

Viewpoint—The Pump or the Plug?



Environmental Competitiveness and R&D

Today more drivers than ever are asking “the pump or the plug?” As drivers, they want acceleration, reliability, range, and convenient charging—on the consumer’s bedrock expectations for cost, convenience, comfort, choice, and control. Many also look upstream from the pump or the plug to ask how electricity competes with gasoline or diesel in terms of environmental costs and benefits.

For the future of electricity, an important aspect of its economic competitiveness will be its environmental advantages. It may seem a paradox to some, but this potential advantage is rooted in a long progression of environmental regulations.

More than a quarter-century ago, Harvard Business School Professor Michael Porter envisioned this kind of competition when he coined the famous Porter Hypothesis.

Simply stated, this hypothesis proposes that well-designed environmental regulation can enhance market competitiveness. He replaced the paradigm of cost versus benefit with his hypothesis that the benefits of regulation could offset, at least in part, the costs, even accounting for near-term cuts to jobs or profits.

Innovation and more efficient production drive this offset.

The May–June *EPRI Journal* may shed some light on these two aspects of environmental competitiveness. The Porter Hypothesis acknowledges that environmental regulations can add costs. For example, this can be expected to result from the U.S. Environmental Protection Agency’s regulations requiring power plant operators to reduce and, in some cases, eliminate pollutants from wastewater streams. EPRI research will help these companies understand these complex rules and make decisions on major technology investments.

With new biological and membrane water treatment technologies emerging, the benefits of the regulations may eventually accrue to farmers who are competing for scarce water resources or to cities banking long term on breakthroughs in desalination. Water is a finite and dwindling resource in many areas, and much is riding on its conservation. Incremental costs today in addressing power plant wastewater discharges may be more than offset by much wider benefits to society.

Managing risk is fundamental to considering environmental competitiveness. Society has subjected nuclear power to continuous cost-benefit scrutiny since its beginnings, with a keen interest in costs or potential costs associated with its risks. The earthquake and tsunami at Fukushima Daiichi provide a dramatic recent example. *EPRI Journal* reports on advances in seismic research and assessing plant components' vulnerability to earthquake damage, as well as methods to prevent radioactive releases in the wake of extreme conditions such as those at Fukushima.

In recent years as scrutiny increased exponentially on carbon emissions, we saw a new approach emerge with respect to nuclear power's costs and benefits. Competition, if you will, emerged between electricity from carbon-emitting sources and electricity from sources with low or zero emissions. Environmentalists reconsidered nuclear power and in some cases moved from adversary to advocate as they factored risks and benefits related to reducing carbon emissions.

Environmental competitiveness also hinges on economic efficiency. At the 21st session of the Conference of Parties to the United Nations Framework Convention on Climate Change ("COP21"), EPRI joined with Duke University's Nicholas Institute for Environmental Policy Solutions and the International Emissions Trading Association to examine the value and challenges of market mechanisms. Other EPRI sessions at COP21 examined the potential for international emissions trading partnerships and the science for estimating aggregate global damages to society from climate change. EPRI research is examining how emissions trading could benefit participating countries by reducing the societal cost of achieving emissions reduction goals.

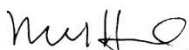
An EPRI effort with 29 electric utilities is looking at how their customers can achieve cost savings and enhanced productivity by replacing fossil-fueled technologies with electricity. It's the "pump or plug" question for a greater spectrum of technologies and needs. Utility customers are looking for improved efficiency, costs, and air quality among other benefits, and are focusing on recovering their investment costs in three years or less. We have identified approximately 460,000 gigawatt-hours of electrification opportunities for the participating utilities.

Lighting offers a familiar example of how environmental competitiveness can play out. The U.S. Congress passed a law in 2007 phasing out the manufacture of incandescent bulbs. Many consumers balked at the cost, color quality, and inconvenience associated with alternatives. Today at EPRI, we see a pace of innovation in lighting similar to the computer industry at its prime. Consumers are driving renewed competition, even as the broader environmental and efficiency goals are realized.

In general, I like the term "environmental competitiveness." Typically, we hear the word "environmental" paired with "compliance," which describes a fundamental aspect of doing business. Environmental competitiveness describes a different perspective—one of success through innovation and competition—to serve customers and benefit society.

The competition between pump and plug provides a symbol of this. It centers on many factors. How will the environmental competitiveness be defined for internal combustion engines and electric motors? The market's demands will ultimately drive this, but I believe that the environmental aspects of energy production, delivery, and use will be right up there next to the driver, "riding shotgun."

Mike Howard



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