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Base energy policy on negawatts, not megawatts

By Jim Shackelford

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The Morning Call reported last month on PPL's interest in a license for a third reactor at the Susquehanna Nuclear Power Plant. If this leads to an actual reactor around 2015, one result is highly likely. The reactor will produce mainly thermal pollution. Two-thirds of the energy input in giant U.S. power plants, whether nuclear or coal-fired, is immediately lost into the atmosphere and bodies of water as heat. Then, a significant portion of the electricity generated is also lost as thermal pollution over long runs of power lines. These gross inefficiencies help explain why orders for nuclear power plants stopped in 1976, three years before anyone heard of Three Mile Island.

Nuclear power has never been all that cheap. To get an idea of how much it costs, add together construction expenses, subsidies funded by taxes, and operating costs. Researchers don't rank it low in price compared to other power sources. So what's the fiscally responsible thing to do in a society where nine out of 10 units of energy result in waste heat? Use energy wisely. Cut the heck out of the waste. It's been said many times, many ways, but it hasn't taken deep root yet. If it had, compact fluorescent bulbs (CFLs) would be flying off store shelves, while incandescents gathered dust. We wouldn't see AC thermostats set at 72 or 65.

Utility companies and their customers need to consistently think in "negawatts," instead of megawatts. How does a utility "generate" negawatts? The best way could be to make sure every customer understands that negawatts are our premier power source. But there are many other possibilities. A power company could hold a big campaign to sell CFLs below cost, say for a $1. If a million customers buy five bulbs, the company loses a few million dollars, right? Nope. Everyone makes money.

If a customer replaces the five bulbs used most often, she makes maybe $30 on this deal in the first year, not counting the discount on the purchase. The back of my envelope says the utility mines 330 million kilowatt-hours of unused electricity annually from these five million bulbs, and gets this power (and CO2 reduction) quicker, cheaper, and cleaner than any other known method. This negawatt production, if applied regionally to everything from refrigerators to water heaters, saves the public billions of dollars in avoided power plant construction and electric usage, and can yield a better profit to utility shareholders if we regulate the industry correctly. Paul Rauber (Sierra, Jan-Feb 2007) finds that a dollar spent on energy efficiency saves seven times more carbon dioxide than a dollar spent on

nuclear power.

Princeton University is working to show the potential of energy efficiency. According to Information Week, the annual power bill for its plasma physics lab went from $105,000 in 2003 to $27,000 in 2006. Better computer chips played a key role. That's $78,000 per year in just one lab, because someone thought in negawatts instead of megawatts.

Princeton also provides an example of a better way to produce megawatts. Not long ago the university replaced its old coal-fired plant with one fueled by natural gas, which is a bit more expensive. Yet the change has yielded annual savings of about $3 million and sizeable cuts in CO2 output because they went to cogeneration -- getting both electricity and heat from the same fuel. Instead of the 33 percent efficiency of plants that produce only electricity, cogeneration comes in around 50 percent.

Trigen Corp. goes a step farther than cogeneration, providing electricity, heat, and cooling to clusters of buildings, such as downtown Tulsa. By using fuel for three purposes, efficiency is raised to the neighborhood of 75 percent. Wise firms and municipalities aren't just thinking in terms of solar and wind, but looking at trigeneration and microturbines, and producing power, heat and cooling as close as possible to the point of use.

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