

Brdar: Fuel Cell Energy: Clean, Abundant

By R. Daniel Brdar
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At its heart, the ongoing Congressional debate over energy and electric power really centers on this simple question: How can we meet our power needs in ways that are economical, reliable and environmentally sound?

Because no one energy source can meet our power needs by itself, effective solutions must include a sensible combination of generation methods. Both traditional and newer, alternative methods — as well as conservation and efficiency — must figure into the mix, including stationary fuel cells.

Today, more than 66 percent of the world's electric power is generated from carbon-based fossil fuels, and this is forecast to continue for some time. While fuel cells are often thought of as a future power source for the automotive industry, stationary fuel cells are being deployed around the world today for distributed power generation. Fuel cells use an electrochemical reaction — not combustion — to convert a variety of fuels into electricity, useable heat energy and water cleanly, quietly and efficiently. Most importantly, fuel cells use a wide variety of fuels that are abundantly available in North America, including biogases and natural gas.

Fuel cells are highly efficient. Greater efficiency means less fuel is needed to produce the same amount of power, which extends the supply of our domestic resources, contributes to national energy independence, and results in significant energy cost savings and lower greenhouse gas emissions. Depending on their configuration, fuel cells operate at a net electrical efficiency of 47 percent to 60 percent, which compares favorably to the average U.S. central station power plant efficiency of only 33 percent. When fuel cells are used in Combined Heat and Power applications where the byproduct heat is used, system efficiencies can reach up to 80 percent.

Fuel cells operate 24/7 and are reliable. While wind and solar should be components of our overall energy solution, they typically generate power only 25 percent to 35 percent of the time. In contrast, fuel cells generate power around the clock, matching our energy needs and enhancing grid stability. Currently there are hundreds of fuel cell power plants operating around the world generating millions of kilowatt hours of electricity.

Fuel cells are ultra-clean. Fuel cells are an advanced, low-carbon, green technology that produce only a fraction of the greenhouse gas emissions of traditional methods of power generation. And because they do not burn fuels, they emit near-zero levels of nitrous oxides and particulates, unlike combustion-based technologies such as engines, turbines and coal-fired central generation power plants.

Fuel cells are economical. Fuel costs are the largest expense of operating any power plant, so highly efficient fuel cells reduce operating costs.

In addition, fuel cells are an ideal form of distributed generation. Distributed generation refers to producing electricity where it is needed most, rather than generating it at a central location and distributing it via the grid. By virtue of their compact design, quiet operation and combination of high efficiency and low emissions, fuel cells can be located anywhere electric power is needed. This avoids the health effects, cost and lengthy process of implementing large-scale central power generation and distribution infrastructure.

Other countries have recognized the importance and benefits of stationary fuel cells to achieving their clean energy goals. South Korea, for example, declared fuel cells one of the top drivers for their economy and is now deploying fuel cells widely.

Stationary fuel cells are made in the United States and are economical, reliable and environmentally sound. Fuel cells are a perfect fit for our power generation mix, and the deployment of fuel cells will mean thousands of high-quality American jobs.

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