

ultracapacitors. Ultralight aerogels are being taken to the commercial market by Aerojet, a segment of GenCorp.

Aluminum Remelting Technology

A \$400,000 grant from the Department of Energy, through the National Industrial Competitiveness Through Energy, Economics, and Environment program to AAP St. Mary's of Ohio has resulted in a more efficient technology for aluminum remelting. By avoiding the second aluminum chip melt during recycling, real energy savings are 6.36 billion British thermal units annually--6,249 gallons of diesel fuel, and 155,000 gallons of coolant. Additionally, the new technology eliminates 59 tons per year of emissions and 64 tons per year of dross. **Dollar savings equal \$642,000 annually.**

Vacuum Pressure Swing Adsorption

By eliminating the nitrogen from air in glassmaking furnaces burning gas or oil, vacuum pressure swing adsorption technology has reduced furnace emissions of nitrogen oxides by 90 percent and particulates by 25 percent. Furnace energy requirements are reduced by 25 percent. Three companies, Praxair, Inc., (Tarrytown, N.Y.), Corning, Inc., (Corning, N.Y.), and Gallo Glass Company (Modesto, California) have commercialized this energy-efficient technology. **Approximately 15 percent of all glass made in the United States now employs this technology.**

Electrochemical Dezincing of Steel Scrap

Department of Energy scientists have developed an electrochemical method of removing the galvanized coatings from steel scrap that would allow 10 million tons of this valuable resource to be used in steelmaking furnaces. This process would increase production yields and quality as well as decrease environmental problems and cost. By the year 2000, electrochemical dezincing could **save 50 trillion British thermal units of energy**, reduce raw material costs by at least \$160 million per year, and reduce the need to import at least 75,000 tons per year of zinc, saving at least \$77 million annually.

High-Efficiency Weld Unit

Improving power supply efficiency is key to achieving significant energy savings in welding processes. Conventional arcwelding power supplies use a low-frequency transformer, which makes them power-inefficient and unwieldy in weight and size. The Department of Energy developed a more efficient power supply with the Cyclomatics Company. The new system uses solidstate electronics known as inverter technology to shut off power to essentially all of the power source components when a unit is idling. This reduces electrical energy consumption by up to 45 percent compared to conventional power supplies. Nationwide, these units have saved more than 13 trillion British thermal units of energy and can be credited with reducing emissions of carbon dioxide by 20,000 tons each year. **Annual savings are \$15 million.**

Direct Steelmaking

The Department of Energy supported post-combustion research in a Basic Oxygen Steelmaking Furnace, which led to the application of the technology in the electric arc furnace. The result is a savings of 40 to 50 kilowatthour per ton and a 6 to 7 percent increase in productivity. This work was performed by Union Carbide, now Praxair, under a subcontract from the American Iron and Steel Institute. Praxair is now marketing the technology worldwide. This technology can be applied in approximately 50 million tons of steelmaking annually, with an annual savings of \$30 million.

Superplastic Metal Formation Technology

The superplastic metal forming process developed through research sponsored by the Department of Energy allows the manufacture of metal components into shapes very near final dimension. This results in several advantages. It minimizes machining material waste, eliminates the use of environmentally