Pulaski, Tenn. Joins the Global Fiber-Connected Community

Greg Solomon, VP & Chief Information Officer, PES Energize

In this new century it’s become clear that bandwidth is now the lifeblood of a community’s commerce, lifestyle, education, and growth. This realization has led to the deployment of FTTH to over 8M homes and businesses in the United States, and it’s likely that number will grow to 50M homes in the next decade. Globally, 25M homes and businesses now have fiber access with 150M likely in 10 years, reaching nearly half of the developed world. As high bandwidth service becomes not only an enhancement to the community but increasingly a necessity, small rural communities desire to participate and grow with the fiber-fueled economy. And that’s exactly what we are doing in Pulaski, Tennessee.

Pulaski Tennessee is a vibrant community nestled in south central Tennessee. From the early 19th century, Pulaski and surrounding communities in Giles county have grown to become the first powered by the TVA (Tennessee Valley Authority), and soon Pulaski will be one of the first cities in Tennessee powered by fiber optics. While many cities are benefiting from FTTH the superior Internet and video services enabled by FTTH, only about 7 percent of homes and businesses in the United States have access to FTTH. Pulaski will soon be one of the select few fiber connected communities in Tennessee and the United States.

Pulaski Electric System, through its PES Energize subsidiary, is excited to offer an advanced FTTH network to 5,000 homes and businesses in response to requests for superior broadband and video services. The Pulaski City Council and PES agree that the super-high-speed Internet and video services that will be provided through its FTTH network will boost the regional economy by attracting and retaining businesses and residents. PES’s mission is to empower progress and prepare Giles County for tomorrow’s vision of excellence. Our citizens wanted local choice with local control, and PES Energize plays a leading role in economic development.
What benefits can Pulaski citizens and businesses expect from the new FTTH services? While we often think of Internet access and television, FTTH can deliver far more. New video-rich applications can increase business efficiencies, business development, and quality of life. Now that over 1.5 million homes are FTTH connected we are beginning to see many high value applications emerge such as:

- Instant video downloads and uploads
- Enabling Digital Government
- Interactive Gaming
- Video Telephony
- Tele-medicine
- Virtual Meetings
- Virtual Shopping
- Distance Learning

Why is FTTH required to deliver these 21st century applications? Full motion video at ever higher definition will be incorporated to many applications, and video eats bandwidth. Fortunately, FTTH can serve up enough bandwidth to satisfy the growing appetites of these applications for many decades, while copper-based systems are severely limited. FTTH systems carry information over optical fibers that possess very high bandwidth, with very low signal loss over long distances. Copper-based systems such as DSL and cable use copper wires that limit both bandwidth and distance. Copper served customers well for many decades but physics are limiting further improvements, while fiber offers nearly unlimited bandwidth potential.

The bandwidth trends show no signs of changing, and soon most networks will be FTTH to meet customer and business demands.
Video mail and downloads will soon provide huge benefits to businesses and residents, if they are fiber-connected. Optical broadband connections make HD and large screen video mail feasible. A business traveler might want to download a movie or a video rich sales presentation before leaving for the airport. With FTTH this would require only minutes while a cable modem or DSL might take hours for the same task. A resident e-mailing a 10 minute DVD quality video clip of a child’s birthday (400 MB) to a relative across the country would strangle a DSL or cable modem connected PC for over 1 hour with the typically best available 1 Mbps speeds, while just a first generation 3 Mbps FTTH upload would take only 20 minutes. The same benefits apply for a home based or small business e-mailing video sales presentations to a customer: fiber is feasible while copper would take hours. The next generations of FTTH will be four to 100 times faster to keep pace with video driven bandwidth demands.

What is the value of FTTH to a community? Fiber-connected businesses can more effectively sell products and services using video and high definition imagery. Businesses can reduce costs and accelerate innovation by more efficiently collaborating with global suppliers and customers. A fiber connected home sells for 4 percent to 7 percent more than an equivalent copper-connected home (source: RVA analysis) as consumers have come to understand the value of a fiber connected residence. This all adds up to a more vibrant, attractive community with improved quality of life and economic opportunity, enabled by the PES Energize FTTH System.

