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December 31, 2019

The Honorable Ann Cummings, Chair
Senate Finance Committee

The Honorable Tim Briglin, Chair
House Committee on Energy and Technology

Re: Feasibility Study of Electric Companies Offering Broadband in Vermont

Dear Chair Cummings and Chair Briglin:

I am pleased to submit this report entitled a Feasibility Study of Electric Companies Offering Broadband in Vermont, pursuant to Act No. 79. This study, developed in consultation with Magellan Advisors and the Public Utility Commission, specifically addresses Section 11 of the Act, which requires the Department of Public Service ("Department") to explore what role electric utilities can and should play in the deployment of broadband services.

Electric utilities across the country are entering the broadband market in service to their customers. Electric cooperatives are increasingly hearing from their memberships that broadband is an important but unmet need. Additionally, trends in the energy sector suggest that there is an emerging convergence of broadband technologies with electric power distribution services. These factors are encouraging utilities to explore the possibility of entering the broadband market.

This report provides an in-depth analysis of the financial and technological feasibility of electric utilities participating in the broadband market. While this report is not the final authority on the matter, it provides an abundance of financial and market data. The report concludes that while it is possible for many of Vermont's utilities to develop retail, fiber-to-the-home broadband offerings, such a move would expose them and their ratepayers to substantial financial risk. Nevertheless, distribution utilities can play a significant role in the provision of broadband through shared access to broadband capable facilities, such as middle and last mile fiber deployed for Supervisory Control and Data Acquisition systems and smart meters – a role that most of Vermont's electric distribution utilities are not fulfilling today.

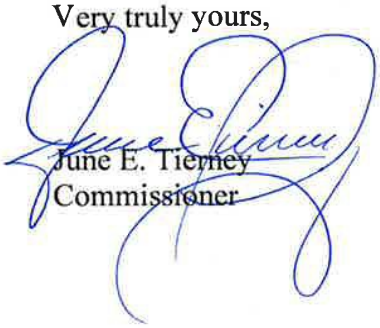
The report also outlines legal and regulatory barriers to deployment and provides examples of how other states have facilitated the entrance of distribution utilities into the broadband market. The report also describes federal and state grant and loan programs available to distribution

utilities, many of which are only eligible to electric distribution utilities. While, there are no easy solutions to bridging the digital divide, this report provides several avenues for further exploration by Vermont's distribution utilities.

Contemporaneous with this report, the Department will also a Request for Proposals ("RFP") under our Broadband Innovation Grant program ("BIG") that is specific to electric utilities. This RFP will call on distribution utilities to seek funds to conduct feasibility studies for broadband deployment in their service territories. Act 79 allows the Department to award up to two grants to distribution utilities. We hope that this report will help inform how the BIG grantees should approach broadband service in their territories.

If you have any questions or concerns upon reading this study, please do not hesitate to contact me or the Utilities Finance and Economics Analyst, Scott Wheeler at (802) 828-1780 or scott.wheeler@vermont.gov.

Very truly yours,

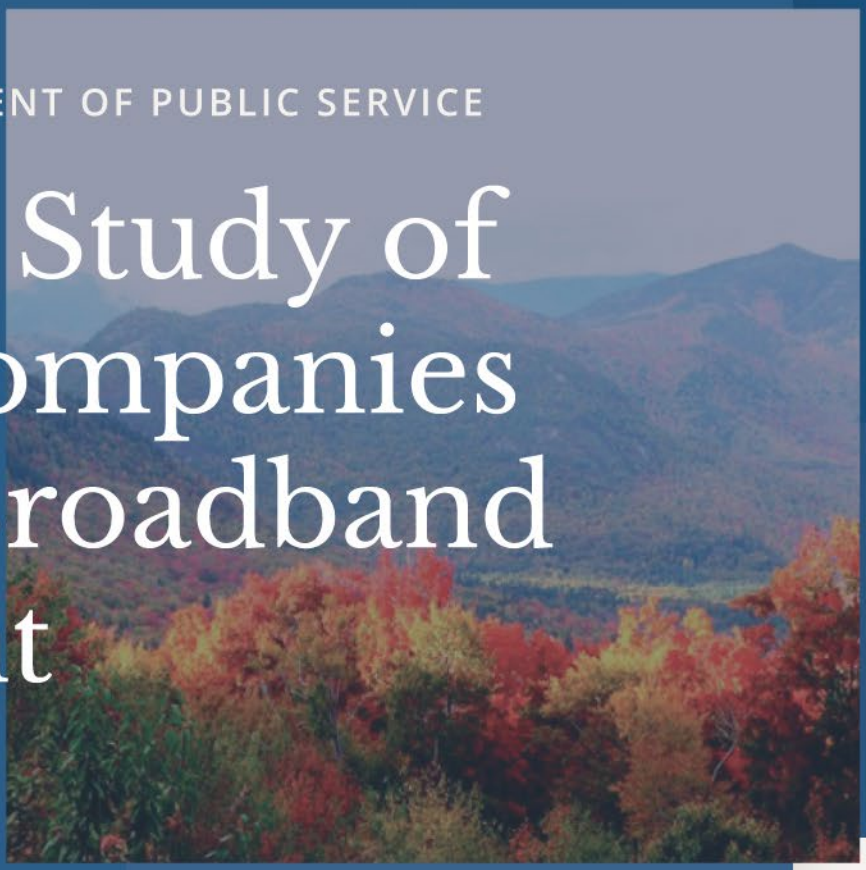


June E. Tierney
Commissioner

Encl.

VERMONT DEPARTMENT OF PUBLIC SERVICE

Feasibility Study of Electric Companies Offering Broadband in Vermont



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DECEMBER 2019

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Report Summary

Electric transmission and distribution systems are in the midst of a transformation, or convergence, as technology and innovation disrupt traditional models from generation to beyond the meter. These convergence factors include[1]:

- **Electrification** of large sectors of the economy such as transportation and heating.
- **Decentralization** spurred by the decrease in costs for distributed energy resources (DERs) such as distributed generation, distributed storage and energy efficiency.
- **Digitalization** of the grid featuring smart metering, smart sensors, automation and beyond the meter, or the advent of the Internet of Things (IoT) and a surge of power-consuming connected devices.

This Report studies the topics laid out in the Broadband Deployment Act[2] passed by the General Assembly in the last session. It aims to identify possible ways electric utilities could participate in deploying broadband to unserved areas throughout Vermont by leveraging those trends. Further and more detailed utility-specific studies will be required to pinpoint specific opportunities and risks for each utility. The intent here is to paint a broad picture of the current landscape in Vermont and how electric utilities may be able to extend broadband service to more Vermonters. The potential benefits of expanding broadband are well known to policymakers:

1. Expanded economic development opportunities.
2. Increased education access and equity.
3. Access to telehealth and telemedicine services
4. More employment opportunities.
5. Revitalized rural communities.

Over the last decade, the State of Vermont (through the efforts of the Department of Public Service and its partners) has gathered extensive data regarding broadband availability and has implemented new methods of data collection and analysis to address known problems with federal mapping requirements. The DPS broadband mapping effort is superior to that of other states in that it allows identification of broadband speeds and availability at the premise level. This level of sophistication and granularity was crucial for Magellan Advisors to estimate the costs of extending broadband service to unserved areas of Vermont via the electric distribution system. This data indicates that despite several programs and policy initiatives (i.e., establishment of Communications Union Districts) over 80,000 premises in Vermont remain

[1] ***The Future of Electricity*** *New Technologies Transforming the Grid Edge* prepared for the World Economic Forum in collaboration with Bain & Company March 2017.
[2] Act No. 79, An act relating to broadband deployment throughout Vermont. (the "Broadband Deployment Act" or "the Act".)

unserved with broadband service – defined as 25 Mbps download speed and 3 Mbps upload speed in both the Broadband Deployment Act and by the Federal Communications Commission.

The sophisticated data available to us allows the State of Vermont to know with precision where premises without adequate broadband are located. We used this data to produce a high-level cost estimate for provision of facilities using electric distribution infrastructure to these 80,802 unserved premises. We provide figures showing mapping of each distribution utility's serving area including its boundaries, the unserved and underserved addresses within it, and cable TV plant facilities to show the distance of those addresses that would have to be spanned via line extension for broadband service. In the majority of cases, it was found that cable operators did not have infrastructure in close proximity to underserved or unserved address points.

We surveyed the electric transmission and distribution utilities to Vermont seek their analysis and views on the feasibility of using electric distribution infrastructure for broadband service. We received very thoughtful responses from every electric utility which are greatly appreciated and made this a better Report. The survey responses were crucial for informing analysis on subjects the Broadband Deployment Act requires this report to address[3]:

- The "potential advantages of serving utilities' internal data needs and expanding fiber for providing broadband service".
    - The many advantages to fiber deployment in the electric distribution system include support for advanced metering infrastructure, Smart Meters and Smart Grid applications, support of real-time data from SCADA systems for operating and reliability purposes, supporting increased reliability and resiliency, improved cyber-security, and potential for increased revenues and support for economic development which would increase sales.
    - Identified disadvantages and concerns include those relating to financial risk and resource issues including implications of a new line of business with heavy investment requirements which suggests additional debt with related debt service costs. Also, gearing up operationally with the necessary trained staff and marketing/development costs is a concern, as well as potentially competing with telecom companies.
    - The advantages and disadvantages will have different weights and meanings for each distribution utility, and it will be necessary for each electric company to make its own assessment and analysis of needs, prospects, costs and any other issues to reach conclusions. There is not a "one size fits all" solution to extending internet services to Vermont's unserved areas but individual feasibility studies as contemplated by the Broadband Deployment Act would provide concrete

[3] Broadband Deployment Act, Sec. 11(a).

assessment of the issues in a particular geographic area while highlighting feasible options to the extent they exist.

- "The compatibility of broadband service with existing electric service".
  - We found very limited compatibilities between electric service and broadband service, and the incompatibilities appear to be costly and significant. The compatibilities appear to be very high level in nature, such as both are utility services upon which the public relies to be "always on", both use poles and lines for supporting infrastructure, and both have similar functional requirements at a high level. However, the business models and industries are very different and separate books and separate work forces would be required for the different lines of business. Electric companies do not provide in-home services behind the meter, while broadband internet services do require technicians in the home to install, configure, maintain, and troubleshoot issues with equipment (e.g., modems) within the home including in-home wiring (e.g., coax, Ethernet, and wireless). Furthermore, it would likely be costly to address the various incompatibilities stemming from engineering, maintenance, staffing and field workers, management expertise, operations and vehicles, billing and customer service and helpdesk functions as well as service restoration priorities.
  - However, deployment of the fiber-optic cable in the electric distribution system that is necessary for Smart Grid applications will also tend to create fiber-optic capacity that could be used for broadband services. This is true simply by the nature of fiber-optic facilities. This should be considered in the planning and development of Smart Grid deployment as well as funding strategies.
- "The financial investment necessary to undertake the provision of broadband service".
  - Our financial feasibility study found the capital investment required would be very sizeable.
- "Identification of the unserved and underserved areas of the State where the provision of broadband service by an electric company appears feasible".
  - Underserved and unserved areas were identified using the detailed and granular address-level data available from the DPS broadband mapping system.
- "The impact on electric rates".
  - Vermont has long-standing regulatory and statutory policy that prohibits cross-subsidization of services. Cross-subsidy of broadband services by electric services should not be permitted. The Commission's authority and cost allocation rules should be sufficient to prevent cross-subsidies. Also "ring fencing" practices can be employed to separate accounting, funds, and financing between electric services and broadband services. As noted regarding compatibilities and incompatibilities of electric operations vs. broadband operations, the unique costs of the broadband operation would need to stand on their own. Regulatory

provisions appear adequate to prevent an impact on electric rates from inclusion of broadband costs.

- In addition, cross-subsidization of broadband services via electric rates would conflict with important state policy objectives to transition to use of electric service from renewable energy sources to be a leader in global climate change efforts. Higher prices for electricity would contradict and impede achievement of these policy objectives.

- "The financial risk to electric companies".
  - Financial risk circumstances and implications vary depending on the type of electric utility. The municipal electric departments' financial standing aligns closely with the financial capacity of the town or village, which tend to have good debt ratios while the electric departments carry little or no debt. The municipal electric departments are not borrowers from the federal Rural Utilities Services programs, while the two larger electric cooperatives are RUS borrowers and carry typical debt levels for an electric company, as does Green Mountain Power.
  - Overall the electric utilities see many risks which must be addressed including significant investment implying significant debt, low customer densities and take rates against high fixed operating/staffing and investment costs, attracting and retaining the needed pool of technically skilled employees, uncertain or deferred break-even and cost recovery, competition and technological change, negative impacts on non-profit status, and regulatory disallowances.
- "Any differences that may exist between electric companies".
  - Our analysis concluded there are important differences between and among the fourteen municipal electric departments, the two larger electric cooperatives and the one large investor-owned utility serving Vermont. There is not a "one size fits all" solution to extending broadband service in Vermont.
- "Any financial consequences and any technical or safety issues resulting from attaching communications facilities in the electric safety space as opposed to the communications space of distribution infrastructure."
  - This subject drew extensive comments and discussion. The National Electric Safety Code (NESC)[4] does not include the term "electric safety space" so this discussion will be in the context of the electric supply space. There are types of fiber-optic cable that can be placed in the supply space – for example ADSS (All-dielectric self-supporting) cable or OPGW (Optical ground wire). As with all engineering questions there are trade-offs between this type of placement versus a

[4] 2017 National Electric Safety Code, C2-2017, the Institute of Electrical and Electronics Engineers (IEEE). The NESC is published by IEEE on a five-year update cycle. It is the product of work by various IEEE subcommittees. From an electric utility perspective, the NESC is the standard for safe installation, operation and maintenance of electric power and communications lines and equipment.

strand and lash method for placement of more traditional fiber-optic cable. A significant advantage of ADSS fiber in the electric supply space is that there is minimal make-ready required, which means less upfront capital and a faster initial deployment. It is faster because it is not necessary to wait for third party make-ready to get done, but also because of how it is installed. With strand and lash, it is necessary to install the messenger wire first and then come back and place the fiber and lash it to the messenger wire. With ADSS, the installation is essentially just one step. ADSS tends to be a little more expensive (5-10%) than traditional fiber.

