Environmentally Beneficial Electrification: Electricity as the End-Use Option

The November 2015 edition of The Electricity Journal *features an article by Keith Dennis, senior principal for end-use solutions and standards at the National Rural Electric Cooperative Association (NRECA). A full version of the article, summarized below, can be found here via the EJ website, and audio slides are also available for your convenience.*

Almost a century after the first poles and wires brought electricity into American homes and businesses, energy and environmental experts are promoting "beneficial electrification" to help the country meet its environmental goals. Yet federal, state, and local policymakers are using outdated information and metrics to evaluate the environmental attributes of electricity, leading to policies that favor on-site combustion of fossil fuel over electricity use in homes and businesses across the Nation.

Recent research by Energy and Environmental Economics (E3) and Lawrence Berkeley National Laboratory (LBNL) indicates that the country cannot meet federal goals for reducing greenhouse gas emissions unless we increase our reliance on electricity and move away from the use of appliances that burn fossil fuels in the home. "Moving away from oil [diesel, propane] and natural gas and towards electricity is a key decarbonization strategy," asserts LBNL.

The electric industry is undergoing a major transformation that is dramatically altering the fuel mix that generates electricity and the system for distributing it. These changes have brought environmental benefits – most significantly, an industry-wide reduction in the emission of carbon dioxide. Put simply, efficiency improvements and the addition of renewable resources have made electricity a greener option.

Three trends in the electric industry have led many analysts and experts to reevaluate the environmental value of electric appliances that produce heat and hot water in buildings:

- A reduction in the intensity of greenhouse gas emissions from power plants over the long term
- Increased efficiency in the appliances themselves
- New technologies that convert electric appliances into a tool for integrating intermittent renewable energy resources into the bulk power grid

An updated systems approach that takes these industry and technology changes into account will be invaluable for regulators, lawmakers, and others as they craft energy policy to meet new environmental goals. Without these new metrics, policies could discourage the conversion of vehicles and appliances to electricity.

Ripe for re-evaluation is the Department of Energy's long-standing presumption about appliances that burn fossil fuels on-site, such as natural gas water heaters. The conventional wisdom is that they have less of an environmental impact than electric water heaters. This long-standing convention ignores several factors, including changes in how electricity is produced, more efficient electric distribution, and the potential of grid-connected water heaters to store thermal energy produced by wind and solar.

NRECA and others are urging the country's energy policy makers to rethink these biases, including how the "source" energy metric is calculated and used, in order to align energy policy with the environmental goals.

For more information or to join the NRECA energy efficiency interest group, please contact Keith Dennis at Keith.Dennis@nreca.coop.