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AT&T executive director answers detractors of cell networks for grid

What is the best way to link smart meters with a utility's NOC? Though most meter-makers, AMI firms and utilities use private networks to link smart meters with each other and the NOC, some instead use the vast networks owned and run by commercial cellular carriers. Each camp may occasionally use both networks but the question of which is preferable, where, and under what circumstances, "is a huge conversation point, a raging debate right now," AT&T executive director Andrew Hebert told us recently.

We spoke to Hebert in an attempt to help readers understand the increasingly large number of communications technologies -- including, most recently, Wi-Fi (SGT, [Mar-22](#)) and WiMax (SGT, [2009-Apr-07](#)) -- now being pressed into AMI service.

Hebert recently set out some common misconceptions about cellular networks, that he labeled "myths," and then offered AT&T's refutations.

Two basic models describe how smart meters communicate with the NOC, Hebert said. By far the most popular is

the mesh or aggregation model. Meters are linked over a private 700 MHz or 900 MHz RF network and the data from many meters -- from several hundred meters to a few thousand -- is transmitted via RF to a collection point. From that connection point, some communications technology -- fiber-optic cable, RF or the cellular network -- carries the data to and from the NOC. The other model, called point-to-point, uses one technology to link the meters directly with the NOC.

A third alternative, sending data over

the power lines (known as power line carrier or PLC), is rare. A fourth, using WiMax or Wi-Fi for the entire network, is also a possibility, though still unusual. Combinations of those technologies, or yet others, are undoubtedly also in use. And many installations use some point-to-point technology to connect the 15-30% of meters that mesh cannot reach, a process known as gap-filling or in-filling.

SmartSynch, of Jackson, Miss, is the firm best known for point-to-point

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Meet Alex Huang, director of NCSU's comprehensive smart grid test bed

The FREEDM Systems Center at North Carolina State University (NCSU) will in June open a physical smart grid test bed, Alex Huang, who directs the center and teaches at NCSU, told us last week. Before the center opens its 15,000-volt distribution system, it will hold its annual conference May 18-20 at Florida State University Tallahassee. The conference has two main functions, Huang said.

First, researchers, faculty and students will present about 100 papers. And second, the National Science Foundation will "have representatives and reviewers come and review us, looking at not only those technical papers but also presentations from the

center's technical and education leaders on our overall progress."

FREEDM stands for Future Renewable Electric Energy Delivery and Management. The National Science Foundation (NSF) about 20 months ago helped NCSU set up an engineering research center for the creation of a "green energy grid" -- committing to invest \$18.5 million in the center over five years. The center also expects to pull in about \$10 million over five years in institutional support and industry membership fees.

The North Carolina center is the only NSF effort exploring the power industry in general and the smart grid in particular, said Huang, noting

that the center is conducting research to transform the US power grid into an efficient network that integrates renewables and novel storage methods.

Arizona State University, Florida A&M University, Florida State University and Missouri University of Science & Technology are center partners and Rheinisch-Westfälische Technische Hochschule Aachen University in Germany and the Swiss Federal Institute of Technology are contributing added expertise and international perspectives.

Smart grid industry partners include ABB and Cisco.

Green Energy Corp (GEC) and open-source goliath Red Hat are set to work together to market strategic projects such as those coming out of the FREEDM Systems Center (SGT, [Feb-10](#)).

Red Hat is likely to be part of a working group brewing in the center Huang leads, he added.

In addition to the "real smart grid" the center is constructing, it is experimenting

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with new technology, equipment and software -- plenty of fodder for a technical conference, Huang said.

Since the center's charter includes entrepreneurship, it is even looking at how policies can be "small-business friendly," he added.

The center offers to degree and non-degree students a Renewable Electric Energy Systems Certificate Program plus a Graduate Certificate in Renewable Electric Energy Systems. Students seeking the latter can develop an expertise in advanced electric power grid technology. Students seeking a bachelor's degree in electrical engineering at NCSU can also specify a concentration in Renewable Electric Energy Systems -- a concentration that includes study of the smart grid.

Altogether, the center plans to collaborate with universities, industry and national laboratories in 28 states and nine countries -- including China, Japan and Korea -- to develop technology to revolutionize the US power grid and speed the adoption of renewable electric-energy technologies.

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Spitzer helps define 'renaissance' in modern power industry

FERC Commissioner Marc Spitzer found the concept of NEM's 13th annual conference, "A Renaissance in Energy Markets," fascinating, he told the gathering yesterday.