- A significant obstacle or disadvantage is that anyone who works on the ADSS plant will need to be a certified lineman, which drives up the labor cost. The survey responses also make clear a significant issue can be anticipated in rural Vermont especially for attracting, paying, and retaining the specially trained and qualified employees and contractors required for this specialized work. These qualified workers are expensive and difficult to attract at a time when Vermont lacks an adequate base of line workers.
- The electric companies in their survey responses raise important concerns regarding placement of fiber-optic facilities in the electric supply space and emphasize the primacy of safety for the public and the linemen who maintain and operate the facilities. As stated by VELCO, "the dangers of locating communication equipment in this space can never be underestimated." The companies state fiber in the electric space is "one more" obstruction or complication to maintenance or restoration work; fiber provides another potential path to ground and current carrying potential; and other operating concerns. Also, in cases where the electric company uses poles jointly owned with communications companies there may be objections to placement of this fiber without paying pole attachment fees.
- These questions would need to be effectively addressed to make placement of fiber in the electric supply space truly feasible.

The Act also requires[5] consideration of regulatory barriers to provision of broadband service by electric companies and legislative proposals to address those barriers as well as evaluating whether it is in the public interest to

> (1) Make improvements to the distribution grid in furtherance of providing broadband service in conjunction with electric distribution grid transformation projects. Our survey indicated broad agreement with the proposition that deployment of the fiber-optic cable in the electric distribution system that is necessary for Smart Grid applications will also

[5] Broadband Deployment Act, Sec. 11(b).

tend to create fiber-optic capacity that could be used for broadband services, simply by the nature of fiber-optic facilities. This direction also ties into funding strategies.

(2) Operate a network using electric distribution and transmission infrastructure to provide broadband service at speeds of at least 25 Mbps download and 3 Mbps upload. We found that this should be addressed through financial feasibility studies.

(3) Permit a communications union district or other unit of government, nonprofit organization, cooperative, or for-profit business to lease excess utility capacity to provide broadband service to unserved and underserved areas of the State." While one survey respondent sees "limited expertise and understanding, resulting in uninformed or poor decision making" by Communications Union Districts, most other respondents view these districts favorably, stating the "ECFiber model is proven and working", and seeing value in leveraging more use of existing assets among other favorable views. Magellan Advisors believes there is merit to further the use of the Communications Union District (CUD) concept and structure to address the problem of expanding broadband service to unserved and underserved areas. "The formation of a CUD protects individual towns from the credit risks associated with a failing project as the district is considered its own municipal organization. Forming a CUD also allows the entity to draw on the human capital of several towns, such as lawyers, technologists, financiers and other skilled people who can join a CUD board and contribute to its success."[6]

In addition, numerous parties referenced the possibility of challenges regarding the use of electric facilities located in public rights-of-way and easements for attachment of communications fiber if distribution utilities were to decide to do so to provide broadband infrastructure for retail or wholesale use. Magellan Advisors believes there is merit to exploring statutory clarification of such future use of easements and public rights-of-way. Many other states have recently enacted provisions to clarify this issue, and the bill texts are included as Appendix VII for reference.

Finally, DPS notes there is a conflict from Communications Unions operating as a business that generates commercially sensitive information (such as subscriber specific information, subscriber counts, usage date and billing information, and engineering records including maps) while its member/owners are subject to Vermont's Public Records Act. No other telecommunications providers must disclose this type of commercially sensitive business information to the public, and while this subject has not been tested or challenged, we agree with

[6] Report on the Use of General Obligation Bonds for Improvements to Municipal Telecommunications Plants submitted to the Vermont Legislature by Susanne Young, Secretary of Administration, December 1, 2019, at page 9. ("Secretary of Administration's Report on Use of General Obligation Bonds for Municipal Telecommunications Plant")

DPS that a clear statement in the Public Records Act specifically exempting Communications Unions from these types of disclosures would provide beneficial guidance.[7]

Magellan Advisors used its experience and knowledge to make high-level cost estimates for extending the electric distribution network to provide broadband service to unserved locations. Our cost estimates included all fiber distribution construction, huts, fiber drops, headend equipment and home equipment needed to provide internet services (and optionally voice) to customers. We used the total distribution plant mileage reported by Vermont's distribution utilities to the DPS (which included the aerial vs. underground proportion of total plant) to estimate the fiber distribution cost to serve the 80,802 unserved locations with fiber-to-the-premises infrastructure. The total fixed capital costs included a 20% construction contingency and were estimated for fiber feeder distribution plant (inclusive of telecommunications shelters), headend facilities, headend electronics and field electronics necessary to provision broadband services to the 80,802 underserved and unserved locations – which totaled $248 million for the fixed capital costs required to pass all 80,802 locations or an average of $3,355 cost per premise passed. GMP and VEC contain the greatest number of underserved and unserved locations, which also require the greatest amount of new construction to reach these locations. The service territories of these two organizations represent 76% of total underserved and unserved addresses in Vermont with 61,629 unique addresses. Total cost to reach these addresses is estimated at $207 million or 73% of the costs required to serve all 80,802 addresses.

The fixed capital costs do not include variable capital costs such as fiber drops and home equipment, which are a function of the number of customers that subscribe to service or the "take rate". We calculated an average fiber drop and home equipment cost of $1,610 per premise, which includes the fiber drop, the optical network terminal, uninterruptable power supply, wireless gateway device and inside wiring and testing. These costs are calculated separately in the financial feasibility analysis. The "take rate" in the context of the internet service industry is the percentage of households passed by the distribution network expected to subscribe to internet service. Take rate estimation is not an exact science. Take rates are influenced by service pricing, service options including the available substitutes in the market; demographics of the population including income, age, educational attainment and presence of children; and, successful execution of sales and marketing strategies. We considered the impact of cable availability on take rates and concluded most unserved locations did not have a cable provider who could serve without a line extension.

Using these cost figures, we performed separate financial feasibility analyses. Scenario 1-A considered service deployment only to unserved and underserved addresses in electric serving

[7] 2018 Vermont Telecommunications Plan, DRAFT issued by the Vermont Department of Public Service, November 14, 2018, at page 51. ("Vermont Telecommunications Plan" or "Telecommunications Plan").

areas. Scenario 1-B considered service deployment only to unserved and underserved addresses in electric serving areas but with an existing ISP partner. Scenario 2 models a deployment whereby a DU may desire to serve its entire customer base rather than only underserved and unserved customers, which is customary for many DUs.

For Scenario 1-A we found for those with very few unserved and underserved addresses (Orleans, Hyde Park, Johnson, Ludlow, Swanton and Burlington) it would likely be very challenging to provide broadband services, given the small number of customers and the high fixed costs to deploy the network, headend and operations. But for the nine other distribution utilities, feasible business cases exist, depending on the term of the financing available to each organization. Feasibility is tied to the availability of grant funding.

We found Scenario 1-B yields more feasible financial scenarios for many of the organizations under study. Whereas only one distribution utility achieved a positive Internal Rate of Return in 20 years when providing broadband directly, many utilities achieved a positive IRR in the partnership model. This results from lower capital costs since the distribution utility would not need to invest in headend, electronics or home equipment since these are procured by the partner, lower operating costs since the partner bears these costs of operation and existing scale in operations from the partner. A variation of this model includes leasing already installed fiber with extra capacity to organizations which offer broadband to customers. Examples would be Communications Union District (CUD) firms like ECFiber and CVFiber.

Scenario 2, where a distribution utility desires to serve the entire territory, is complicated by the fact that increased capital is required and take rates will be highly dependent on execution of the business plan since in served areas the distribution utility would face competition from cable and telecom providers if overbuilding existing networks. Grant funding likely will not be available for this portion of the network build and most of the capital required will have to come from traditional utility and municipal financing vehicles.

We provide several tables to summarize the results of financial modeling for these different deployment and business models, including this overall summary.

	Underserved/Unserved Area Only		Entire Service Area	
	Distribution Utility Providing Services	Distribution Utility Partnering with Existing Providers	Distribution Utility Providing Services	Distribution Utility Partnering with Existing Providers
Village of Jacksonville Electric Dept.	-100.00%	-100.00%	-100.00%	-100.00%
Washington Electric Co-op	-2.64%	-0.46%	16.11%	19.28%
Village of Hardwick	1.15%	3.13%	17.74%	21.54%
Village of Barton	1.64%	4.07%	18.48%	22.59%
Village of Enosburg Falls	1.42%	5.07%	13.64%	16.72%
Village of Lyndonville Electric Dept.	1.30%	4.53%	6.15%	10.17%
Vermont Electric Co-op	1.33%	3.29%	4.21%	5.27%
Village of Morrisville Water & Light Dept.	1.12%	4.40%	6.14%	7.18%
Town of Stowe Electric Dept.	4.17%	8.22%	9.19%	12.98%
Village of Orleans	-100.00%	4.45%	-100.00%	-1.99%
Green Mountain Power	1.70%	3.76%	3.16%	4.09%
Village of Hyde Park	-100.00%	2.14%	-100.00%	-7.07%
Village of Johnson	-100.00%	8.34%	-100.00%	8.89%
Ludlow Electric Light Dept.	-100.00%	-100.00%	-100.00%	-100.00%
Swanton Village Electric Dept.	-11.01%	14.33%	5.98%	16.54%
Burlington Electric Dept.	-100.00%	24.07%	21.28%	26.75%

The Department is exploring a possible proposal where existing utility owned fiber optic facilities could be employed to facilitate broadband deployment. Specifically, utilities could offer heavily discounted "backhaul", or the lease of existing fiber facilities, from substations in unserved areas to interconnection points with other broadband providers. This could lower the cost of deploying service in unserved areas, and thus improve the business model for these challenging projects.

Finally, we explore funding strategies. Each of the financial feasibility scenarios analyzed assumed funding to be available. We list and describe various federal and state funding sources, including a primary funding source – the USDA/RUS "ReConnect" program. Funding strategies include:

- Utilize existing electric DU fiber not funded by RUS to offer broadband service directly or partner with Internet service providers and/or communications union districts to provide access to fiber or lightwaves for that purpose.
- DPS should seek the opportunity to demonstrate that areas of the VTel Wireless BIP loan-funded service area have no service from VTel Wireless, so that an applicant could look for the clusters of unserved homes and apply for funding to serve those areas. DPS should share with RUS the results of the DPS 2019 drive-by speed test which showed that VTel Wireless service was not available in a percentage of all locations tested in the BIP funded service area, and request that RUS allow an RUS or other licensed engineer to verify service availability in the funded area, or accept the results of a nonbiased consumer survey to verify coverage availability and speed, or both.
- Apply for RUS Electric Program loans to build new "Smart Grid" infrastructure and lease excess fibers to Internet Service Providers (including VTel and VTel wireless) and/or Communications Union Districts where they exist for broadband service.
- In the interim period, Electric DUs should monitor federal and state grant opportunities from other funding agencies than RUS to provide smart grid and resilient networks or broadband networks, either directly or in partnership with other service providers and/or Communications Union Districts.
- Electric DUs should monitor news and state legislation regarding funding sources for communications union districts. If CUDs have available funding for fiber-optic network deployment, Electric DUs may enter into a construction, maintenance and fiber-sharing agreement with a CUD that provides for electric DU pole make ready and construction of the network on DU poles, and maintenance and repair of the fiber.

A distribution utility considering deployment of smart grid/broadband infrastructure should engage an expert advisor with comprehensive experience in planning, capital formation, deployment management and operational management of broadband ventures, and especially rural broadband ventures, as well federal contract administration and compliance management, to develop a feasibility assessment and comprehensive business plan before moving forward with deployment. Important tax considerations exist for cooperative organizations including the 85% member-income test, recognition of unrelated business income, and accounting treatment for grants.

In summary, the study highlights areas where participation by the electric utilities could be part of the solution to extending broadband service to unserved areas of Vermont. But the results should not be viewed as solving all of the inherent problems related to broadband expansion throughout Vermont. Significant work by individual utilities interested in entering the broadband space will be required prior to becoming active participants.

