Waste Heat to Power Update

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339 mmBTU/hr of heat energy being wasted to atmosphere at 2000°F
Ray’s Wireless Call Log – # calls per day (source: ATT wireless)
Henry Hub Natural Gas Price - $ per MMBTU

Amazing 1:1 Correlation!
Existing WHP in the U.S.

- Primary Energy generates 50 MW, 90 MW and 95 MW at its WHP plants in steel mills (IN).
- 3.5 MW is generated using waste heat from a Trailblazer pipeline compressor station (CO).
- JR Simplot uses excess heat from exothermic reactions to drive a steam turbine that generates 16 MW (ID).
- The 40MW (equivalent) Port Arthur Steam Energy system produces both process steam and 5MW power from kiln exhaust energy (TX).
- Albany County Sewer District utilizes exhaust gas from sludge incinerators to generate 925 kW (NY).
Heat Recovery Opportunities

- **Organic Rankine Cycles**
  - Distillation Columns - Boilers
  - Fluid Heating
  - Drying
  - Thermal Oxidizers and Other
  - Metal Heat Treating
- **Steam Rankine Cycles**
  - Calcining
  - Metal melting (Al)
  - Nonmetal melting
  - Curing and Forming
  - Metal melting Steel
  - Smelting
  - Agglomeration/Sintering

Source: MCEAC
Hot off the Press: DOE WHP Market Assessment

DOE’s Oak Ridge National Lab commissioned ICF report on WHP in the U.S.

- Evaluates waste heat sources across a variety of industrial sectors and states
- Identifies WHP technologies used for both high and low temperature waste heat streams
- Predicts size of opportunity
- Identifies drivers, barriers, and public policies that support WHP
DOE WHP Market Assessment – Key Findings

Over 14,500 MW of technical potential at over 2,900 industrial sites

Over 4,000 MW of projects with a payback of three years or less

3,160 MW of potential opportunities in Texas, California and Louisiana alone, over 1,100 MW of which could be cost effectively implemented today

3,500 MW of potential in the petroleum refining sector, nearly 1,500 MW of which could be cost effectively implemented today
Total Potential for WHP = 15,360 MW

**Existing Projects**

- **Primary Metals**
  - 3 projects
  - 217 MW
  - 28%

- **Chemicals**
  - 19 projects
  - 270 MW
  - 35%

- **Refining**
  - 5 projects
  - 118 MW
  - 16%

- **Other**
  - 57 projects
  - 98 MW
  - 13%

- **Pipeline Transmission**
  - 12 projects
  - 64 MW
  - 8%

**Potential for Additional Projects**

- **450-1200°F**
  - 7,733 MW
  - 53%

- **<300°F**
  - 1,798 MW
  - 12%

- **300-450°F**
  - 3,607 MW
  - 25%

- **>1,200°F**
  - 1,455 MW
  - 10%

**Existing Projects**

- **766 MW**

**Potential for Additional Projects**

- **14,594 MW**

Source: ICF Waste Heat to Power Market Assessment March 2015
There are enough WHP opportunities in the United States to Power the State of Virginia (Only nine states use more electricity than VA)

Source: CA Energy Commission, Energy Almanac

Source: ICF Waste Heat to Power Market Assessment March 2015
Potential for Additional WHP Projects

Petroleum: 118 MW installed; 98% of opportunity untapped

Chemicals: 270 MW installed; 87% untapped

Primary Metals: 217 MW installed; 89% untapped

Source: ICF Waste Heat to Power Market Assessment March 2015
WHP is a Renewable Energy Resource in 17 States

WHP qualifies as renewable in 17 states, either in the state’s RPS, goal, pilot program, or SGIP

States refer to WHP as:
- waste heat to power
- waste heat recovery
- waste heat recovery converted into electricity
- waste gas and waste heat capture or recovery
- waste energy recovery system
- energy recovery processes
- recycled energy
- industrial byproduct technology
- renewable energy source
The Heat is Power Association

The industry-led advocacy organization focused exclusively on advancing waste heat to power.

Active with federal, state and regional stakeholders including
- Congress
- Federal agencies including U.S. EPA and U.S. DOE
- NARUC
- Regional industry and environmental organizations

Through education and advocacy HiP works to get WHP included as an emission-free, energy efficient power resource in legislation, regulations and programs.
Congressional Support for WHP

The efforts of the HiP Association have led to WHP drivers in a number of pending bills:

**Three bills would allow a 30% investment tax credit for WHP property**
- ✓ HR 4916 - the Power Efficiency and Resiliency “POWER” Act first introduced June 19, 2014
- ✓ S. 2189 - the Energy Efficiency Tax Incentives Act first introduced April 1, 2014
- ✓ HR 2972 - The Heat is Power Act introduced Aug. 1, 2013
- ✓ In addition, amendment to Tax Extenders legislation providing a 30% ITC for WHP has been offered

**The Master Limited Partnership Parity Act** would extend the publicly traded partnership ownership structure to energy power generation projects, transportation fuels, and related energy activities, including WHP
- ✓ S. 795 – Introduced Apr. 24, 2013 (6 bipartisan sponsors)
- ✓ HR 1696 Introduced Apr. 24, 2013 (companion bill, 1 sponsor, 68 co-sponsors)
HiP Online Resources
Building Opportunities for WHP

For more information about HiP’s efforts contact:

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