By Paul Davidson, USA TODAY

Buzz grows for modernizing energy grid

Alternative energy is taking it on the chin this recession, with solar and wind developers canceling projects and laying off workers. But a far more obscure slice of the energy sector is hotter than ever: the electricity grid.

How hot?

President Obama has made modernizing the nation's vast power network a key piece of his $819 billion economic stimulus plan, passed by the House Wednesday. Last weekend he called for the installation of 3,000 miles of transmission lines to carry renewable energy to population centers and 40 million smart electric meters in homes. The House bill sets aside $11 billion to help finance the investments.

Obama's endorsement of a sweeping upgrade to the century-old grid is jolting an industry already on a roll. Top power companies and lawmakers lately have called for an up to $1 trillion nationwide backbone electric grid.

Meantime, utilities and venture-capital firms are bucking the credit crisis and pouring billions of dollars into the "smart grid."

What's that? Simply put, the electric grid is finally following telecommunications, TVs and music into the digital age. Consumers with smart digital meters can better manage their electricity consumption and reduce their monthly bills. And utilities can more nimbly control the electricity that flows over their wires to prevent outages such as the 2003 Northeast blackout.

"It's like the Internet for the energy economy," says Katherine Hamilton, head of the GridWise Alliance.

Controversy

The proposal for a nationwide backbone grid is more controversial. Big wind and solar farms are planned for remote reaches such as the blustery Plains states and Arizona desert. But there aren't enough high-voltage lines to zap the power to coastal or Midwest urban centers. That's a problem: Many states impose renewable energy mandates.

Ed Kamiab of Southern California Edison makes sure components of the smart grid in San Bernardino County are running smoothly.

Some states, meanwhile, don't want their residents to pay for lines they believe will spoil their rustic byways while largely benefiting neighboring states.

A 2005 law gave the feds new authority to designate special corridors for high-voltage lines and overrule states. But the process is cumbersome, and federal authority is murky.

Utility giants American Electric Power (AEP) and FPL Energy, the American Wind Energy Association and ITC Transmission are among those saying the U.S. government should have sweeping powers to approve high-voltage lines, especially if they're transporting renewable energy. While states would have input — deciding, for instance, which route a line takes — the Federal Energy Regulatory Commission would have the final say and could allocate the cost burden among customers in various states.

"It's key to taking advantage of big swaths of renewable resources," says Susan Tomasky, AEP's transmission chief. Sen. Jeff Bingaman, D-N.M., chairman of the Senate Energy Committee, says he plans to include the provision in an energy bill soon, adding the government "needs to play a larger role."

Although many states oppose the idea, a consensus is building for some type of expedited approval, says Reid Detchon, head of the Energy Future Coalition.

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Meanwhile, a smart-grid rollout is already in high gear. Even in last year's dismal second half, venture-capital firms pumped $183 million into smart-grid start-ups, as much as the previous four years combined, says Dow Jones VentureSource. That pace is likely to continue despite a recession that's slowing clean energy funding, says Greentech Media analyst Eric Wesoff. "2009 and 2010 are going to be the years of … the smart grid," he says.

About 70 utilities are proposing rollouts of smart grids costing $64 billion through 2016, says consulting firm KEMA.

Why?

While a solar-panel factory costs about $300 million, a venture capitalist can take a big stake in a smart-grid technology company for only $50 million. And capital expenses are more than recouped through cuts in electric bills, avoiding new power plants — key as utilities face greenhouse gas limits — and operational savings such as fewer truck dispatches, says Brattle Group consultant Ahmad Faruqui.

In turn, skeptical regulators are slowly warming to the idea of tacking charges on customer bills to fund the initiatives, says Fred Butler, head of the National Association of Regulatory Utility Commissioners.

Another driver: Utilities are starting to install gear that relies on common standards, such as those used on the Internet, instead of proprietary technology. That's opening the market to more suppliers, says Adam Grosser of Foundation Capital, a smart-grid investor. Start-ups such as GridPoint and SmartSynch are developing software and sensors to run the grids.

Some benefits:

• **Smart meters**. Today, most consumers pay the same price for electricity, day or night. Digital meters let utilities offer variable prices to reflect wholesale power costs, like cellphone plans. Rates are typically highest at midday, when electricity usage peaks, and lowest in the wee hours.

Smart meters already are in 5% of U.S. homes and businesses, up from 1% two years ago, though many don't offer variable pricing yet. The devices will be linked to 40% of homes in five years, a recent FERC report says.

Consumers that choose time-of-use pricing are prodded to cut air conditioning use on hot days when the grid is stressed and shift, say, their laundry to later in the evening. Utilities avoid building plants needed only at peak hours. Customers on variable pricing in southern Illinois save about 10% on their bills, says program coordinator CNT Energy.

Companies such as GE are developing appliances that run at low levels when prices are high or turn on only after prices drop. Trilliant's software will even let consumers program their home networks from their iPhones.

• **Plug-in electric vehicles**. Car manufacturers plan to roll out large numbers of plug-in hybrid electric vehicles in a few years. But if they all charge their batteries during the day, the grid couldn't handle the load. So cars typically will be programmed to recharge at night, when the grid is sparsely used and wind turbines are spinning furiously.

By the same token, hybrids could become mini-generating plants at midday. They could be plugged into office garage outlets, primed to feed power to the grid when prices surge, says Elliot Mainzer of Bonneville Power Administration.

• **Utility benefits**. Smart meters let utilities read meters and turn power on or off remotely, avoiding technician visits. Xcel Energy is putting smart-grid technology to work across its network in Boulder, Colo. Sensors remotely alert technicians when a transformer or other equipment has failed — or even when it's about to fail — preventing outages and doing away with costly detective work. Substations, newly computerized, can talk to each other so overloaded circuits hand off electricity to underused ones. That can sidestep blackouts and the need to build generators.

Southern California Edison has new relays that isolate outages. Also, if voltage drops, capacitors automatically inject more to stabilize the grid or other generators kick in.

That's critical if wind turbines suddenly shut down as gusts taper off. And if there's too much wind or solar power, smart batteries can store it for later use.