The Task

The Vermont General Assembly passed H.513, an act relating to broadband deployment throughout Vermont[8]. The Act made several findings including that the "Department of Public Service data indicates that seven percent of Vermont addresses do not have access to the most basic high-speed Internet access, which is 4 Mbps download and 1 Mbps upload. Nearly 20 percent of Vermont addresses lack access to modern Internet speeds of 10 Mbps download and 1 Mbps upload. The Federal Communications Commission (FCC) defines broadband as a minimum of 25 Mbps download and 3 Mbps upload. Approximately 27 percent of Vermont addresses lack access to this level of service."[9] The Act also found that "As Vermont is a rural state with many geographically remote locations, broadband is essential for supporting economic and educational activities, strengthening health and public safety networks, and reinforcing freedom of expression and democratic, social, and civic engagement"[10] and "The accessibility and quality of communications networks in Vermont, specifically broadband, is critical to our State's future."[11] As one means to address provision of this essential service, the Act requires a study of the "feasibility of electric companies offering broadband service in Vermont" using electric distribution and transmission infrastructure.[12] This study to be performed by the Department of Public Service is to address (along with any other relevant matters):

- The "potential advantages of serving utilities' internal data needs and expanding fiber for providing broadband service";
- "The compatibility of broadband service with existing electric service";
- "The financial investment necessary to undertake the provision of broadband service";
- "Identification of the unserved and underserved areas of the State where the provision of broadband service by an electric company appears feasible";
- "The impact on electric rates";
- "The financial risk to electric companies";
- "Any differences that may exist between electric companies"; and,
- "Any financial consequences and any technical or safety issues resulting from attaching communications facilities in the electric safety space as opposed to the communications space of distribution infrastructure."[13]

[8] The Broadband Deployment Act.
[9] Broadband Deployment Act, Sec. 1(1).
[10] Broadband Deployment Act, Sec. 1(2).
[11] Broadband Deployment Act, Sec. 1(3).
[12] Broadband Deployment Act, Sec. 11.
[13] Broadband Deployment Act, Sec. 11(a).

The Act also requires the DPS Commissioner in consultation with the Public Utility Commission to "consider regulatory barriers to the provision of broadband service by electric companies, and shall develop legislative proposals to address those barriers" as well as address in collaboration with electric company representatives "whether it is in the public interest and also in the interest of electric companies for electric companies to:

> (1) Make improvements to the distribution grid in furtherance of providing broadband service in conjunction with electric distribution grid transformation projects;
>
> (2) Operate a network using electric distribution and transmission infrastructure to provide broadband service at speeds of at least 25 Mbps download and 3 Mbps upload; and
>
> (3) Permit a communications union district or other unit of government, nonprofit organization, cooperative, or for-profit business to lease excess utility capacity to provide broadband service to unserved and underserved areas of the State."[14]

Finally, the Act directs electric distribution and transmission companies subject to Vermont Public Utility Commission jurisdiction to aid in the development of information and analysis as requested by the Department of Public Service to complete the feasibility study of electric companies offering broadband service in Vermont using electric distribution and transmission infrastructure.[15] Magellan Advisors was engaged to assist the DPS in producing this study and Report and greatly appreciates that cooperation and information from each jurisdictional electric utility in Vermont, as well as the energetic support of the Commissioner and DPS staff.

Assessment of Vermont Broadband Issues and Needs Analysis

Stakeholder engagement and outreach

The Broadband Deployment Act directs electric distribution and transmission companies subject to Vermont Public Utility Commission jurisdiction to aid in the development of information and analysis as requested by the Department of Public Service to complete the feasibility study of electric companies offering broadband service in Vermont using electric distribution and transmission infrastructure.[16] Magellan Advisors worked with DPS to construct a survey containing questions relevant to the feasibility of electric companies offering broadband service in Vermont using electric distribution and transmission infrastructure. The Survey of Vermont Electric Utilities was circulated to all jurisdictional electric companies, and all companies

[14] Broadband Deployment Act, Sec. 11(b).
[15] Broadband Deployment Act, Sec. 11(c).
[16] Broadband Deployment Act, Sec. 11(c).

responded to the survey very thoughtfully. We greatly appreciate the time and thoughtfulness each company put into its response – a better report has been facilitated by each response.
In consideration of the feasibility of electric companies offering broadband using electric utility infrastructure, the Act requires that this subject be considered with reference to "any differences that may exist between electric companies."[17] The State of Vermont obtains its electric services from an array of electric utilities:

- Fourteen (14) municipal electric utility departments, ranging in size from 674 customers (Orleans Electric) to 5,700 customers (Lyndonville Electric), with Burlington Electric Department serving 21,005 customers as of the end of 2018;
- Two (2) electric cooperatives, with Vermont Electric Cooperative serving 32,000 residential, commercial and industrial customers and Washington Electric Cooperative serving 11,519 residential, commercial and industrial customers; and,
- Green Mountain Power serving approximately 265,000 residential, commercial and industrial customers.

The Department of Public Service map of electric utility service territories service areas of these electric utilities is provided as Appendix I.

Given the three different types of electric companies in Vermont and the requirements of the Act to consider these differences, our analysis of the survey responses will separately consider them by type (municipal utility, cooperative or investor-owned), and by question (1-18). In addition, stakeholder input for this study was requested from Vermont's ISP community via email dated October 23, 2019. Both Consolidated Communications and the New England Cable & Telecommunications Association provided their input. Their comments have been considered in compiling this Report, and are included as Appendix II and Appendix III, respectively. Also, the Town of Stowe Electric Department provided comments regarding the Report which are attached as Appendix IV.

[17] Broadband Deployment Act, Sec. 11(a).

Vermont Broadband

The State of Vermont has a longstanding commitment to "ensuring that all Vermonters have the best available high-speed Internet access."[18] This is expressed in more detail in the Broadband Deployment Act as follows where it finds:

- "As Vermont is a rural state with many geographically remote locations, broadband is essential for supporting economic and educational activities, strengthening health and public safety networks, and reinforcing freedom of expression and democratic, social, and civic engagement."
- "The accessibility and quality of communications networks in Vermont, specifically broadband, is critical to our State's future."[19]

The Act refers to the DPS statistical data on broadband penetration that

- seven percent of Vermont addresses do not have access to the most basic high-speed Internet access (4 Mbps download and 1 Mbps upload);
- nearly 20 percent of Vermont addresses lack access to modern Internet speeds (10 Mbps download and 1 Mbps upload); and,
- therefore, under the Federal Communications Commission (FCC) definition of broadband (25 Mbps download and 3 Mbps upload) approximately 27 percent of Vermont addresses lack access to this level of service.[20]

The State of Vermont has a more challenging policy objective for broadband deployment than achieving the FCC's definition of broadband throughout the State: "ensur[ing] that by the end of the year 2024, every E-911 business and residential location in Vermont has infrastructure capable of delivering Internet access with service that has a minimum download speed of 100 Mbps and is symmetrical."[21] This lack of access to broadband service, whether defined by the FCC or State of Vermont policy, is caused in large part by "last mile" facilities (the connection between the home or business and "switch" serving the area) which are adequate to support telephone service but inadequate to support transmission of internet data at the FCC standard, 25 Mbps download and 3 Mbps upload. Inadequate facilities are in turn caused by lack of investment and upgrade due to lack of a "business case" demonstrating reasonable prospect of payback of the investment – which can be due to a combination of factors including high cost,

[18] Broadband Action Plan, Vermont Department of Public Service, April 26, 2019, at page 1. ("Broadband Action Plan.") The Broadband Action Plan is a requirement of 30 V.S.A. §202e(b)(6) and was originally issued on January 15, 2018.
[19] Broadband Deployment Act, Sec. 1(3).
[20] Broadband Deployment Act, Sec. 1(1).
[21] 30 V.S.A § 202c (b)(10).

uncertain consumer take-rates, etc. The Vermont Telecommunications Plan assesses this by stating:

> There remains a need to bring high quality broadband to the last mile. Serving the last mile will require multiple strategies. Unlike the top-down approach of the federal and state investments, reaching the last-mile will require a grass-roots approach that is founded on input and support of local communities, whose residents are best situated to decide what broadband solution fits their needs.[22]

A crucial question for this study is whether use of electric distribution facilities provide a viable infrastructure platform to provide the "last mile" to extend broadband service to presently underserved or unserved areas of Vermont and thereby be part of the solution to "last mile" issues.

Vermont Broadband Mapping

The State of Vermont over the years has gathered extensive data regarding broadband availability and has implemented new methods of data collection and analysis to address known problems with federal mapping requirements. Through the efforts of DPS and its partners the State of Vermont knows far better than any other state (to Magellan's knowledge) precise to-the-premise detail regarding where "broadband" is available or not available, and the specific areas of Vermont that are unserved and underserved with broadband services. Vermont used funds authorized by the American Recovery & Reinvestment Act of 2009 grant through the U.S. Department of Commerce National Telecommunications & Information Administration ("NTIA") stimulus grant funds to bring the DPS, the Vermont Telecommunications Authority, and the Vermont Center for Geographic Information together to map broadband data including availability and speeds. DPS has leveraged and continued that broadband mapping effort – which unlike any other state allows identification of broadband speeds and availability at the premise level. Magellan Advisors is unaware of any other state that has this level of sophistication and granularity, and we do not see any of the issues that plague the federal mapping system in the work DPS has done. DPS matches E-911 records from the Enhanced 911 Board for location of businesses and residences with telecommunications provider data on broadband service to create statewide broadband mapping data that shows whether a specific premise has access to broadband service, and at what speed.[23] This granular data is for all practical purposes the most accurate universal data available and is much more accurate than the census-block based data

[22] Vermont Telecommunications Plan, at page vii.

[23] Vermont E-911 records attempt to locate every single building, any of which may be occupied or unoccupied by a residence or business. As a result, the E-911 records – and the broadband mapping – will also include locations which could be considered to be "unoccupied" such as camps, older buildings used as sheds or storage, buildings that are part of ski lift or cross-country ski trail operations, etc. Therefore, a feasibility study for a particular area will necessarily include determining whether such locations should be included in plans for facilities construction or not.

collected from service providers by the FCC using its Form 477. Using this mapping data, DPS has managed the Connectivity Initiative since 2015, which is funded from the Vermont Universal Service Fund ("VUSF") and was originally intended "to provide each service location in Vermont access to Internet service that is capable of speeds of at least 10 Mbps download and 1 Mbps upload."[24] The Broadband Deployment Act (Section 5) increases this requirement to 25 Mbps download and 3 Mbps upload.

> The VUSF typically provides several hundred thousand dollars every year to ISPs to buildout last-mile broadband. For instance, in 2017 the VUSF contributed $220,000 at the end of the fiscal year. The amount of money available to the fund pales in comparison to the amount of funding requests that the Department receives, which is generally in the millions of dollars. With approximately 20,000 unserved and underserved addresses in Vermont [based on a 4/1 Mbps broadband standard], the Connectivity Initiative cannot make a meaningful dent in the number of underserved locations.[25]

DPS provided these GIS files to Magellan Advisors for use to identify each premise location in Vermont that is not served with broadband service of at least 25 Mbps download/3 Mbps upload for purposes of the engineering and financial analysis described below. The financial analysis confirms that the amount of funding provided by the VUSF "cannot make a meaningful dent in the number of underserved locations." The Connectivity Division 2018 Annual Report provided to the Assembly states two rounds of grants have been awarded in 2015 and 2016 to fund facilities "capable of speeds of at least 10 Mbps download and 1 Mbps upload." Proposals to construct such facilities to serve a total of 859 customer locations have been awarded to Comcast, ECFiber, FairPoint (Consolidated), and Pear Networks in the amounts of $677,742 (2015); $529,176 (2016, Round I); and $247,500 (2016, Round II), at an average cost of $1,693 per location. Proposals for the next round of funding have been received and are under consideration by Connectivity Division staff.[26] The Vermont General Assembly increased the rate of charge for the Vermont Universal Service Fund in Section 2 of the Broadband Deployment Act, and directed the transfer of the funds from this increase to the Connectivity Fund. These funds are apportioned with 45% to the High-Cost Program, and 55% to the Connectivity Initiative. Section 3 of the Broadband Deployment Act directs that up to $120,000 of the Connectivity Fund be appropriated to DPS for a Rural Broadband Technical Assistance Specialist and related support services and costs with the remainder used to expand the capacity of the Connectivity Initiative program.

[24] 30 V.S.A. § 7515b.
[25] Vermont Telecommunications Plan, at page 7.
[26] Department of Public Service Connectivity Division 2018 Annual Report to the Vermont General Assembly, dated April 26, 2019, at pages 6-7.

Communications Union Districts

The Vermont General Assembly passed provisions for establishment and operation of Communications Union Districts in 2015.[27] "Two or more towns and cities may elect to form a communications union district for the delivery of communications services and the operation of a communications plant."[28] This is similar to the structure used to provide water and waste collection services. The statute further provides that "a district formed under this chapter shall be composed of and include all of the lands and residents within a member municipality, and any other town or city subsequently admitted to the district."[29] It is further provided that "To the extent a district constructs communications infrastructure with the intent of providing communications services, the district shall ensure that any and all losses from these services, or in the event these services are abandoned or curtailed, any and all costs associated with the investment in communications infrastructure, are not borne by the taxpayers of district members."[30]

The Communications District may:

> Provide communications services for its district members, including the residential and business locations located therein; and also provide communications services for such other residential and business locations as its facilities and obligations may allow, provided such other locations are in a municipality that is contiguous with the town limits of a district member, and further provided such other locations do not have access to Internet service capable of speeds that meet or exceed the current speed requirements for funding eligibility under the Connectivity Initiative…[31]

Communications District powers[32] include all things necessary to operate a communications network, such as:

- "Operate, cause to be operated, or contract for the construction, ownership, management, financing, and operation of a communications plant for the delivery of communications services";
- "Purchase, sell, lease, own, acquire, convey, mortgage, improve, and use real and personal property in connection with its purpose";
- Hire and compensate employees;

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[27] 30 V.S.A. § 3051.
[28] 30 V.S.A. § 3051(a).
[29] 30 V.S.A. § 3052.
[30] 30 V.S.A. § 3053(d).
[31] 30 V.S.A. § 3054(a)(8). The speed requirement for Connectivity Initiative funding originally was less than 10 Mbps download and 1 Mbps upload. The Broadband Deployment Act modified this to 25 Mbps download and 3 Mbps upload, or the FCC's speed requirement for its Connect America Fund Phase II, whichever is higher.
[32] 30 V.S.A. § 3054.

