summary

- Plant Energy Statistics
- Steam System Equipment
- Combustion Tests
- Steam Loads and Distribution
- Metering and Reporting
- Water Treatment
- Savings and Cost Calculations
- Safety
- Steam Cost
- Mass and Heat Balance





The Steam Plant Performance Test and Audit Identified Savings 1997 to 2002

- **Number of Audits Completed:** 66
- **Total Annual Gas Consumption:** 579 MCU M/YR
- **Annual Fuel Cost:** \$ 145 Million
- **Savings Projects Identified:** 349
- **Annual Fuel Savings Identified:** 71.5 MCU M/YR
12.3% of Total
- **Annual Dollar Savings Identified:** \$ 17.9 M per YR
- **Note: M CU M = Million Cubic Metres**



The Steam Plant Performance Test and Audit Implemented Projects 1992 to 2002

- **Projects Implemented:** 70
- **Annual Fuel Savings:** 25.3 M CU M/YR
- **Annual Cost Savings:** \$ 6.3 M per Year
- **Implementation Rate:** 35%

Note: Savings figure excludes electricity, fuel oil,
water and chemicals.

\$ M = Million Dollars



Where Do the Savings Come From?
349 Projects Identified, 66 Plants

	<u>M CU M</u>	<u>% of Fuel</u>
■ Combustion Improvements	10.1	1.7%
■ Boiler Plant Capital Projects	9.3	1.6%
■ Heat Recovery	16.4	2.8%
■ Operating Changes	3.0	2.2%
■ Steam & Condensate Return	5.9	1.0%
■ Building HVAC	6.4	1.1%
■ Metering	1.8	0.3%
■ Insulation Improvements	1.6	0.3 %
■ Steam Pressure Reduction	3.6	0.6%
■ Other	3.4	0.7%
■ <u>TOTAL</u>	<u>71.5</u>	<u>12.3%</u>



Steam Trap Surveys
Years 2000, 2001 and 2002

■ Number of Surveys Completed:	104	
■ Number of Traps Identified:	22,642	
■ Number of Traps Tested:	17,060	
■ Leaking or Blow-Through:	2973	17.4%
■ Blocked or Flooded:	1133	6.6%
■ Total Defects:	4106	24.0%
■ Annual Steam Loss:	315 Million LB/YR	
■ Annual Savings Identified:	13.2 Million CU M/YR	
■ Traps repaired or replaced:	10.6 Million CU M/YR	



Other Steam Saver Programs Annual Savings Implemented

- Combustion Tune-up Program: 1.1
 - Insulation Surveys: 1.0
 - Other Projects (Stand alone) 1.9
 - eg. Direct Contact Water Heaters
 - M.U. Air Unit Conversions
 - Total Savings Implemented-Other 4.0 M CU M/YR
- \$ 0.5 Million per YR



Total Savings Implemented All Steam Programs to date

	<u>Savings</u>	<u>Payback</u>
■ 66 Steam Plant Audits	\$ 6.3M	1.6 YR
■ 104 Steam Trap Surveys	\$ 2.7	0.8 YR
■ All Other Programs	\$ 1.4	1.8 YR
■ <u>Total</u>	<u>\$ 10.4 M</u>	<u>1.5 YR</u>

Note: M = Millions of Dollars

Savings based on natural gas at \$ 0.25 per CU M

Savings exclude electricity, water, fuel oil and chemicals



How Much Does a Survey Cost? Average for All Surveys To Date

	<u>Total Cost</u>	<u>Enbridge Share</u>
■ Boiler Plant Audit	\$ 9,000	\$ 5,000
■ Steam Trap Survey	\$ 2,500	\$ 1,100
■ Insulation Survey	\$ 4,000	\$ 2,000



The Cost of Steam

for 15 typical plants-avg. steam production 42KLB/HR

	<u>Average Per Site</u>	<u>Avg. per K LB</u>
■ Fuel	\$ 3,650,000	\$9.872
■ Electricity	78,949	0.214
■ Water	54,000	0.146
■ Chemicals	41,832	0.113
■ Labour	303,722	0.821
■ Maintenance	214,655	0.580
■ Total	<u>\$ 4,343,188</u>	<u>\$ 11.746</u>