In Sandy's Wake, Time to Upgrade the Power Grid

For starters, bury electrical-distribution networks underground.

By GEORGE PATAKI

Superstorm Sandy exposed perhaps the greatest flaw underpinning the American way of life: insecure and unreliable electrical infrastructure. Four weeks after the storm, thousands of people in New York and New Jersey remain without power.

How did this happen? Under normal conditions, the energy systems of these areas are a complex but reliable network of pipelines, power plants, poles and wires. Under the stress of a major storm, however, these systems have proven inadequate in responding and recovering.

To make our electrical grid more reliable, serious consideration has to be given to burying electrical-distribution networks underground. This costly but critical investment would eliminate the need for utility poles and overhead wires, drastically reducing the need for repairs caused by wind and tree damage. New York's Consolidated Edison ED +1.24% is considering burying power lines, but it won't be easy because utilities must earn government approval for rate increases before making most improvements. New Yorkers already pay some of the highest electricity rates in the country, so hardening the system while keeping rates down will require creativity.

Another priority should be to harden and modernize the transmission systems that carry high-voltage electricity from large power plants down to the local distribution level. Modernization includes increasing the use of high-voltage direct-current (DC) transmission lines, which are less prone to failure than the alternating-current (AC) systems used throughout the country. DC lines can be buried underground or underwater, as is the Cross Sound Cable between Connecticut and Long Island, helping to enhance their reliability. (Conventional high-voltage AC lines can be placed below ground, but doing so is very costly when long distances are involved.)

Damage to substations, poles, transformers and power lines causes most power outages during storms. Even so, improvements to other parts of the grid can protect us against disasters. One improvement would
be to expand the use of distributed power generation through fuel cells, microturbines, and the simultaneous "cogeneration" of both heat and power.

Such distributed power sources have very small installation footprints—fitting even on the roof of a building—and can provide secure power regardless of other outages on the electrical grid. During and after Sandy, cogeneration allowed pockets of New York City (such as the large Co-op City neighborhood) never to lose electricity or heat. Crucially, favorable amortization schedules and tax treatment, along with operational cost savings, can make these power sources attractive investments for building owners and other investors. They can even generate revenue by selling excess electricity back into the marketplace during times of peak demand, a practice known as demand response.

Finally, the way the Federal Emergency Management Agency works with electrical utilities after disasters needs reform. Under the current system, utilities receive federal emergency funding to replace damaged electrical components only if they replace them "in-kind" with the same technology. This means that all sorts of antiquated components are simply being replaced. This makes no sense. The federal government should promote modern technologies and best practices.

Officials at all levels of government should work to ensure that structures rebuilt after Sandy are more resilient and energy-efficient than their predecessors. They can do this by continuing to expand smart-grid technologies such as advanced meters, which communicate concise and instant information to repair teams in the event of an outage, instead of relying on customers to report general information via telephone.

Likewise, so-called self-healing transmission and electric-system technology can help the electrical grid react to system damage as it occurs by isolating outages. So instead of a blown transformer triggering a widespread power outage, the grid can automatically reroute electrical current to avoid the damaged area. Some parts of New York and New Jersey already use this technology, but it can be far more widely adopted.

No matter what, our utilities and governments will spend tens of billions of dollars repairing the damage caused last month. The question is whether Hurricane Sandy will be remembered as the moment America began embracing strategic infrastructure change, or as yet another wasted opportunity to move the country in the right direction.

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