

Champion International Corporation and Rockwell International demonstrated on a laboratory and limited pilot-plant scale that kraft black liquor can be gasified in a fused-salt reactor to produce low-Btu gases. The clean gases can be burned directly in a gas turbine to produce electrical energy, and the combustion products can be fed to a waste-heat boiler to raise steam. The gasifier will have a throughput sufficiently high and a heat loss sufficiently low to produce product gases with a heating value of about 100 Btus per standard cubic foot.

Compared with the Tomlinson boiler process, the gasification of kraft black liquor offers high energy efficiency, reduced air emissions, modularity, a higher output ratio of electricity to steam, and improved safety. Economic analysis indicates significant potential savings in both capital and operating costs compared with alternative systems.

Recycling of Postconsumer Plastic Scrap

The energy that could be saved through recycling postconsumer plastic scrap might be as much as 1% of U.S. annual energy consumption. These savings would be in premium fuels, oil, and natural gas used as feedstocks and fuels in plastics production. In addition, because more than 40 billion pounds of plastics are produced annually in the United States, recovering and recycling plastics would alleviate a major disposal problem. Also, the capability to recycle plastics from scrapped automobiles may make the use of plastics for major structural parts, such as fenders and hoods, more acceptable to automobile manufacturers and environmentalists.

Under DOE funding, the Plastics Institute of America at the Stevens Institute of Technology, in a coordinated effort with Lowell University, Lehigh University, and the Polytechnic Institute of New York, successfully showed the technical feasibility of recycling plastic scrap from shredded automobiles. These studies were complemented by an industrial scale-up effort coordinated by the Plastics Institute and funded by DOE.

In June 1986, the Plastics Institute of America held a technology exchange workshop on "Plastics Recycling as a Future Business Opportunity." This workshop, supported entirely by the institute, was primarily aimed at entrepreneurs, representatives of local governments, and congressional staff members.

Workshop attendees concluded that there is a potential constituency for plastics recycling in the private and local government sectors.

Boiler Workshops

Steam boilers are used in every industrial and commercial sector to produce process steam, hot water, and building heat. Because boilers are the most prevalent energy conversion technology in industry, even small efficiency improvements in boiler operation can save large amounts of fuel. In response to this opportunity for energy conservation, DOE developed a national information and instruction program to promote more cost-effective and efficient maintenance and operating practices among boiler operators.

Through this program, university faculty and boiler technology specialists taught well-attended courses all over the country. Many local and industrial organizations then expanded on the pilot DOE program by continuing the courses with their own funding. These workshops are still held periodically in many areas of the United States by groups such as the Association of Energy Engineers, which conducts about five each year.

This DOE project, which was completed in 1987, yields energy savings estimated at 2.8 trillion Btus per year.

Energy Analysis and Diagnostic Centers

Many small- and medium-sized manufacturing companies lack the technical resources to perform thorough energy audits of their plants. Consequently, DOE has sponsored a program that provides free energy analyses by engineering faculty and students from U.S. universities. The program has grown from its experimental beginnings in 1976 to include 16 universities participating across the nation. To date, the Energy Analysis and Diagnostic Centers have performed more than 2800 plant audits. Conservation measures often recommended include using lower wattage lamps; insulating bare storage tanks, vessels, and lines; adjusting burners; and installing compressor air intakes in the coolest locations. About 50% of the recommended measures are routinely implemented, generally those involving low capital cost. The energy savings from this program are estimated at 11.4 trillion Btus per year.