- Enter into contracts, including contracts with "architects, engineers, financial and legal consultants, and others for professional services", with "individuals, corporations, associations, authorities, and agencies for services and property", and various other contracts;
- Enter into financing agreements using the pledge of net revenues, or "alternative means of financing capital improvements and operations."
- Solicit, accept, and administer gifts, grants, and bequests for district purposes; and,
- Other enumerated powers.

Limitations on communications districts[33] include:

- No funding generated by a member's taxing or assessment power;
- No power to "levy, assess, apportion, or collect any tax upon property within the district, nor upon any of its members, without specific authorization of the General Assembly"; and,
- "Every issue of a district's notes and bonds shall be payable only out of any revenues or monies of the district."

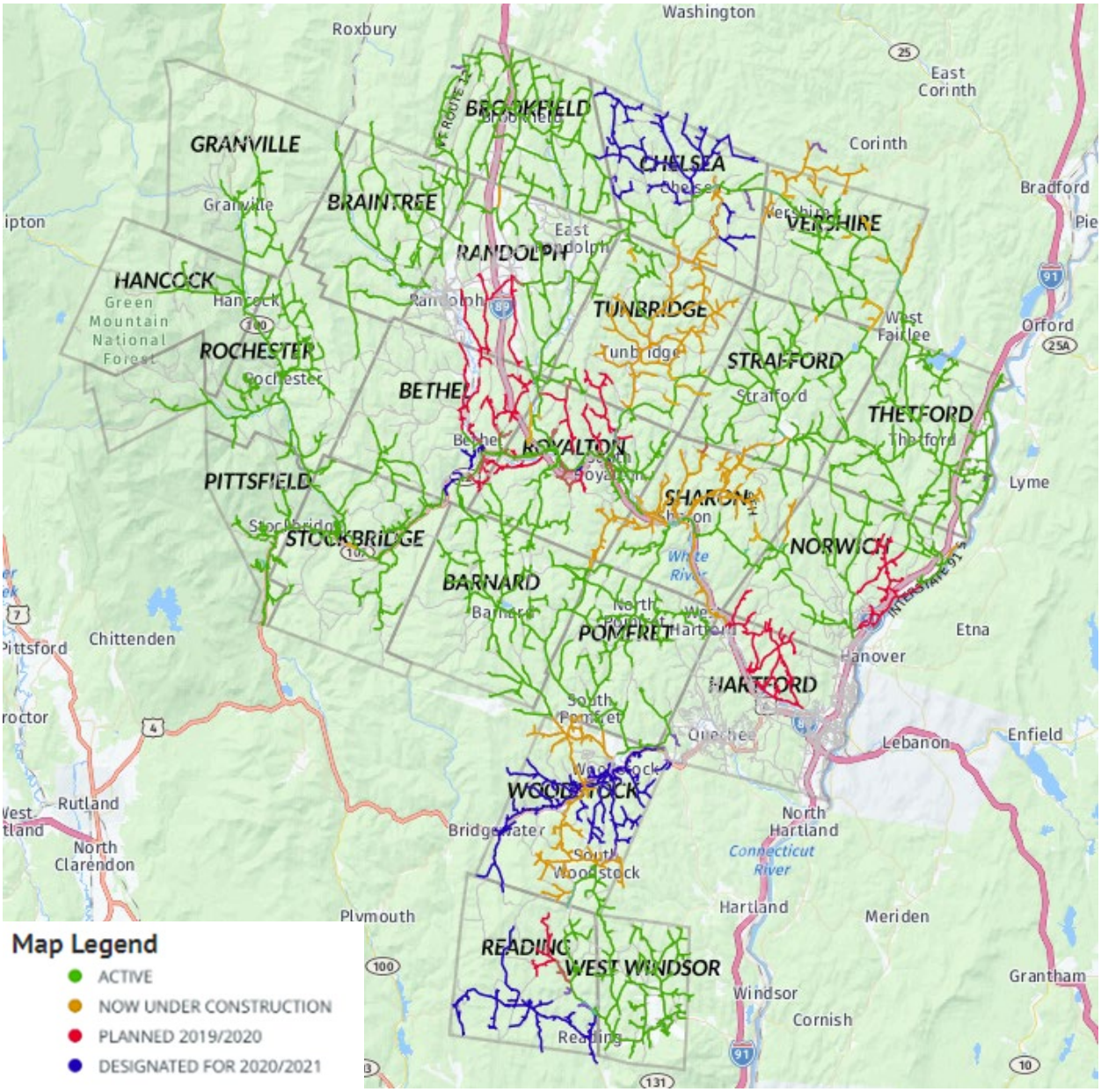
To date, two Communications Union Districts have formed.[34]

- East Central Vermont Telecommunications Union District ("ECFiber") "is a municipal body with 24 member towns in east-central Vermont. As of October 2019, ECFiber has more than 4,000 customers connected. ECFiber currently has essentially full coverage in eight towns, and service is available on the majority of roads in an additional five towns. By the end of 2019, the District hopes to have an additional four fully covered towns. Our top priority is reaching as many unserved and under-served locations as possible, with a focus on back roads and outlying neighborhoods."[35] ECFiber started with investments from private members of the community and today relies heavily on revenue.
- Bonds to support its growth. ECFiber member towns include:
  - Barnard (395 Active Customers[36])
  - Bethel (114)
  - Braintree (125)
  - Brookfield (170)
  - Chelsea (47)
  - Granville (39)
  - Hancock (39)
  - Hartford (0)
  - Montpelier (0)
  - Norwich (355)
  - Pittsfield (181)
  - Pomfret (267)
  - Randolph (142)
  - Reading (44)

[33] 30 V.S.A. § 3056.
[34] Vermont Telecommunications Plan, at page 51.
[35] https://www.ecfiber.net/
[36] https://www.ecfiber.net/member-towns-list/, viewed on December 6, 2019.

- Rochester (132)
- Royalton (198)
- Sharon (144)
- Stockbridge (156)
- Strafford (325)
- Thetford (621)
- Tunbridge (90)
- Vershire (121)
- West Windsor (238)
- Woodstock (38)

ECFiber Network:



37

- Central Vermont Fiber "is a nonprofit organization made up of 16 Central Vermont towns."[38] CVFiber is currently conducting a feasibility study and business planning.
  - Barre City
  - Barre Town
  - Berlin
  - Cabot
  - Calais
  - East Montpelier
  - Elmore
  - Middlesex
  - Marshfield
  - Montpelier
  - Northfield
  - Orange
  - Plainfield
  - Roxbury
  - Williamstown
  - Woodbury
  - Worcester

The Survey

Our survey of electric companies asked, "Would it serve the public interest to permit a communications union district or other unit of government, nonprofit organization, cooperative, or for-profit business to lease excess utility capacity to provide broadband service to unserved and underserved areas of the State?"

Municipal Electric Departments

Most municipals were unsure on this question but four indicated it would serve the public interest. One respondent stated:

> *I feel the best model for broadband build-out is a Union Communication District such that of ECFiber. They have been able to successfully plan, build, and operate a broadband network with staged growth. The municipal or co-op utility, as well as towns that choose to enter the District, does not have to assume risk. An entity with a single focus is far more effective than a utility, especially smaller local utilities, in planning, building, operating, and maintaining a business that it lacks expertise in.*

Those in favor stated benefits as follows:

- Ability for underserved public to get service.
- ECFiber model is proven and working.

[37] https://map.ecfiber.net/
[38] https://cvfiber.net/

- For situations in which the electric utility deploys fiber to support grid functionality in areas not currently served by fiber, excess capacity (dark fibers) could be leased to broadband suppliers to support wider coverage of 25/3 speeds.
- If there were committed interested parties, it would help to recover costs associated with the construction and installation.
- The leasing party would likely have the knowledge, equipment, and staff to properly maintain the service and control the business operations
- Product choice for those who have internet service but would benefit by having more options
- District primary focus would be to install fiber, single path to follow.
- Multiple towns can choose to join the District to spread the cost over a larger population segment.
- Broadband will reach customers that national companies are unwilling to reach.
    - One respondent noted "Excess Capacity would have to be determined first."

Other comments include:

- "If the 3rd party provides a revenue source to the utility that exceeds the utility's costs, then it seems to be in the interest of the utility, provided that there are no operational challenges with having a 3rd party attach."
- "It would only work if there were commitments from third parties prior to debt incurrence rather than a speculation which could potentially cause losses to the utility and in turn the ratepayers."
- "Broadband over satellite should be looked at as the best option."
- "Working with local communications provider is easier than working with a national company."

One "no" response concluded "rural governance of these organizations seem to have limited expertise and understanding, resulting in uninformed or poor decision making." Also, "Is this push for higher income individuals that want downtown level service in remote locations so they can have their "piece of VT?" The majority of the public in our area seems to be low income moving out of downtowns because they can't afford service." There is also concern "that there is actually existing excess utility capacity."

Electric Cooperatives

Vermont Electric Cooperative stated "anything that leverages additional use of existing assets would be in the public interest, as long as it is done safely and in a least-cost manner. The additional revenue from rents by these entities, as long as the rents exceeded utility costs, could help lower utility costs that in turn can help reduce rate pressure."

Washington Electric Cooperative stated "WEC supports others in rolling out high-speed internet. Other business models may very well make sense and WEC will seek to work with others. In order to answer this question, a feasibly study is needed to explore the various ways high-speed internet could be deployed and the best way for WEC to proceed. The answer to this and many of the questions posed would be answered by a detailed feasibility study and business plan. WEC needs more information to respond. See answer to Q1 for more details [where WEC provided extensive discussion on the subject]."

VELCO states this could serve the public interest:

- Such leases could create new revenues that would offset transmission costs.
- Such leases could help our distribution utility owner/customers increase services to their customers.
- Such leases could help address Vermont's broader economic, environmental, healthcare, education and demographic needs.

Investor Owned Utilities

Green Mountain Power favors this, observing as did VEC that "Anything that leverages more use of existing assets would be in the public interest as long as it is done safely. The additional revenue from rents by these entities, as long as the rents exceeded utility costs, could help lower utility costs which in turn can help reduce rate pressure."

Discussion

Magellan Advisors believes there is merit to further the use of the Communications Union District (CUD) concept and structure to address the problem of expanding broadband service to unserved and underserved areas. "The formation of a CUD protects individual towns from the credit risks associated with a failing project as the district is considered its own municipal organization. Forming a CUD also allows the entity to draw on the human capital of several towns, such as lawyers, technologists, financiers and other skilled people who can join a CUD board and contribute to its success."[39] As stated by one survey respondent, "the best model for broadband build-out is a Communications Union District such as that of ECFiber. They have been able to successfully plan, build, and operate a broadband network with staged growth." Also, "ECFiber represents the state's most encouraging example of municipal broadband."[40]

[39] Report on the Use of General Obligation Bonds for Improvements to Municipal Telecommunications Plants submitted to the Vermont Legislature by Susanne Young, Secretary of Administration, December 1, 2019, at page 9. ("Secretary of Administration's Report on Use of General Obligation Bonds for Municipal Telecommunications Plant")

[40] Secretary of Administration's Report on Use of General Obligation Bonds for Municipal Telecommunications Plant, at page 2.

The statutory powers and limitations of Communications Unions have been accepted by two entities, East Central Vermont Telecommunications District (ECFiber) and Central Vermont Fiber, and there are efforts to form new Communications Union Districts. ECFiber is operational and serves approximately 3,500 customers according to its website. CVFiber is in the planning stage to serve 16 towns. Survey respondents see benefits to the Communications Union approach, such as:

- A primary focus on deploying fiber to provide service to the underserved public;
- Spreading costs over multiple towns and a larger base;
- Reaching customers that national companies are unwilling to reach;
- Potential use of dark fiber excess capacity from electric utility deployment for smart grid;
- Acquisition of knowledge and expertise from the parties who lease the dark fiber;
- Leveraging additional use and cost recovery for the facilities deployed for smart grid;
- Consumer satisfaction from working with a local company; and,
- Ultimately helping address Vermont's broader economic, environmental, healthcare, education and demographic needs.

So, the Communications Union model appears to be proven and working, although one dissenting opinion was expressed indicating the governance has limited expertise and understanding resulting in uninformed or poor decision making.

DPS's Final Draft 2018 Vermont Telecommunications Plan notes two additional reforms that could enhance the ability of Communications Unions to flourish. First, there is a conflict from Communications Unions operating as a business that generates commercially sensitive information while its member/owners are subject to Vermont's Public Records Act. Communications Unions by their operation generate commercially sensitive information such as subscriber specific information, subscriber counts, usage date and billing information, and engineering records including maps. No other telecommunications providers must disclose this type of commercially sensitive business information to the public, yet the Public Records Act may not be clear that such records of a Communications Union are exempt from disclosure requirements. DPS notes that a clear statement in the Public Records Act specifically exempting Communications Unions from these types of disclosures would provide clear and beneficial guidance.[41] Second, "Vermont law currently prohibits towns from using taxpayer money to fund the capital expenditures and operations of a municipal telecommunications facility."[42] Currently

[41] Vermont Telecommunications Plan, at page 51.
[42] Vermont Telecommunications Plan, at page 51, citing 24 V.S.A. § 1913.

municipalities are prohibited from pledging tax dollars to fund telecommunications plant although revenue-backed bonds are allowed.[43]

The Vermont Telecommunications Plan suggests this law:

> Could be changed to allow towns to bond for some capital expenditures of existing or starting networks. This new program would mirror New Hampshire's SB 170, which provides a process for towns to bond to expand networks to unserved locations within a municipality. Vermont could use a similar program to help start Communications Union Districts as well as allow towns to invest in existing networks of incumbent providers. Limitations on the authority to bond would need to be put in place. Such limitations should include focusing capital to underserved locations only, limiting the amount (or percentage) of taxpayer dollars allowed to be collateralized, and setting technical requirements for the service. Lastly, the State should consider ways to help towns explore the feasibility of CUDs through resources geared toward planning.

