Executive Summary

Introduction

We believe that the Powell Valley Electric Last Mile Tennessee project represents a replicable solution that can be used nationwide to bring lasting, economical, broadband connectivity to rural America. It emulates the LENOWISCO network in Virginia, and will be one of the few projects that will be able to show the “end game” for broadband deployment and data from this project will be beneficial to the FCC’s strategic plan. It will bring access to 100% of the households in the Powell Valley Electric service area in Hancock, Hawkins, Grainger, Claiborne, and Union counties in Tennessee, where Hancock and Hawkins county have one of the highest unemployment rates in the state at 15%. It will bring connectivity to more than 5,000 homes and businesses utilizing a partnership whose business plan will not only ensure sustainability but also continue to grow, eventually satisfying the total “take rate” demand.

It will utilize 100% fiber optic media over existing community and public service rights of ways, and will ensure near infinite scalability without the need to redeploy fiber for at least forty years while supporting any envisioned bandwidth hungry application. The network uses carrier class electronics suitable for a national infrastructure capable of supporting governmental essential services, including national defense. The electronics have inexpensive cost/Mbps versus legacy systems, insuring economical transport costs and supporting the drive to commodity Internet pricing. The actual grant request of $36.8 million is relatively inexpensive when compared to traditional infrastructures that have been the drivers of the US economy, such as the electric grid, highway and rail systems.

Our project synergizes with LENOWISCO in Virginia and their LENOWISCO Last Mile Virginia project, with which it will interconnect. It also is critical to our DOE application DE-FOA-0000058 titled “Powell Valley Electric SmartGrid Initiative.” This project provides equipment to install 3,000 meters to read electric consumption in real time. The fiber-optic broadband infrastructures in Southwest Virginia, and the partners responsible for it, are the springboards from which PVEC will launch its Smart Grid Initiative. The Powell Valley Electric Smart Grid Initiative will implement a real-time, meter-reading system throughout the PVEC electrical footprint, and install “Ethernet capable" controls on three-phase line breakers that will all communicate over an Ethernet-based fiber optic system that will be operated by Sunset Digital Communications (SDC). This advanced system will serve to:

- Provide real-time information on AMI meters in the Powell Valley Electric system
- Transmit rate information to the consumer to encourage conservation
- Provide a new revenue stream to Powell Valley Electric to cover current organization overhead so as to keep costs low as consumers use less
- Create a data portal through which PVEC may provide consumers with personalized data on their electrical usage through various portals such as the

Internet and IPTV implementations
- Monitor the real time status of its distribution feeder circuits to rapidly identify and isolate distribution circuit problems

This research and demonstration project will help develop consumer energy consumption behavior modifications techniques while providing another service for the PVEC Network, and help the environment.

Economic Impact

Hancock, Hawkins, Grainger, Claiborne, and Union counties of Tennessee are at the far Northeastern tip of Tennessee, and contain 17 census designated communities. According to our in-house meter count, this project would pass all of the 20,663 homes and businesses in the service area. It would pass 42 anchor institutions. It would directly connect 5,000 homes, businesses and anchor institutions to the active optical fiber network with equipment capable of supporting 1Gbps per connection. These 5,000 connections create a projected cash flow that will support continued drop construction to the eventual total demanded take rate. Ultimately we intend to provide access to 100% of the households within 1,500 feet of the fiber. Since PVEC owns its own right-of-way, and has no "hostile" pole attachments to obtain, we believe this an obtainable goal.

The required increase in staff to accomplish this task will directly create over 30 jobs for linemen and supporting administrative staff over the three year project. We estimate this to be about $5.6M in additional payroll over 3 years. As the network operator and services provider, SDC and Clariti will increase their staff by 30 to support this project. Using Sunset's current payroll as a basis, this should equate to an additional $5.6M in payroll over 3 years. This brings the total new payroll investment for the next 3 years from this project to $11.2M.

