



### *Symposia Summary*

## **Waste Heat Recovery**

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Waste heat recovery is an important area for investigation to reduce costs, energy resources, and reduce greenhouse gas formation. Within the metals industry, it is estimated that energy losses to waste heat equal 20 to 50 percent of the total energy input. This means there is great opportunity to utilize these losses as a type of “free” alternative energy. The papers presented at this symposium demonstrated the range of work within the topic, including summaries of the sources of waste energy and uses, investigations and studies in this field, and practical examples of current technologies.

Arvind Thekdi, E3M, Inc., reviewed the sources of waste heat in the metals industry, evaluated the various options to utilize this heat, and summarized the current costs and status of the technologies. He noted that the first priority is to reduce the waste heat of a process. Waste heat can then be used within the process to preheat combustion air or materials. After that, it can be utilized by other processes such as steam generation or HVAC applications. Finally, it can be used to produce electricity through various methods.

Xiaojun Dai, University of Birmingham, reviewed the work done in CRIMSON technology to reduce waste heat in casting plants. The practical aspects of current technologies in aluminum melting furnaces were presented by John Norton, Norton Engineering, LLC, and included discussion of a newer heat pipe technology. Studies were also presented in the metals industry to recovery heat from furnace slag by Junxiang Liu and Peng Li, both from Northeastern University, and as part of the presentation from Maytinee Vayankul, Hatch. Hadi Fanisalek, Hormozal, also reviewed a study using waste heat from a primary aluminum plant to distill clean water from sea water.

The use of waste heat in boilers to produce steam or Organic Rankine Cycle (ORC) processes to produce electricity was discussed by several presenters, including Vatanakul and Donna Guillen from Idaho National Laboratory, while Bob Miller of Calnetix reviewed the practical application of the ORC waste heat generators. Thermoelectric generation (TEG) is a promising field in the development stage using semiconductors to directly convert heat energy to electric energy and current work with TEG was presented by was presented by Jan Beck, TXL Group, Inc., and Philippe Jund, Université Montpellier.

Next year, the waste heat recovery topic will be incorporated with a new, larger symposium, “Energy Technologies and Carbon Dioxide Management.”

—Submitted by *Cynthia K. Belt*