The Broadband Deployment Act addressed this second issue in two parts. First, 24 V.S.A. § 1913 is amended to add provisions allowing a municipality to enter into a public-private partnership to provide telecommunications services, contracting with a private entity to operate and manage communications plant owned or co-owned by the municipality. There is a proviso that "the municipality first issues a request for proposals seeking an Internet service provider to serve or to assist with serving unserved and underserved locations targeted by the issuing municipality."[44] Second, the Broadband Deployment Act provided that "The Secretary of Administration or designee, in collaboration with the State Treasurer or designee and the Executive Director of the Vermont Municipal Bond Bank or designee, shall investigate the use of general obligation bonds by a municipality to finance capital improvements related to the operation of a communications plant."[45] This Report[46] was provided to the Vermont Legislature by the Secretary of Administration on December 1, 2019. The Report noted "it can be argued that the prohibition [on use of general obligation bonds] serves a legitimate and compelling financial safeguard, it can also be argued that the prohibition ignores the will of the community and unduly restricts towns from implementing workable broadband models."[47] While state and local policy leaders see municipal bonding as a powerful tool for broadband expansion funding, the Report recommends a "wait and see" approach to observe the impact of other tools adopted

[43] 24 V.S.A. § 1913(c); and, Secretary of Administration's Report on Use of General Obligation Bonds for Municipal Telecommunications Plant at page 1.
[44] 24 V.S.A. § 1913(f).
[45] Broadband Deployment Act, Sec. 14.
[46] Secretary of Administration's Report on Use of General Obligation Bonds for Municipal Telecommunications Plant.
[47] *Ibid*., at page 1.

in the Broadband Deployment Act including the establishment of more Communications Union Districts before lifting the bond restriction.[48]

The Vermont Telecommunications Plan notes the growing interest in creating Communications Union Districts and suggests "funding should be made accessible to these districts to complete feasibility studies and engineer systems"[49] to support proper planning and initial funding. We believe each of these recommendations is reasonable for implementation by the Vermont General Assembly to further the ability of Communications Unions to expand broadband service to unserved locations in Vermont.

Assessment of Unserved/Underserved Areas

The Broadband Deployment Act requires this Report to identify "the unserved and underserved areas of the State where the provision of broadband service by an electric company appears feasible."[50] "Unserved" and "underserved" have varying meanings in different contexts. For example, as used for Connectivity Initiative purposes, "unserved means a location having access to only satellite or dial-up Internet service and 'underserved' means a location having access to Internet service with speeds that exceed satellite and dial-up speeds but are less than 4 Mbps download and 1 Mbps upload." The original purpose of the Connectivity Initiative was to support provision of access to Internet service capable of speeds at least 10 Mbps download and 1 Mbps upload, to each service location in Vermont. The Broadband Deployment Act recognizes changes to this definition by the FCC to stay abreast of the marketplace, increasing the speed requirements defining "broadband service" to 25 Mbps download and 3 Mbps upload. Under that definition of broadband as stated above approximately 27% of Vermont addresses lack access to this level of internet access service. The 80,802 locations in Vermont which do not have access to internet services at this speed are shown by distribution utility in Table 1, in the "Cost Estimates" section below. As described in the Vermont Broadband Mapping section above, we used the excellent Geographic Information Systems mapping data for broadband services, administered by DPS and its partners, to identify each premise location in Vermont that does not have internet access at this speed. We then performed cost analysis for a high-level estimate of costs to build facilities to each location as well as a financial feasibility analysis to include operating costs, take rates and profitability/pay-back period, as shown in the Cost and Financial Feasibility sections below.

[48] *Ibid*.
[49] Vermont Telecommunications Plan, at page xi.
[50] Broadband Deployment Act, Sec. 11(a).

The following maps provide illustrations of each distribution utility's serving area with the underserved and unserved addresses within it. **Dots shown in red, yellow and orange correspond to the address points for underserved, at least 4/1 service and at least 10/1 service respectively**.

