

Monday, November 22, 2010

Amperion takes substation communications innovation to Caribbean

Amperion has begun work on a multi-phase substation BPL feeder metering communications pilot project for Jamaica Public Service (JPS) and recently agreed to the use of its high-voltage broadband over power lines (HVBPL) technology in a trial by the Puerto Rico Electric Power Authority (PREPA), Amperion CEO Nachum Sadan told us last week. He met with us in Buenos Aires, Argentina, where he was visiting family.

In the two new customer engagements, Lawrence, Mass.-based Amperion continues to focus on the substation as a data management hub. But, Sadan acknowledged, the Caribbean moves could represent more than incremental gains for his firm and the smart grid industry.

In the multi-phase project in Jamaica, Amperion will deliver power line network communications that will connect feeder meter reading equipment inside Jamaica's

substations. The first phase, which was recently completed, was a pilot and included four substations; the second phase will include the majority of the substations that cover the island nation.

JPS is installing meters at different points along the power flow from generation to consumption in order to gain better visibility and control of energy loss along the path. The utility installed meters on high voltage feeders inside the substations as part of the first phase of the project.

The BPL communication equipment Amperion provided uses the same AC power line that feeds the meters inside substations. "There's a low-voltage network (110 volts) going to the meters on poles. The meters were just installed, and they were not networked. We put an Amperion gateway right underneath the meter. We connect to the serial port of the meter and do a serial to Ethernet conversion -- inside the box. We take the Ethernet IP packets and send them over the power line, back to the control room inside the substation," Sadan said. "Now they can tell what's coming in and what's going out."

What's more, Amperion next year plans to work with JPS to start putting devices on every transformer pole. JPS has 60 substations and about 36,000 distribution style transformers. "Now we're pushing the smart grid perimeter out all the way to the transformer" he said.

In places like Jamaica, where energy theft may account for more than 10% of a utility's annual budget, it does not make sense to install smart meters at homes and businesses "because they're going to be compromised," Sadan added. "The last device, the edge device, if you will, that the utility can control is the transformer. It's on the medium voltage line, so people risk their lives if they climb the pole and try to tamper with it."

"Amperion's expertise in communications for the grid combined with a reasonable price structure led us to select them for this project," Clive Wright, JPS' general manager for electronic & communication systems department, said in prepared remarks issued today.

Energy theft is just one application of "intelligence at the edge," Sadan told

Central Maine Power surprised by resistance to new meters

The consumer backlash against smart meters has spread to a small portion of the East Coast of the US from California and Texas. At least three Maine towns have sought moratoriums on smart meter installations by Central Maine Power (CMP), and one town won a brief halt. Some are worried about health impacts related to RF from smart meters. CMP has set up town meetings, solicited expert opinions and responded to a complaint filed with Maine's PUC.

"This is not an issue we anticipated," John Carroll, a CMP spokesperson, told us Friday. "The wireless-communications technology we're using is so common, and people are exposed to RF from so many sources every day. Our concern is that this worry is shifting public attention away from the very real consumer benefits AMI has to offer."

The town of Sanford, Maine, on Tuesday passed a resolution asking CMP to halt smart meter installations for 90 days and to let the town's 23,000 residents express their thoughts about the meters before any are installed there.

"If they want us to go talk with them, we'll go, but we're not committing to the moratorium," Carroll said Friday.

CMP did pause in its smart grid roll-out for the town of Scarborough, he noted. That town, in an Oct 20 resolution, urged CMP to forego installing any smart meters or wireless-

communications equipment for at least 90 days until the utility held a meeting addressing concerns among the town's 20,000 residents about adverse effects from RF and microwave radiation. The town also urged that CMP let Scarborough residents opt to avoid smart meters.

The meeting is scheduled for Nov 29, and a halt until then -- though not for the requested 90 days -- was granted because "at the time, it was the first request we'd gotten, and there were no proceedings yet at the PUC, so we wanted to be respectful," Carroll said. "Now there are proceedings under way, so more information is available" and there is less need for a halt elsewhere, he said.