Much of the rebirth in energy markets will be coupled with the rollout of the smart grid that will fundamentally change the way consumers interact with markets. In markets, people express their desires and giving them more information will let them make more choices.

"The old Soviet-style, East German, vertically integrated monopoly was utterly ill-suited to listen to the markets," said Spitzer.

Pitfalls abound with moving from a system that has seen relatively static prices for decades to ones that can shift dramatically depending the time of day or year. Early flare-ups of consumer discontent over smart meters and dynamic pricing in California and Texas

highlight the need for ample education, he added.

Customers will have to respond to the signals markets send through the meters to tap into the huge potential economic and environmental benefits, said Spitzer.

Realizing the vision many have of the evolving electric markets will necessitate the industry standing up and advocating for itself, he added.

He listed hot topics challenging the industry including compensation for DR, a subject FERC is spending lots of time on and recently released an NPRM on, he reminded. FERC supports more DR in the marketplace but how much it should get paid is a tricky issue.

The NPRM offered full locational marginal pricing all the time as a straw-man but Spitzer noted he was mindful that different RTOs had very different positions on the subject.

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New meter reads itself, delivers electronic bill to customer

Much of the conversation at the closing technical workshop at NEMs "Renaissance in Energy Markets" conference yesterday was about security -- an issue surrounding smart grid implementation, but also being raised was a new type of metering that would be good for both the smart grid and marketers.

"Something no one really talks about is subscriber-side billing," said Robert Block, a partner at Sunrgi and the man who helped create the new meter. "Everything is secure inside the meter and a microprocessor can calculate the bill -- and you can download directly from the meter to a display such as a television or other monitor or to the internet," Block told us yesterday. "Electronic billing is very efficient and the customer could get used to an electronic bill."

The customer could then send the information to the local utility,

potentially cutting the incumbent utility's costs of doing business.

In essence, the meter reads itself and would bypass many of the security issues raised by stakeholders.

The device could help marketers as the consumer would have ready access to their own use information thus helping them shop the market. "We would love to see that type of meter on the market," NEM President Craig Goodman told us yesterday. "Unfortunately, it's not something the utilities would let happen because they consider all of that information proprietary."

The meter also could be upgraded remotely, something else Block believes is important to having a smart grid that could withstand the test of time -- and innovation. "It would be enormously beneficial to the independent marketers It's practical and possible today," added Block.

[\[Comments\]](#)

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networks using cellular networks. Though a non-exclusive arrangement with AT&T, it has a 10,000-meter trial under way, it said in September, with Texas-New Mexico Power (SGT, [Sep-17](#)).

It announced in February a 16,000-meter contract with municipal Griffin (Ga) Power (SGT, [Feb-12](#)).

Other firms making some use of the cellular networks include Cooper Power, Itron and Ambient. Ambient is working with Duke Energy using Verizon's network (SGT, [Jan-14](#)). Sprint is also active in the AMI market.

So why do not more utilities and vendors consider a bigger role for the cellular networks? Hebert lined up the concerns:

- "It's the same as using the internet -- too little security," the knock goes. But the cellular networks take great pains to create a connection that does not touch the internet or expose data to the internet's inherent risks, Hebert noted. Those essentially private connections are generally routed directly from the carrier's switching

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centers directly to the utility's data center.

• "Private networks are more secure," some say. Consider, Hebert responded, the \$8-9 billion/year AT&T alone spends on its wireless network. The cellular networks have entire staffs devoted to nothing but security. A private network would naturally have a far smaller amount to spend on ensuring security.

• "Private networks cost less," their proponents have argued. "We've done a lot of work on that front," Hebert told us. "We've started talking to our very largest utility customers about a utility-specific price plan we think will help them make a decision in favor of using the public network." If a utility already has a significant investment in spectrum or fiber, a private network might cost it less, he acknowledged.

At a SmartSynch user conference this week in Atlanta, one slide showed the cost of a private AMI network over 10 years as \$110 million, versus \$54 million for use of a commercial cellular network, AT&T said.

Energy marketers hear how third parties could tap profits in smart grid

The smart grid holds a lot of promise for the power industry in general and energy marketers, but it is not without its pitfalls, NEM President Craig Goodman said in opening a panel on the subject at the group's 13th annual membership meeting yesterday. NEM is a national trade association for energy marketers.

