

**News**

## **CONXX Builds a Network for Cambria County**

**This is how government should build networks. The Cambria Connected network provides bandwidth for emergency responders, government, and schools, and allocates the remainder to ISPs.**

**by Alex Goldman**  
ISP-Planet Managing Editor  
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We first wrote about Cumberland, Md.-based public network builder [CONXX](#) in 2005, when we described the company's network architecture as [The ATM WISP](#). CONXX's public networks are built to telco standards, the company says, with high redundancy. In addition, by using ATM instead of Ethernet, the company reduces network overhead and increases real throughput.

Yesterday, the company announced the completion of a network outside its home base. The new network, in [Cambria county, Pennsylvania](#), is called [Cambria Connected](#). It gives the county government, first responders, and schools broadband connections. That includes a 35 Mbps connection for each school. It also includes 900 MHz mobile service to emergency responders.

And what about the ISPs, you're thinking. Every ISP uses a sort of massive VPN, a logical network on top of the physical network of Cambria Connected, explains Brent Mortensen, CONXX president. But there must be a limit to how many virtual networks it can accommodate? Yes, but the limit is about 2,000, explains Mortensen, and so far there are three ISPs on Cambria Connected (we interviewed two of them, see related articles at the end of this article).

The network consists of 17 towers, with four OC-3s at each tower (microwave backhaul). The network structure is a pair of SONET rings in a figure eight configuration, says Mortensen. The last mile is Wi-Fi (Ethernet) at 5.8 GHz, using Alvarion's [Breezeaccess VL](#) equipment.

### **The money**

It's a better network than most cities have built, and better means more expensive, so how did rural Cambria county find more cash to spend than, say, the city of Philadelphia? Paul Henriod, CONXX chairman of the board, explains.

"In the rural counties in America, financing is everything. Coming up with the fund to ensure that you're able to do public safety is key. Johnstown [the biggest town in Cambria county] was no exception. There were clear needs for infrastructure but finding cash and grants was difficult."

"We presented a business model whereby they examined circuits unrelated to their public safety costs, such as T-1s for schools and other circuits that the county was paying for. These circuits can be readily replaced with wireless circuits on the Cambria Connected network. A substantial portion of the costs can be paid for by taking out a loan and paying it back over a number of years. The savings from replacing circuits, plus additional sales, pay for the cost of building the network."

Of course, a public safety network alone is both valuable and expensive. "Building only a public safety network would have cost several million dollars," says Henriod.

So is there an anchor tenant? "The first anchor tenant is the county itself. Then there are the cities, such as [Johnstown](#). The school districts are numerous. Pennsylvania has the largest number of school districts per capita in the U.S.

What about business customers? None yet, but that's the job of the ISPs. "Our three participating ISPs have signed 200 business and residential customers for the first month," says Mortensen.

Cambria county expects a lot from the network, says Henriod. "It's the overlooked heartland of America, which is the majority of the nation by square mileage. It offers a compelling lifestyle, with hunting and fishing, and now also has broadband. Broadband doesn't alleviate all of the issues—transportation is an issue (air and road)—but it solves many problems. Every school will now have a 35 Mbps connection, whereas most schools in the rest of the country are using one or more T-1s.

And now businesses won't have to leave in order to get broadband.

Although the project has a grant, the buildout to date was completed "without the specific promise of federal funding."

It's a challenging area for wireless. Pennsylvania, after all, means "Mr. Penn's forest" and the mountains and valleys are numerous too. The goal is 90 percent coverage for public safety, and CONXX is still testing the area covered by its 17 towers, but, Mortensen says, coverage is already superior to what the county had before.

As for network management, the CONXX delivers a proprietary system it calls the [CONXX Communications Observer](#) (CCO) which delivers a monster number of features for network management, billing, and equipment inventory.

### **Regulation**

It's impressive that the network's there at all. Pennsylvania has a [law](#) giving the ILEC (generally Verizon) the right of first refusal. This means that CONXX had to let Verizon know in advance of its plans to build Cambria Connected. Verizon had the option of promising to build its own network, which would have prevented CONXX from building one, or allowing Cambria Connected to go forward.

Verizon declined. But you have to wonder what will happen next. If the Cambria Connected network delivers on all promises, adjacent counties will want something similar. If there's a domino effect, Cambria is two counties away from Allegheny county, home of Pittsburgh, a city that Verizon would not give up.

Furthermore, the wireless signal does not magically stop at the borders of the county. Will residents of Cambria county object if people nearby in other counties get broadband from its network? Possibly not, if their subscriptions help pay for it. But you never know.

### **Conclusion**

This network took years to build (politics and planning included), and it's just opening up to residential service this week. This is not the project that an elected official on a four year term can adopt in order as the keystone to a re-election campaign. It could take more than four years. CONXX worked with a large number of officials, not all of them elected, in order to build a longer term plan and a better network than the average municipal wireless network.

Every ISP, Mortensen says, gets the same wholesale rates on a plan that's designed like a telco tariff to offer specific prices for specific services. The county sets the prices and defines the services, he adds.

CONXX has a NOC in Cambria county staffed with two employees. Tier 1 support will be provided by the ISPs; the NOC will handle network problems and provide tier 1 support for the government and municipal services of Cambria county.

"The brilliance of the network," Mortensen says, "is that our ATM network delivers almost a 1:1 ratio of backhaul to actual throughput. If you have a 5 Mbps camera stream on a traditional Ethernet connection, it could require 15 Mbps of backhaul. This allows carrier grade services. The network has a latency of less than 10 ms edge to edge. It enables ISPs to be creative with services, such as mail, backup, collaboration, and VoIP. Verizon didn't get rich on DSL alone."

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