Figure 1: Washington Electric Cooperative – Shaded in Aqua

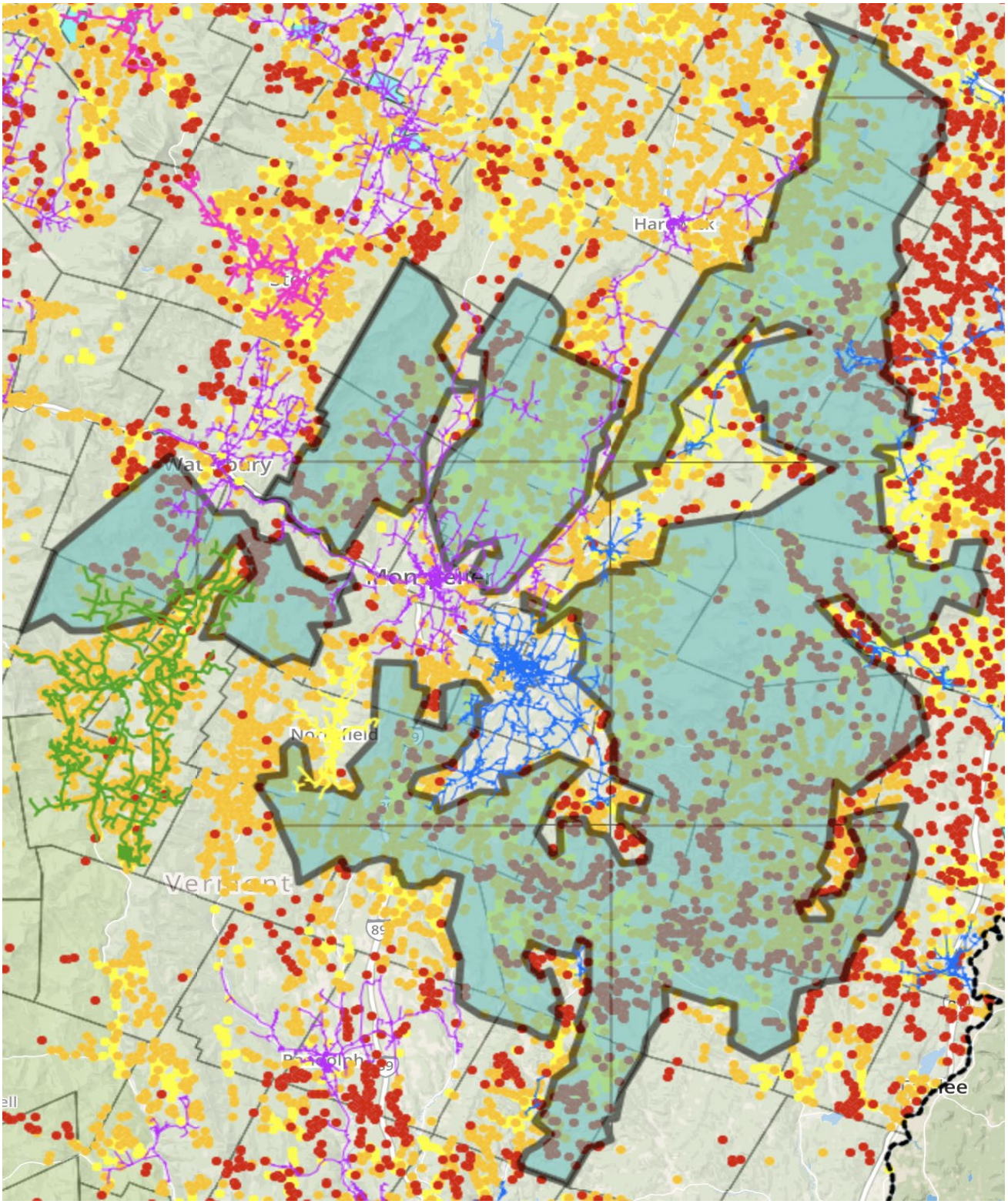


Figure 2: Town of Stowe Electric Dept. – Shaded in Pink

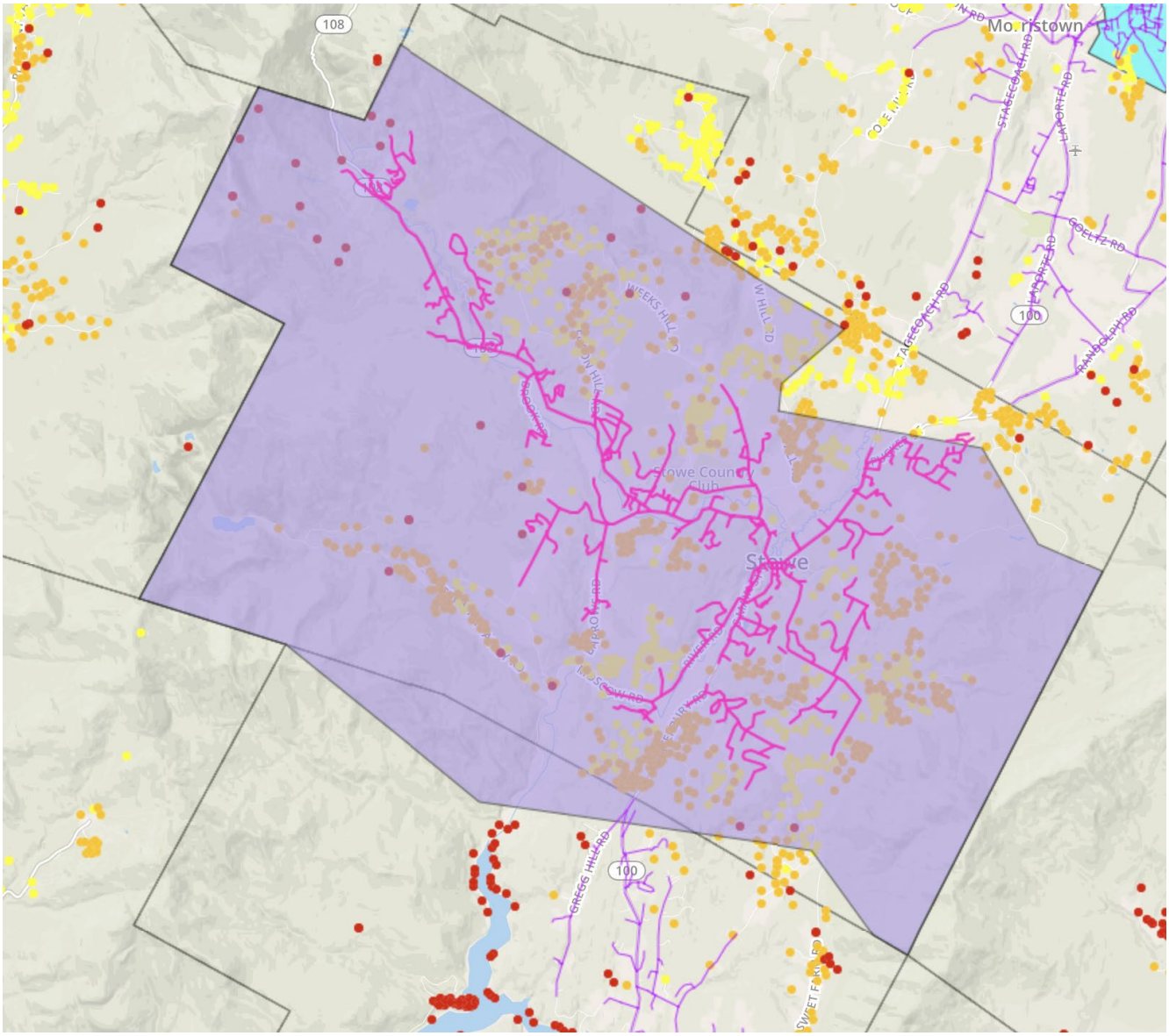


Figure 3: Village of Orleans – Shaded in Green

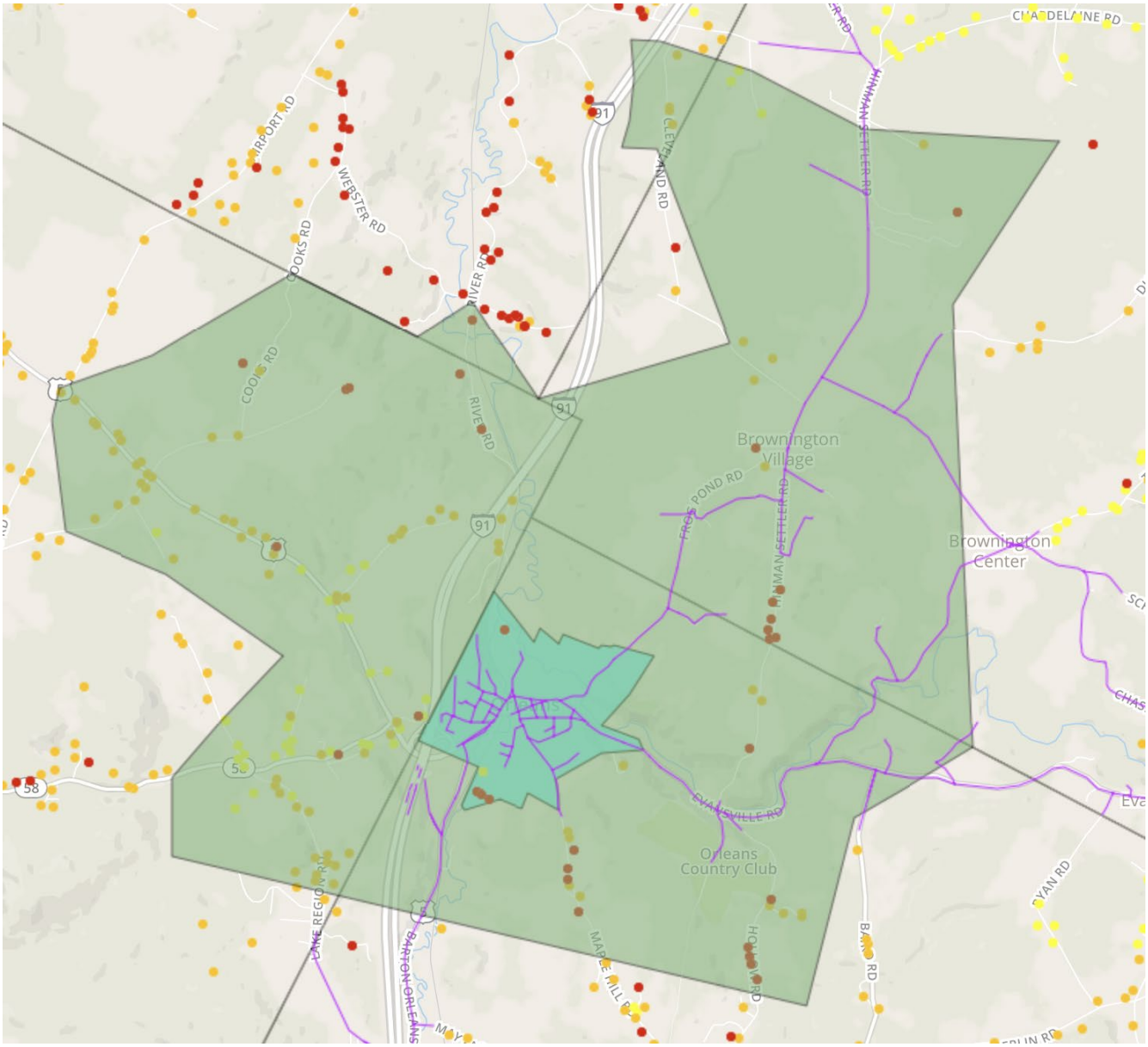


Figure 4: Village of Northfield – Shaded in Blue

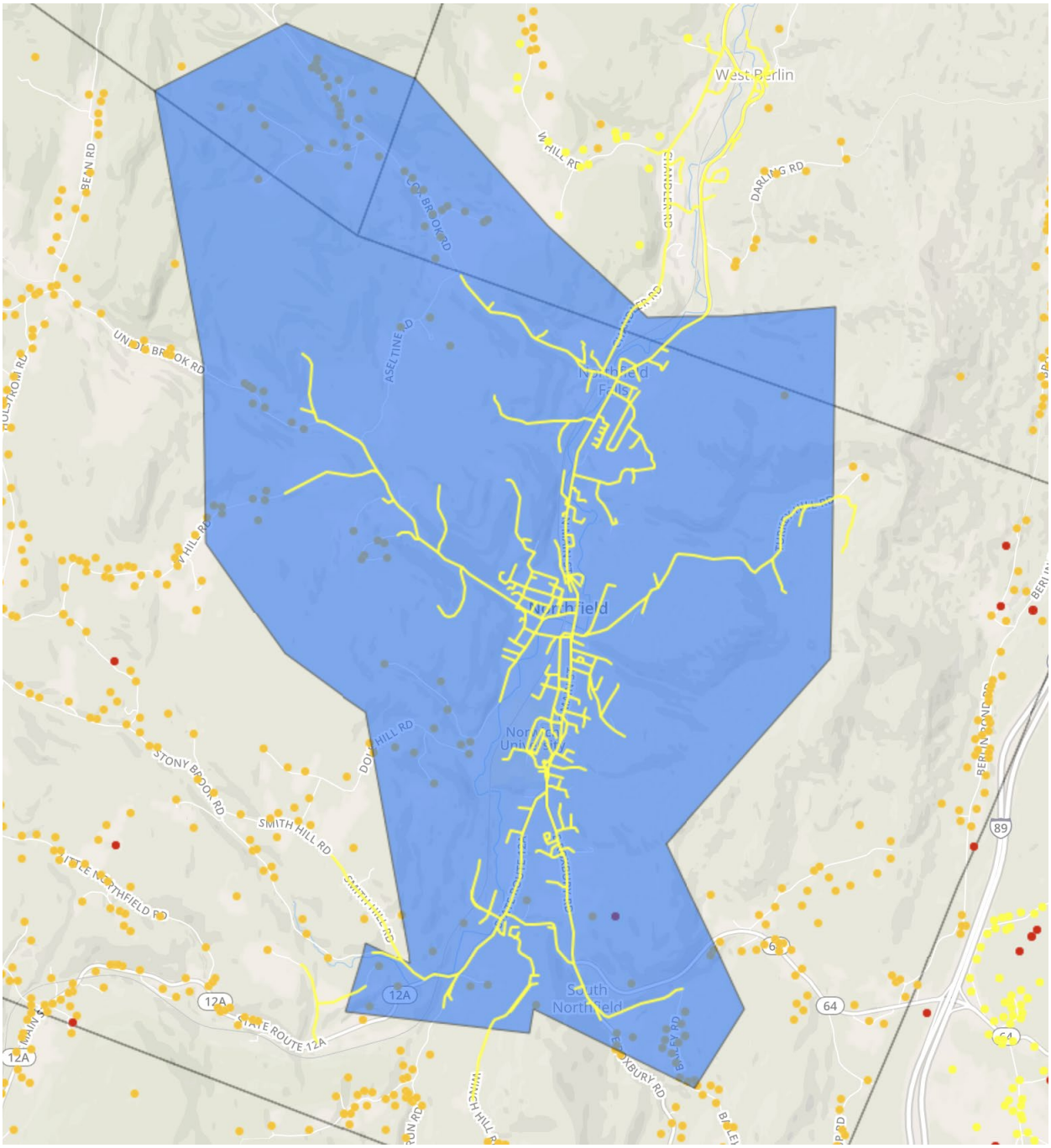


Figure 5: Village of Morrisville Water and Light. – Shaded in Green

