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Smart Grid, Dumb Grid

By Richard Reis, PE, Smart Grid technology addresses many of the key challenges with electrical power generation, distribution, and consumption including:

- Mitigating environmental damage
- Controlling costs
- Improving reliability

Key attributes of smart grid technology are:

- Time of day and day of week pricing
- Smart meters to record and transmit detailed usage information including when power is used.
- Real time consumer feedback showing rate of usage
- Detailed information on incipient problems that could lead to outages
- Flexibility to deal with shifting loads
- The ability to reduce loads when the grid is straining under high loads
- Some electrical energy storage, such as advanced batteries or compressed air
- Capability to absorb power from on-site energy generation (such as solar power)
- Support for electric or plug-in hybrid vehicles by methods such as scheduling charging for off-peak hours

Peak power usage occurs during the hottest part of summer days just when there is the most sunlight. Power companies strain to provide adequate electricity during those times. As power lines become overstressed and overheated, electrical resistance increases leading to more heating and energy loss. Sometimes these heated lines stretch and sag touching trees and causing massive outages.

Smart Grid technology addresses this issue by lowering peak demand. Homeowners can receive a monthly rebate by volunteering to let power companies shut off their air conditioners during peak hours. Industrial power control devices provide similar features on a larger scale. For example, I am employing an electrical lighting controller at an auto repair facility that reduces electric lighting loads when daylight is strongest, times that coincide with peak usage hours.

People and businesses that employ solar photovoltaic power reduce their power needs when sunlight is strongest – again times of peak usage. As utilities charge for usage by time of day, they encourage users to employ energy storage that shift usage from peak hours to times of lowest usage, such as midnight to 5 AM. They may use thermal storage systems that employ less expensive off-peak electricity to freeze ice at night; as the ice thaws the following afternoon, it cools the building cold with minimal electrical power.

In addition, the Smart Grid holds the promise of substantial carbon reduction.¹ The Pacific Northwest Laboratory recently reported that Smart Grid technology could lead to carbon savings of 12 percent if the grid is fully implemented by 2030.

In contrast, let's call the older and antiquated way "Dumb Grid" technology. It seeks to build expensive and massive power lines to provide ample power, regardless of the energy source, costs, or environmental effects. The proposed PATH² and MAPP³ power lines in our region are excellent examples of this approach. These power lines would bring coal-fired power from dirty power plants close to the coal fields of West Virginia and Kentucky to east coast areas. This is sometimes referred to as coal by wire. This approach exacerbates air, water, and land pollution as well as global climate change.

To ensure that Maryland follows the Smart Grid path (not PATH), Delegates Roger Manno (District 19) and Sue Hecht (District 3A) introduced House Bill 522, which would require the Public Service Commission (PSC) to analyze and report on the state's long-term energy needs. In preparing the report – a blueprint for action, the Commission would have to solicit input from other state agencies, such as the Maryland Energy Administration and the Department of the Environment, as well consumers and environmental organizations. The plan would have to consider cost, reliability, and environmental laws and goals. Particularly because the PSC and utilities oppose this bill, you may wish to contact your delegates in support of this bill and your senator to support companion senate legislation.

¹ Sweet, B, "Smart Grid Promises Substantial Carbon Abatement", 2/14/10, <http://spectrum.ieee.org/energywise/energy/the-smarter-grid/smart-grid-promises-substantial-carbon-abatement>

² The Potomac-Appalachian Transmission Highline (PATH) is a joint venture of American Electric Power (AEP) and Allegheny Energy to build a new high-voltage interstate transmission line.

³ The Maryland, the Mid-Atlantic Power Pathway (MAPP) is a joint venture Potomac Electric Power Company (PEPCO), Delmarva Power and Light Company, and Baltimore Gas and Electric Company (BGE) to build a new high-voltage interstate transmission line.