

## Process Heating and Survey Tool (PHAST) Executive Summary

**Overview:** The Process Heating and Survey Tool (PHAST) is a free software tool that helps industrial end users develop a model of the process heating equipment in their facility. The tool can be applied to systems heated by fuels, steam, or electricity and results in a heat balance identifying the magnitude of major energy flows in the equipment.

The PHAST model can be used to identify the energy savings associated with possible changes to the equipment or the process as compared to the original process model. Although PHAST cannot tell you how to improve a system, it does allow the user to identify those process changes that are expected to result in economically attractive energy savings and highlight those areas in need of further investigation. The PHAST software also has features that enable the user to develop, process by process, an overview of the energy use footprint across all the heated processes within the facility.

The reheat furnace in one steel mill was burning 135 MMBtu per hour in the heating zone and 32 MMBtu per hour in the soak zone. The PHAST model was used to identify 37 MMBtu per hour of savings through a combination of actions, such as reducing heat losses through openings; more frequent burner adjustments, changes in equipment insulation thicknesses and types, etc.

**Data Collection Requirements:** The following needs to be collected:

- Available energy sources for the furnace being evaluated and the fuel heating value and cost
- Energy use data for the furnace being evaluated
- Energy use for the auxiliary equipment associated with the furnace being evaluated
- Energy use in various parts of the furnace being evaluated under given operating conditions
- Thermal properties of the charge materials, fixtures, process atmosphere, etc. in the process heating application

Data collection includes measurements that require specific equipment like temperature sensors and flue gas analyzers. It could take an average plant several days to collect the necessary data for analyzing an individual piece of process heating equipment. Inputting the data and running the model would require several additional hours.

**Qualifications:** PHAST is designed for personnel who are interested in improving process heating systems performance, including industrial plant engineers, distributors, consulting companies, and utility energy auditors. The tool can be used by in-plant staff members experienced in the design and operation of process heating equipment. PHAST training, developed by USDOE, is available in various formats (2 hour, one day and two day). Attending a DOE training session before using the tool is encouraged, but is not required and may not be necessary for all end users.

**Usage of the tool:** This tool requires only spot measurements to estimate savings under a given set of operating conditions. The tool could be used multiple times to develop models for a given piece of equipment operated under varying process conditions and can be used across the entire range of process heating equipment within a given facility. It can also be used to verify the savings obtained on a particular piece of equipment after changes to the operation have been implemented.

**Ease of Use/Software Compatibility:** PHAST 3.0 and version 2.0 will operate on the following PC's:

- 32-bit computer running Windows 2000, Windows Vista, Windows XP, and Windows 7.

- Microsoft Office Suite 2007. *PHAST 3.0 and version 2.0 will NOT work with Office 2010.* Please download the required Office 2007 program to run concurrently on your computer.

**Product roll-out roadmap:** Version 3.0 was released in November 2010. Next upgrade is planned to start in the fall of 2011 and be completed in 2012.