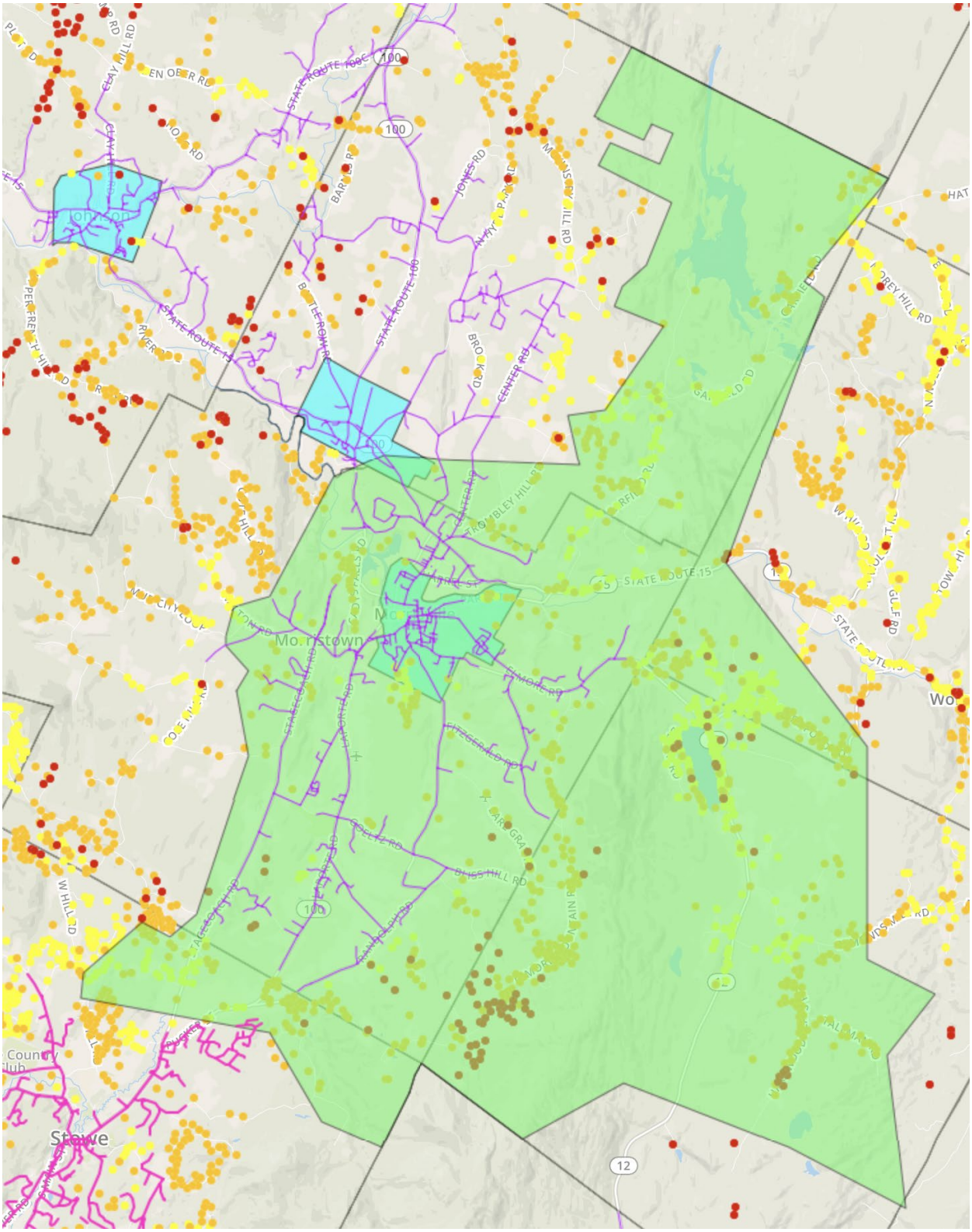


Figure 6: Village of Morrisville Electric – Shaded in Blue

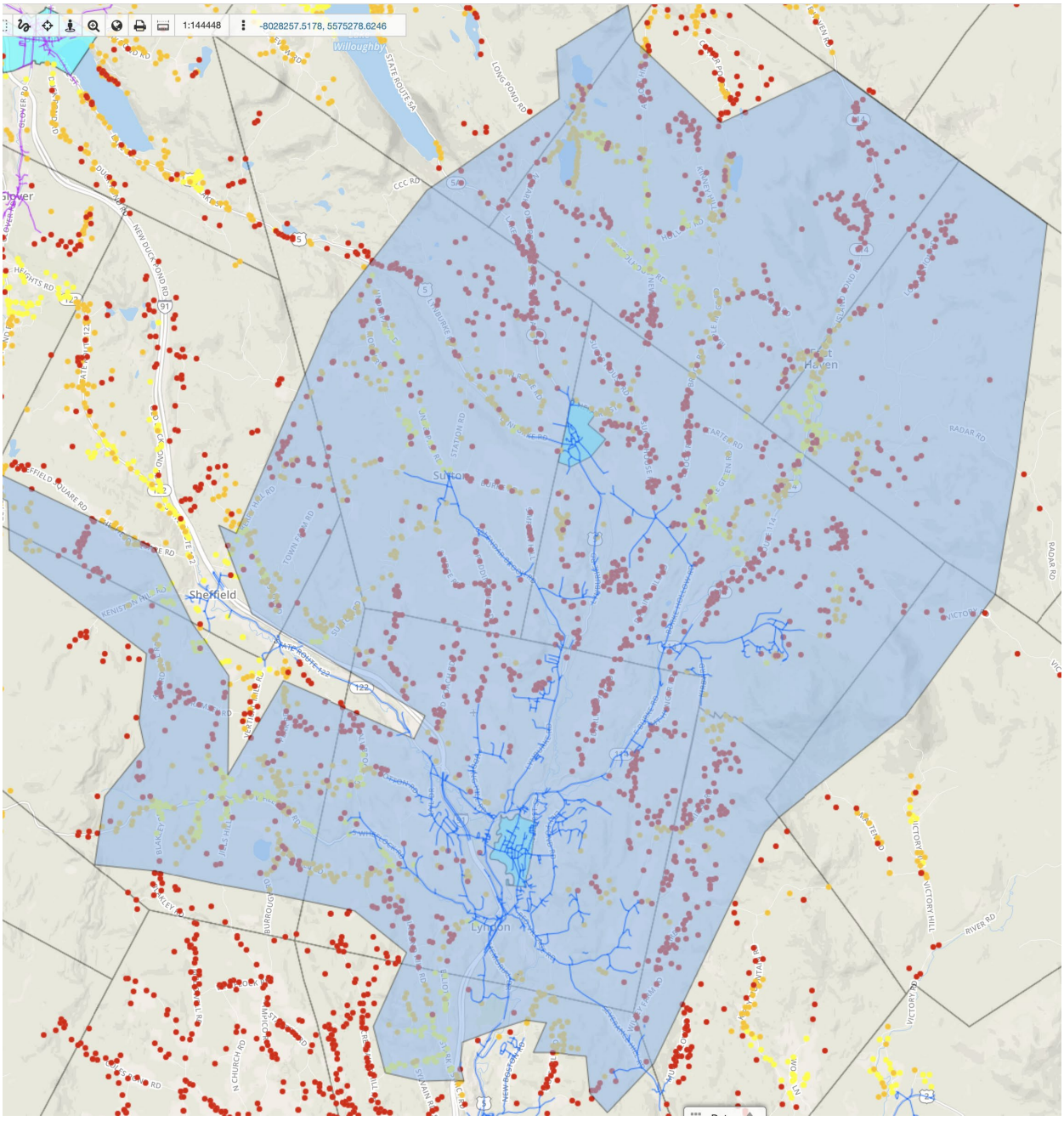


Figure 7: Village of Johnson – Shaded in Purple

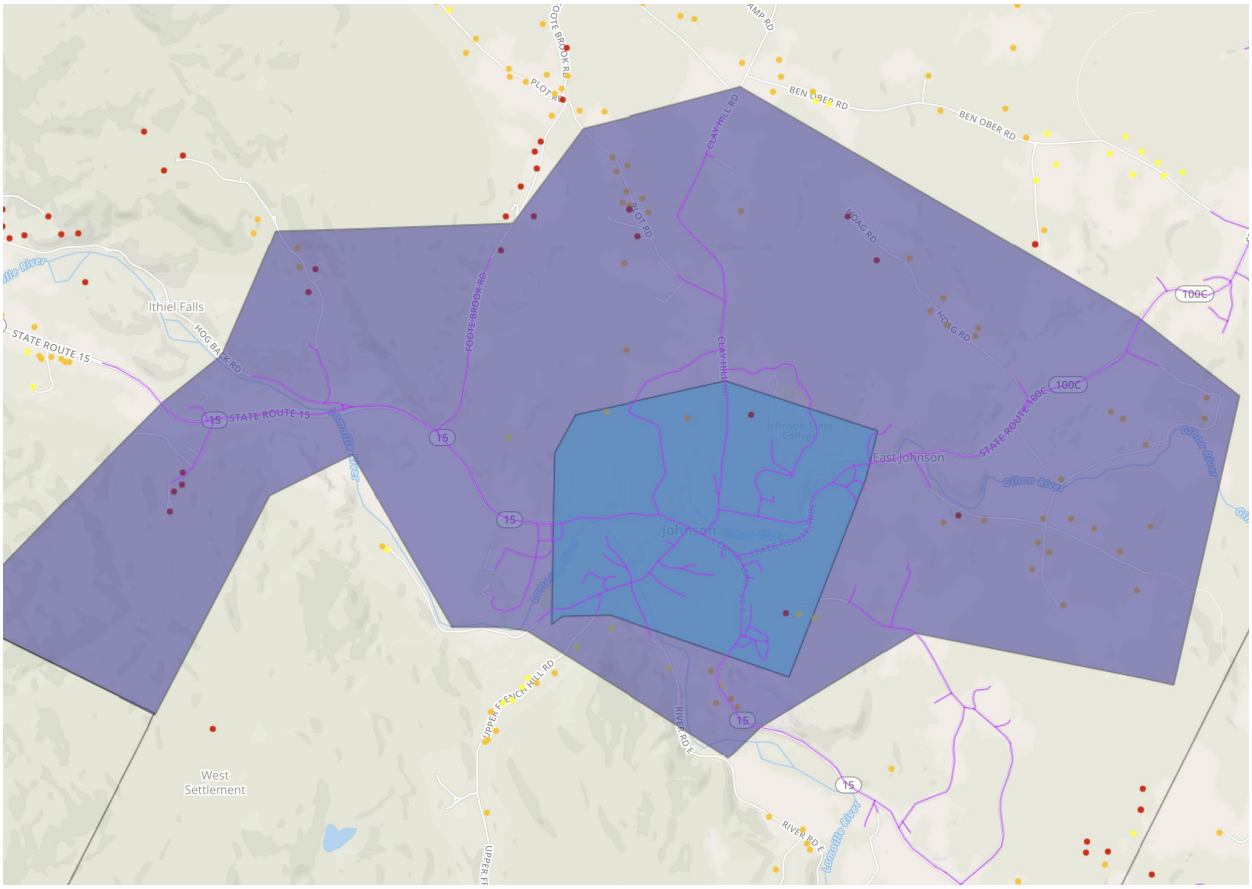


Figure 8: Village of Jacksonville – Shaded in Purple

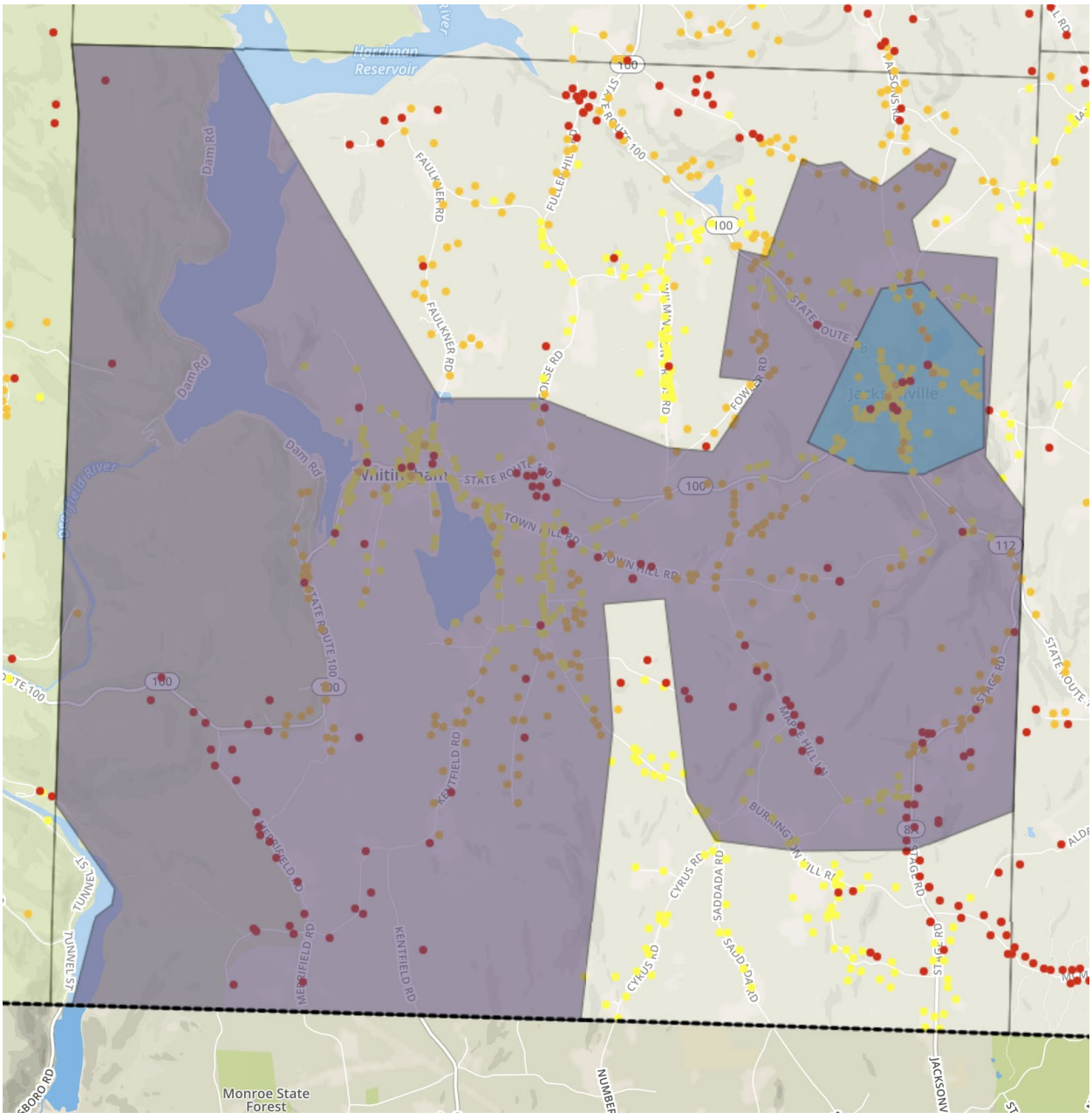


Figure 9: Village of Hyde Park – Shaded in Red

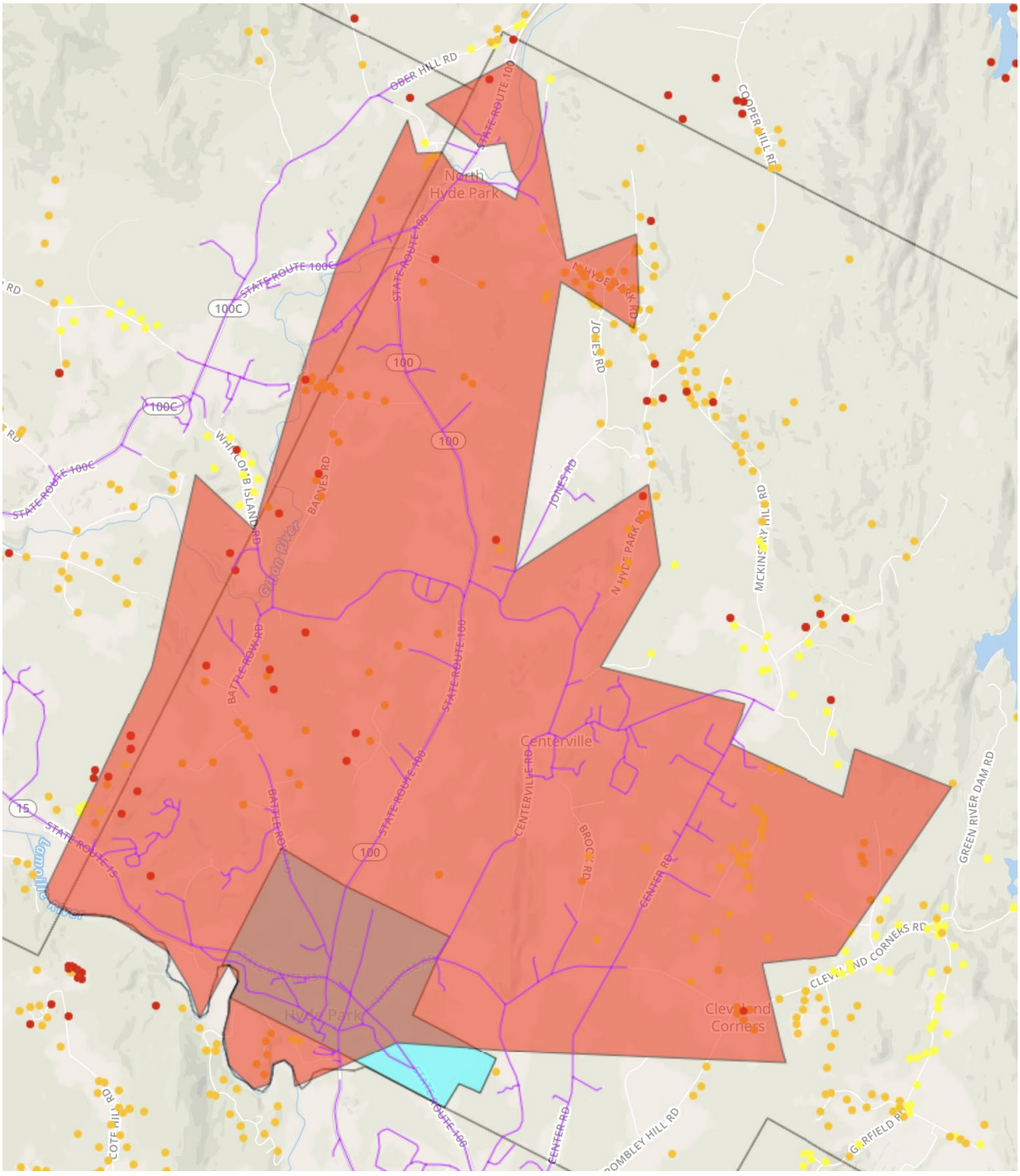