How does the PES network function? The network operations center (NOC) is the central point from which we access and manage the video content, connect to the Internet and phone networks, and combine all of those services onto the FTTH network. We can access this equipment from anywhere to manage customer’s service levels and billing, using an automated billing system. The video acquisition and transmission equipment brings in television video and video on demand from satellites and/or earthbound sources, and then combines those signals into a single stream. An Internet router connects to the Internet backbone so that we can provide the high-speed Internet connections to Pulaski FTTH customers. The PES NOC also utilizes a voice switch that invisibly manages our telephony services. All three of these services are connected into the Optical Line Terminal (OLT), which is the traffic cop managing and combining all the services onto the fiber system. From the OLT, the fiber runs to a cross connect panel and then into the outside cable. We chose our optical fiber system, from OFS since its full spectrum and low-loss capability can cost effectively support many new and higher bandwidth services over the coming decades. The GE-PON system from Wave7 Optics includes the OLT and Optical Networking Terminal (ONT) at each home, and can support up to 1 Gbps to and from homes and businesses.

Figure 2 – Basis Schematic of PES Energize FTTH System
The outside “feeder” cable connects to a small cabinet that serves up to 288 homes in which the optical splitters are housed. From this fiber distribution cabinet a fiber cable is run underground past the homes, and from that cable we can splice in a small single fiber cable to each home when a customer requests our service. That cable plugs into an Optical Network Unit at the house. From there the optical signals are converted to electrical for supporting the services inside the home. While the current system uses two optical wavelengths downstream and one wavelength upstream, the Full Spectrum fiber can support dozens or even hundreds of wavelengths to enable 10 Gbps or even greater data rates per home, which might be required over the 25 to 50 year typical life of the optical cable. In addition, unlike copper systems the PES FTTH outdoor network is fully passive – meaning that none of the outdoor components requires electrical power. This not only conserves energy, but also makes our outdoor network nearly immune to service interruptions caused by lightening than can plague a copper network.

So where is the PES FTTH system today? We are currently only 2½ months into deployment yet have already secured about 10 percent of the market. We have a very good success rate on all three services. Our customers are seeing a significant improvement in the quality of services and in the quality of customer service and technical support. While we are always learning, we would advise others contemplating FTTH to consider our experience. Here are some common questions and answers based on our deployment.

How would you manage the implementation of an FTTH Network?
We created a well-thought-out plan, starting with a solid business case. We evaluated the FTTH system options thoroughly and chose carefully. We had a thorough testing period with beta customers and confirmed services before an official launch.

How did you overcome regulatory challenges?
It was mainly through diligence. Our barriers to entry where not significant, because our community leaders saw a need in Pulaski for additional services and were determined to meet those needs.

How did you acquire content and backhaul bandwidth?
We were fortunate in that we have some long haul fiber that is connected to a backbone carrier with a POP in our Head End. This provides flexibility and multi-homing services that ensure our network meets our service level requirements. We are currently receiving most of our content through the NCTC.

How did PES Market the FTTH services?
Our Chief Marketing Officer, Wes Kelley, had a strong strategic marketing plan that helped us get to market quickly. Some of media we used included billboards throughout the city and full color page adds in the local paper depicting a PES employee that had a home town feel to it. We have also sent out mailers to our market area.

Who are your competitors and how have they responded?
Charter, BellSouth, DirecTV, Dish and a couple of local ISP’s. We haven’t really had to counter the competition. They are attempting to counter the PES offer. We are selling a superior product to our customers in our market area and haven’t yet seen a customer leave PES for a competitor.
What have been both the successes and challenges in the customer experience?

Our customers really like our live customer support structure that uses real live people ready to help them when they need assistance. There are no automated attendants. Overall they are very pleased with our products. With a new technology comes a bump or two and we have only had a couple, but we have been diligent and had open communications with our customers about any issues. They really seem to understand this. When we have had a rare service outage during the start-up phase we take the calls, fix the problem and call them back to verify everything is okay. This is usually done right then over the phone or shortly after we hang up with them.

What was the deployment experience?
It is a great experience, mainly to see the difference we are making to our customers. Knowing that we are providing a better quality service at a really competitive price makes it all worth while.

What are the future plans?
We would like to expand our coverage area to reach more of the community. We would also like to market our hardened facility which has co-location space available, to other communities to enable them to become part of the global fiber connected community.

Conclusion

Pulaski, Tennessee is excited and proud to join the growing ranks of global fiber connected communities. Just as Pulaski surged forward with that first electrical connection from TVC, we feel confident that FTTH will propel our citizens and economy successfully through the 21st century.