

it emit none of the smog-causing pollutants associated with conventional power plants, it is ideal as a distributed power source; that is, it can be sited close to the electricity user, for example, at electrical substations, or at shopping centers or apartment complexes, or in remote villages, minimizing the need for long-distance transmission lines.

The phosphoric acid fuel cell is the first technology to emerge from the joint public-private, cost-shared program. The U.S.-based firm ONSI Corporation, a subsidiary of International Fuel Cells Corporation, is now manufacturing a line of 200-kilowatt commercial, onsite cogeneration systems and has sold 120 units throughout the world, including 60 in the United States. Accumulated fleet operation is over one million hours at an average availability of 95 percent. One of the fuel cell power systems, operated by Southern California Gas at a Kaiser Permanente Hospital facility in Riverside CA, set a record for uninterrupted operation, generating electricity and heat continuously 24-hours-a-day for more than a year at more than 80 percent efficiency.

In the 1990s, the Federal-private R&D program will produce advanced generations of fuel cell technology: the molten carbonate and solid oxide technologies. Both are higher-efficiency, lower-cost systems that will firmly establish the United States as the global leader in fuel cell technology. The first full-scale, prototype molten carbonate fuel cell power plants are now operating. One is generating power in Santa Clara, CA, the other at the Miramar Naval Air Station in San Diego, CA. Both are proving that these new, ultra-clean energy systems can operate in one of the nation's most environmentally stringent regions.

By the early part of the 21st century, annual sales of fuel cell technology could exceed \$1 billion.

Because of the Federal investment in the 1980s and early 1990s, a truly revolutionary approach, the fuel cell, is today becoming available for commercial power generation.

Gasification Power Plants - Drawing Board Concepts Become Commercial-Scale Realities

For more than 20 years, utility engineers have envisioned power plants that would substitute coal gasifiers for the traditional boilers. Coal gasification produces hot, high-pressure gases that can be cleaned of virtually all of their pollutant-forming impurities, then used to fuel a gas turbine/steam turbine combined cycle, one of the most efficient ways to extract electric power from fossil fuels. In the 1990s, the drawing board visions became reality.