Opt-out requests by individuals or towns are "not something we can or are willing to do unilaterally," Carroll said. "We have a commitment to DOE under a grant and to the PUC to develop and deliver an efficient smart grid system, so we're not prepared to give opt-outs in unknown numbers. We look to the PUC for guidance as to whether opt-outs are appropriate."

Opt-outs could cripple the Trilliant RF-mesh communications technology CMP is using, making it difficult for meters from Landis & Gyr and other firms to communicate with each other and the home office, Carroll said.

In addition to Sanford and Scarborough, the 9,000-person town

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us, rattling off a number of DG options that will require the balancing of supply and demand in real time to maintain grid stability. And, he noted, green energy mandates in several US states portend a quick shift away from hierarchical grids.

US stimulus funds were focused on creating jobs and mostly supported already-tested technology like smart meters. Amperion's move in Jamaica, on the other hand, fits into the industry's envelope-pushing discussion of "demand dispatch" -- when load calls for generation.

"It's time to focus on the T&D infrastructure" so the system becomes intelligent enough to know when more power is needed, where to get it, how much green or standard generation needs to be mixed together and then to engage and disengage resources, Sadan said. "That's a very complicated system. It doesn't exist today. But the utilities have to evolve to such a paradigm [in part because] the current system will not meet the needs of the future."

HVBPL piloted

In Puerto Rico, PREPA is using patented technology developed by Amperion and cross licensed with International Broadband Electric Communications (IBEC) to provide broadband communications between two substations on the island.

Amperion and IBEC joined forces 18 months ago (SGT, [2009-Apr-16](#)), and PREPA's is the first project to grow out of their partnership. It took Amperion four years to take HVBPL to commercial deployment from an R&D concept, Sadan noted.

"PREPA's trial project will demonstrate HVBPL's ability to communicate to substations without an existing telecommunication service," IBEC CEO Scott Lee said in prepared remarks issued today. "After successfully establishing BPL networks on low and medium voltage systems, HVBPL was a natural leap forward."

Lee and Sadan took advantage of the Rural Smart Grid Summit last month in Puerto Rico to coordinate details of the pilot. At the same summit, Lee spoke with us about IBEC's newly formed smart grid apps division (SGT, [Oct-27](#)).

The trial is underway and is scheduled to end in the first quarter of next year. Amperion demonstrated the benefits of HVBPL in recent field tests with American Electric Power (AEP), Sadan added. After initial testing on a 0.8-mile, 46 KV circuit spanning the Kanawha River in Charleston, WVA, trials moved to a 5.1-mile, 69 KV circuit

Central Maine Power surprised by resistance to new meters

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of Cape Elizabeth, Maine, on Nov 8 formally asked CMP and the PUC for a moratorium and permission to let residents opt out.

"What happens now is up to the utility and the PUC," Town Clerk Debra Lane told us Friday.

Meanwhile, CMP is building a medical case supporting smart meters. The utility early last week responded to a formal complaint its smart meters pose an RF health hazard, filing several documents including lengthy reports by four researchers. In its 66-page response to an Oct 25 complaint filed by Scarborough resident Elisa Boxer-Cook (SGT, [Nov-17](#)), the utility concluded that

the complaint "does not offer any sound basis for stopping the implementation of AMI, and should therefore be dismissed as without merit."

To support that assertion, Central Maine Power offered testimony from occupational and environmental medicine physician James Kornberg and from three other researchers whose conclusion matched that of the utility.

The PUC is analyzing the utility's response, Evelyn deFrees, a PUC spokesperson, told us Thursday. When it has finished its analysis -- probably after Thanksgiving -- it could seek more information, open judicial proceedings or dismiss the complaint, she said.

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between AEP's Heath, Granville and West Granville stations in central Ohio (SGT, [2009-Apr-24](#)).