According to LENOWISCO network statistics, of the last 317 customers connected, 15.09% of customers use their connection for their business, and 2.2% use it to work from home. Applying these percentages to the 5,000 connections covered with this grant shows that it will create over 864 work-from-home or cottage industry jobs. In the future we expect the economy to create more telecommuting jobs, which could double this forecast to 1,728 regular jobs. This is important because regular job salaries have a multiplier of three on the local economy versus service jobs' multiplier of one. This amplifies the effect these jobs will have locally.

This project would create local economic benefits through local vendors that PVEC and SDC use to support a vehicle fleet, tools and team of work personnel. Using historical data as a guide, we estimate this impact to be over $10M over 3 yrs.

Partnership

PVEC is prevented from running a fiber optic network by Tennessee law. To light the fiber optic network and provide services over it, PVEC has partnered with SDC. SDC

was formed to become a certificated carrier and operate the fiber via lease (IRU) agreement for LENOWISCO in Southwest Virginia.

[redacted] Sunset makes transport available to any third party service provider on a nondiscriminatory basis.

As we move forward, a third party service provider Clariti Media will ensure that network operations are separated from services and the operation of the network remains nondiscriminatory. Clariti has partnered with Sunset to provide some services over the network such as telephone and video services. Together Sunset and Clariti will help dissiminate and project the electrical usage data to customers via the web or IPTV.

Long term viability crucial to this project. As owner of the network, PVEC will reinvest 30% of its proceeds from the network, and to ensure PVEC's revenue stream, PVEC and Sunset will sign a lease (IRU) for a term of thirty years. We feel that this is a unique way to harness the capabilities of a for-profit company, and an infrastructure-oriented utility. Sunset and Clariti have also pledged to match PVEC's reinvestment up to an amount equal to 30% of Sunset's profit after depreciation and before taxes.

Network Services

Sunset Digital, through its partnership with Clariti Media, LLC, would provide three broadband levels:

Level 1: 10Mbps down/512Kbps upload
Level 2: 25Mbps down/1Mbps upload
Level 3: 100Mbps down/2Mbps upload

We believe our Level 3 to be a bandwidth record for any rural network in the United States, and only a month behind being a record for the entire country. The Sunset/Clariti partnership would also provide IPTV and telephone services to homes and businesses. It would provide HD television, and interactive processes to make the TV in the home more useful, provide unlimited long-distance, and overall save the average family about $60/month in their Internet/telephone/television bills.

Non-Discrimination and Interconnectivity

The PVEC network will provide nondiscriminatory access to bandwidth for anyone who can comply with IEEE 802.3 Ethernet, IEEE 802.3u fast Ethernet, or IEEE 802.3z Gigabit Ethernet. Additionally, SDC, Inc is required to provide equal and fairly priced transport to any and all with a reasonable creditworthiness as a condition of the partnership with PVEC. As a result, Sunset ensures the operation of the network while services are to be provided by third parties. Clariti Media, LLC is one such party. Sunset and Clariti have formed a joint venture for the purposes of this grant, allowing the compilation of their cash flow with Sunsets insuring the ability to display sustainability.

Any entity can apply for interconnectivity, and provided they meet the network connectivity standards above, they will not be turned down.

Currently, the Powell Valley Electric Network has a planned interconnect with the LENOWISCO network in Southwest Virginia.

Network Type and Technology

The Powell Valley Electric network will be an active optical Ethernet network utilizing Ciena switching equipment from the backbone to the subscriber. The network provides connectivity that complies with IEEE 802.3 Ethernet, IEEE 802.3u fast Ethernet, or IEEE 802.3z Gigabit Ethernet standards. Private connectivity is provided between or among multiple locations via secure virtual local area networks (VLAN's). Multiple services can be provided to the premises via different VLAN's. Network topology, customer configuration, fiber availability, and the like are all stored in SDC's FiberTrac® system.

Qualifications to Implement Project and be a Sustainable Broadband Provider

This project emulates the LENOWISCO project in Virginia, and uses one of the key partners there, SDC. SDC is one of the most successful fiber optic creation and management teams in the United States. They have experience in not only creating FTTP networks, but in having a successful rural strategy and have met all previous network goals, including self-sustainability.