TIM LARSEN, GOVERNOR'S OFFICE

New Jersey governor Chris Christie (left) and Energy secretary Ernest Moniz speak to reporters after signing an agreement for Sandia National Laboratories to design a microgrid for NJ Transit.

power between generation sites, facilities, and rail lines in Jersey City, Kearny, Secaucus, Hoboken, Harrison, and Newark. Railroad facilities and lines in those communities represent the most crucial and the most vulnerable corridor in the agency's rail system and, Moniz noted, are also a major emergency evacuation route for Manhattan.

"This first-of-its-kind electrical microgrid will supply highly reliable power during storms and help keep our public transportation systems running during times of natural disaster, which is critical not only to our economy but also emergency and evacuation-related activities," Christie said at the announcement. Moniz called the microgrid "a model for developing a 21st-century grid" that would potentially link more than 50 MW of existing distributed generation, such as solar and wind, in the area. In recovering from Sandy, he said, "We have to rebuild in a smart way, in a way that prepares the energy infrastructures not for the last storm but for the next storm, for the next possible major interruptions."

The project will make use of a quantitative risk-based assessment tool developed at Sandia to evaluate communities' regional energy needs and identify cost-effective solutions for an improved electric grid. Sandia-designed microgrids at military bases integrate distributed energy resources such as backup generators, local photovoltaic systems, small wind turbines, and energy storage into a local electrical distribution service area.

A key feature of a microgrid is the ability during a grid disturbance or outage to separate and isolate itself from the utility seamlessly with little or no disruption within the microgrid. Then, when the utility grid returns to normal, the microgrid automatically resynchronizes and reconnects itself in an equally seamless fashion.

In a 26 August speech at Columbia University, Moniz said extreme events like Sandy "are likely harbingers of things to come; scenes that will likely be repeated as carbon emissions from human activity threaten to alter the climate consistent with the longstanding expectations of the climate science community." **David Kramer**

news notes

Physics and astronomy rosters. The numbers of physics and astronomy degrees awarded in the US continue to climb. In the class of 2011–12, 6776 bachelor's degrees were awarded in physics, up 8% from the year before and 86% from a low in 1999; 1762 PhDs represented hikes of 4% from a year earlier and 62% over 2004.

The University of California, Berkeley, and the University of Washington each conferred 84 bachelor's degrees in physics; MIT was close behind with 83, and 10 other universities had physics bachelor's classes exceeding 50. At the PhD level MIT led the pack with 37 degrees.

Some 385 astronomy bachelor's degrees were awarded in 2011–12, double the number from a decade earlier. With 28 bachelor's degrees, the University of Colorado, Boulder, had the largest class. Astronomy PhDs have been steady at about 150 nationwide for the past five years. With 11, Johns Hopkins University was the only institution to reach double digits.

Two reports by the Statistical Research Center at the American Institute of Physics break down enrollment and degree data in physics and astronomy by state (see http://www.aip.org/statistics/catalog.html). TF ■