The average consumer does not have any idea what dynamic pricing is and it would be disastrous for the first education to be when they open up a bill, noted Goodman.

Michigan PSC Chairman and Co-Chair of the FERC-NARUC Smart Grid Collaborative Orjiakor Isiogu sees the smart grid as a potential game changer, he reported.

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• "Voluminous meter data will overwhelm the cellular network," some have said. In fact, meter data is often less than 1 mb/device/month, with some devices sending and receiving fewer than 100 kb/month, Hebert responded. Wireless data networks are well suited to transmitting such packet data.

"What I worry about is the long-term capabilities of mesh," he added. "We'll see how well it stands up to the demand for future capabilities -- and history shows

that demand always grows. Just consider the cell phone: first voice, then emails, now broadband. The competitive nature of things is to have more services forced into that pipe."

Cellular networks boast speeds now up to 7.2 mbps with 50 mbps in the offing, versus speeds as low as single-digit kbps for mesh networks when they start making multiple hops across the mesh network, said Hebert.

[\[Comments\]](#)

One of the major issues for energy marketers is making data more accessible to third parties, other than utilities and customers, so they can develop tools to tap its potential.

He believes that idea has lots of promise but comes with problems from privacy advocates who do not want to see too much personal information brought to daylight. Any release of information to third parties will have to be handled with strong regulation.

Wal-Mart does not see its use of power as a privacy concern. It regularly hands out such data to energy marketers so they can come up with supply offers, said its Director of Markets & Compliance Chris Hendrix. The only privacy issue it has is

others learning the price it pays for power.

The retail giant believes smart meters can let it take part in ancillary services markets that historically were the preserve of generators but lately have seen some storage participation.

Ancillary services could be offered from fuel cells at Wal-Mart stores or it could even be done by the firm's heating, ventilation and air conditioning systems.

A University of Maryland student recently came up with software to let Wal-Mart's HVAC system take part in ancillary services markets -- but that runs into the problem that in PJM, an entity can't provide both DR and ancillary services, said Hendrix.

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Cisco bolsters smart

grid top brass: Paul De Martini has become chief technology officer of Cisco's smart grid team, said a [Cisco blog post Monday](#). De Martini most recently was VP of advanced technology at Southern California Edison, leading that utility's smart grid strategy, policy and technology development, the post said. Last month, Cisco named Jeff Taft as its global smart grid architect. Taft most recently worked at Accenture.

Sacramento State

wins smart grid funds: California State University at Sacramento will get \$2 million/year from the California Energy Commission for research into Sacramento's smart grid system, said [an article the university's newspaper](#). The term of the funding was not yet determined, Emir Macari, dean of the college of engineering and computer science, told the "State Hornet" newspaper. The school, also called Sacramento State, was picked for funding because it is the only California university

offering power engineering as a discipline and a master's program, the "Hornet" quoted Macari as saying. It also houses the only smart grid center in California, the paper said. Those funds, agreed on April 21, are added to \$905,348 in ARRA funding the school was awarded to develop a training program for Sacramento's smart grid project (SGT, [Apr-09](#)).

Belkin buys energy

start-up Zensi: Networking gear maker Belkin International, of Playa Vista, Calif, last week completed its purchase of Zensi, a Los Angeles start-up, it told the press. The deal "indicates a greater commitment in energy management," Belkin said in a prepared statement. Belkin offers the Conserve group of products, designed to conserve energy in homes and offices. Zensi's product portfolio includes exclusive licenses to patent-pending technology developed at the School of Interactive Computing at the Georgia Institute of Technology and at the computer science and engineering and

electrical engineering departments of the University of Washington. Inventors and professors Shwetak Patel (University of Washington), Matthew Reynolds (Duke University), Gregory Abowd (Georgia Tech), and PhD candidate Erich Stuntebeck (Georgia Tech) are Zensi co-founders. Patel and Reynolds will contribute their expertise as consultants to Belkin. Zensi co-founder and CEO Kevin Ashton will join Belkin as general manager of the new Conserve business unit, Belkin said.

Belgian utility uses

Elster gear in Flanders: Eandis, a Belgian power and natural gas firm, is using Elster's EnergyAxis AMI products in a pilot there, it told the press yesterday. Eandis is installing 4,200 Elster smart power and gas meters plus Elster's Energy ICT-brand data concentrators and its EISserver meter data-management software, in the towns of Leest and Hombeek, in Flanders. The pilot also includes Elster's PLC and Coronis radio technologies, it said.

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