Topographical challenges in Puerto Rico leave PREPA unable to reach 30% of its substations with fiber, so the power generation, T&D utility will modernize these substations using HVBPL -- "in a very cost-effective way," Sadan said, noting that the communications network relies on existing high-voltage transmission lines. The network can backhaul aggregated data from the grid's feeders and from inside the substation, enabling applications like line protection, SCADA expansion, video surveillance and substation automation.

Utilities are bound to end up with two or more networks -- one of which can be public and consumer-centric and one of which will be private utility-centric, Sadan said. The public network can handle AMI but it cannot manage the more stringent requirements utilities face -- response times, availability and redundancy -- for mission-critical protection and control applications, he added.

Use what you have

"So, what's the best way to build this private network?" Sadan asked rhetorically. "Leverage existing assets, such as the lines and the substations" that grid modernization is already demanding be upgraded.

Amperion has at the ready the Phoenix, "a substation-class gateway" that contains not only HVBPL but also fiber ports.

"The argument I'm making is the vendor community needs to provide a

migration path to the utility, because this is going to take 10-20 years," he said, noting that utilities' fear of stranded assets is easy to understand.

The Phoenix allows a utility to "start using its own lines for PLC, and when it is ready to upgrade to fiber, it has a migration path to move forward," said Sadan.

Fiber is Amperion's main competitor, he said, noting that Amperion holds the intellectual property rights to HVBPL.

Could Amperion, which employs 10 people, soon be an acquisition target?

"I'd think so," Sadan said. "We have a unique, patented technology. HVBPL has the potential to enable sales of the new digital relays and RTU's [such as from GE and Schweitzer Engineering Laboratories] in places where there is no fiber because we use existing power lines. That opens up a whole new market, with not just utilities but also with industrial customers, such as chemical plants and refineries."

Stands in for fiber

Protection schemes like GE's new current differential require the new digital relays and a reliable communication channel. "Only two communication methods today can support these requirements: fiber and HVBPL," he said. "Since 91% of the substations in the US are not connected by fiber, I'm proposing a solution that's available today and is easy and quick to install."

Amperion estimates it would cost about \$36 billion to deploy fiber everywhere in the US. HVBPL would only lead to 70% coverage, but "with the

existing power lines, there is zero cost for the communications lines,” he reminded.

The challenged US economy might well mean widespread fiber deployment is decades away. Yet the giant losses the national economy experiences due to things like outages and faulty equipment (SGT, [May-28](#)) cry out for quick action.

HVBPL “is a very cost-effective solution that is available today,” Sadan said, noting that Amperion and AEP have lined up a number of projects to commercialize HVBPL starting next year.

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Green energy center at Stanford funding smart grid research

The TomKat Center for Sustainable Energy at Stanford is awarding \$1.2 million to university researchers to work on smart grid systems, the center told the press last week. Grant recipients include Sanjay Lall, associate professor of electrical engineering and of aeronautics and astronautics, and Dimitry Gorinevsky, consulting professor of electrical engineering. The two are conducting an analysis of smart grid systems that includes a look at the impact of EV charging systems and future renewable generation.

Electrical engineers Abbas El Gamal, Stephen Boyd, Ben Van Roy, Amit Narayan and Daniel O’Neill are doing R&D on GridSpice, a software simulation system for modeling and analyzing a smart grid. Frank Wolak and Mark Thurber are teaming with Boyd to investigate how to get renewable energy to the wholesale market by reducing regulatory barriers. Ram Rajagopal will examine how to create cost-effective use of intermittent wind energy by improving power operations.

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1 story in 30 seconds

SGIP reviews interop

standards in webinar: A free webinar the SGIP publicized Friday reviews the five standards NIST last month sent to FERC for approval. The webinar is narrated by Erich Gunther, SGIP administrator, and can be viewed at any time. It was aimed at non-technical viewers and kept as simple as possible, given the inherently technical nature of standards, Gunther said in video narration accompanying the presentation. It started by defining the all-important word “interoperability.”

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support@smartgridtoday.com

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