Figure 10: Village of Hardwick – Shaded in Grey

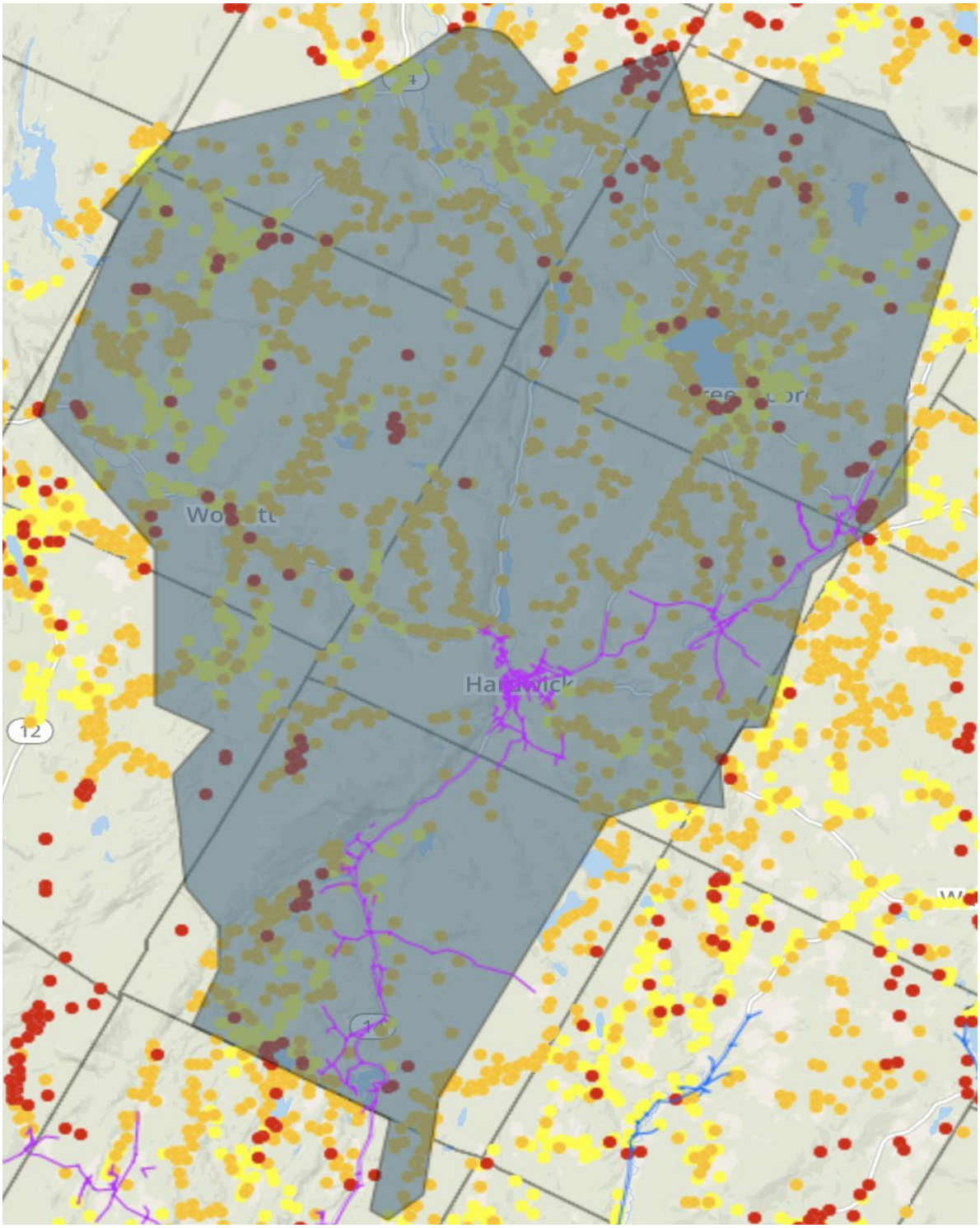


Figure 11: Village of Enosburg Falls – Shaded in Green

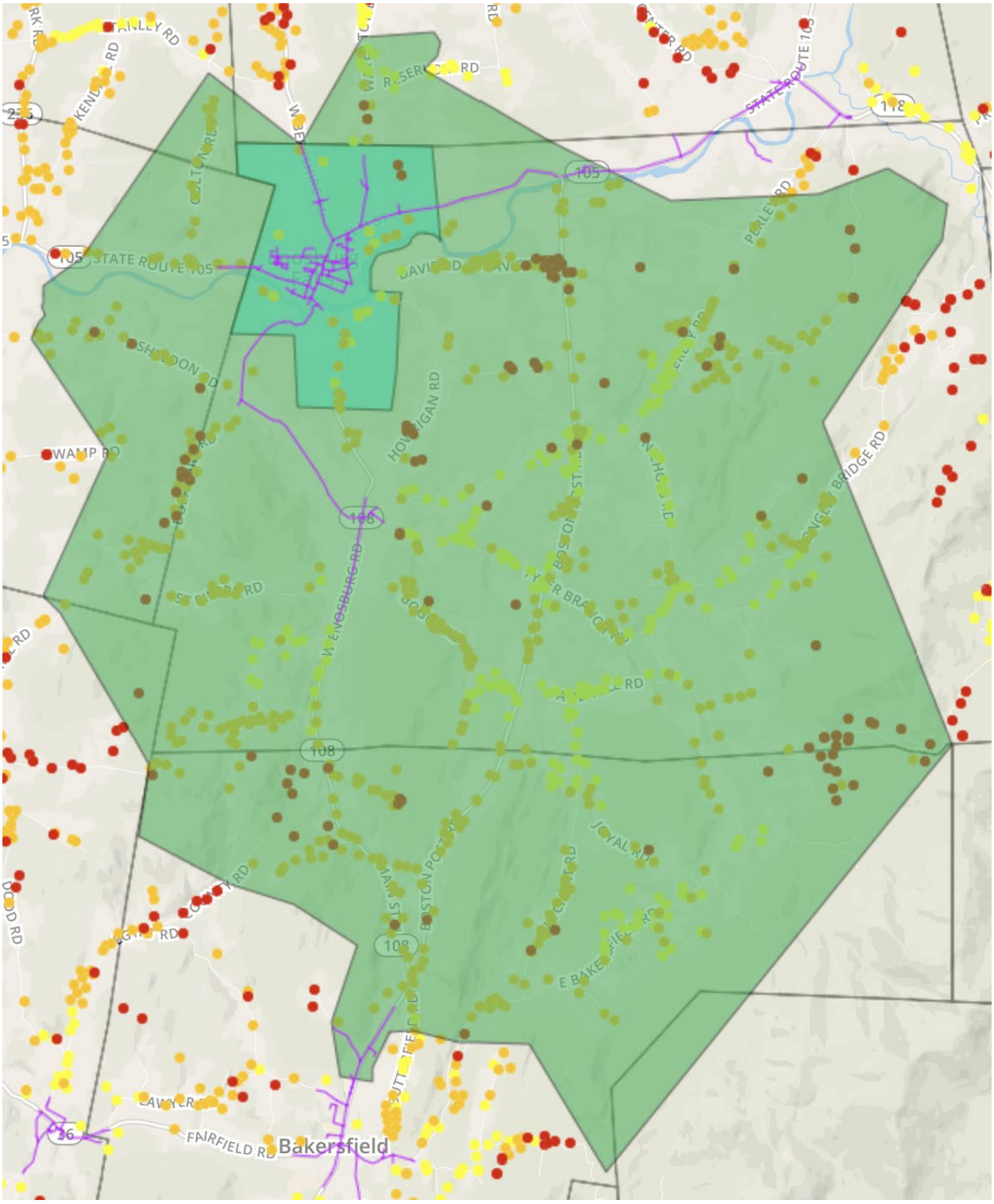


Figure 12: Village of Barton – Shaded in Purple

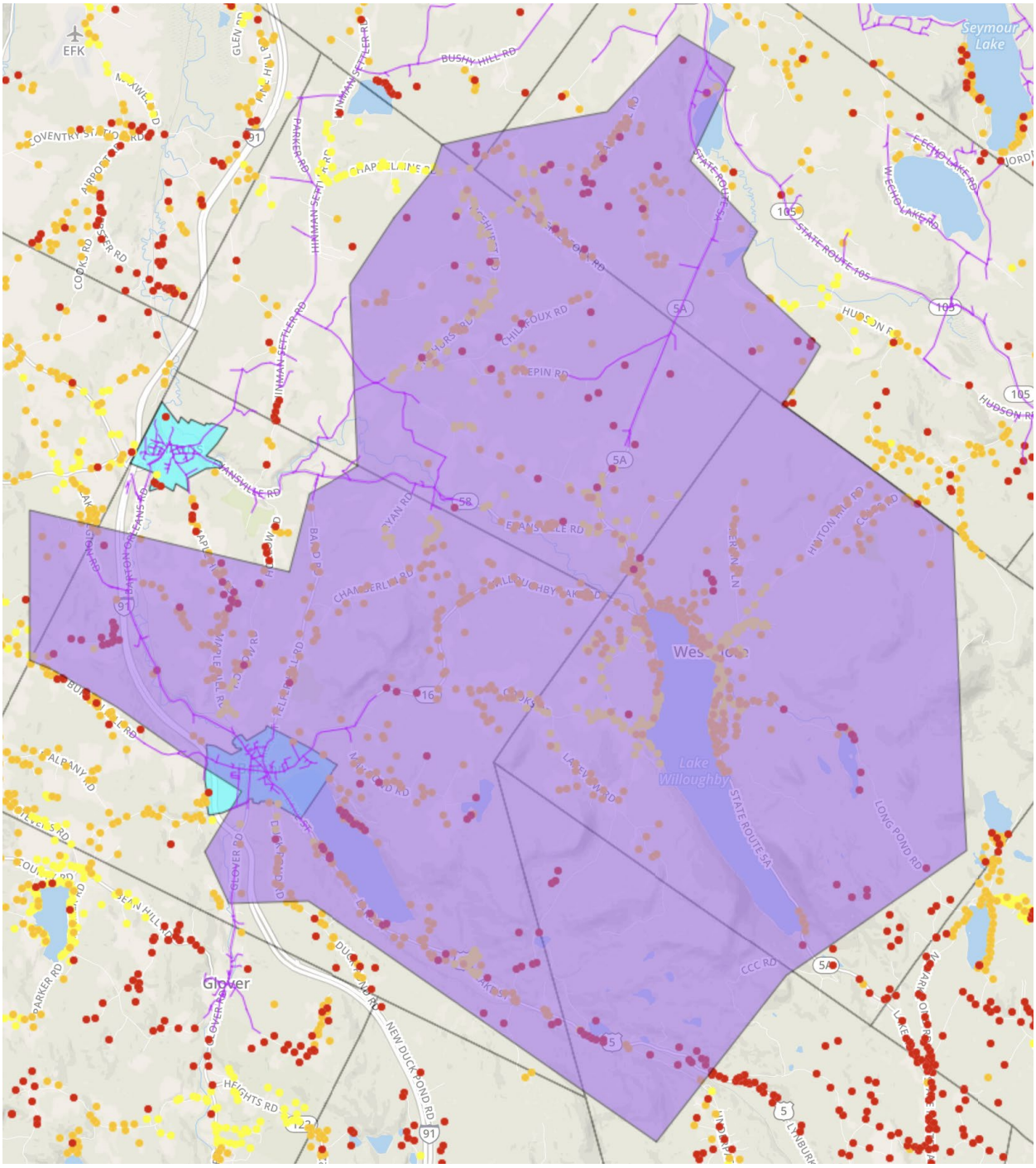


Figure 13: Vermont Electric Cooperative – Shaded in Green

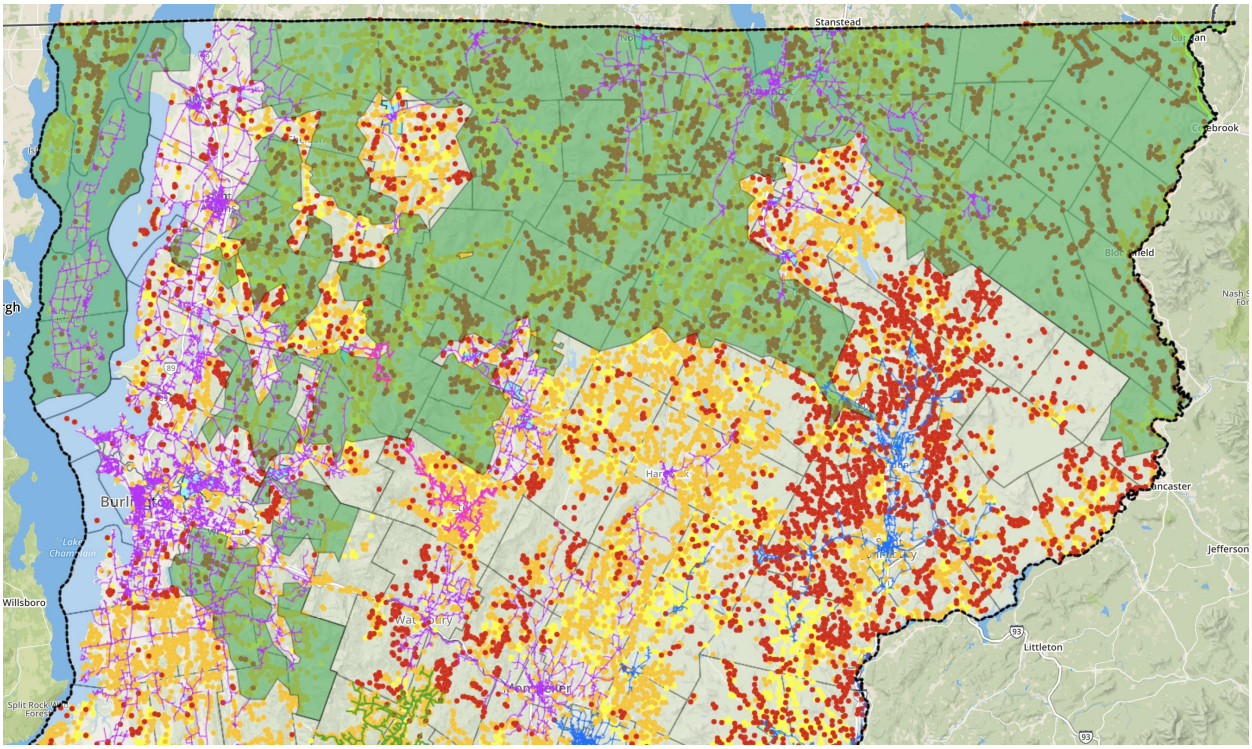


Figure 14: Swanton Village Electric Cooperative – Shaded in Pink

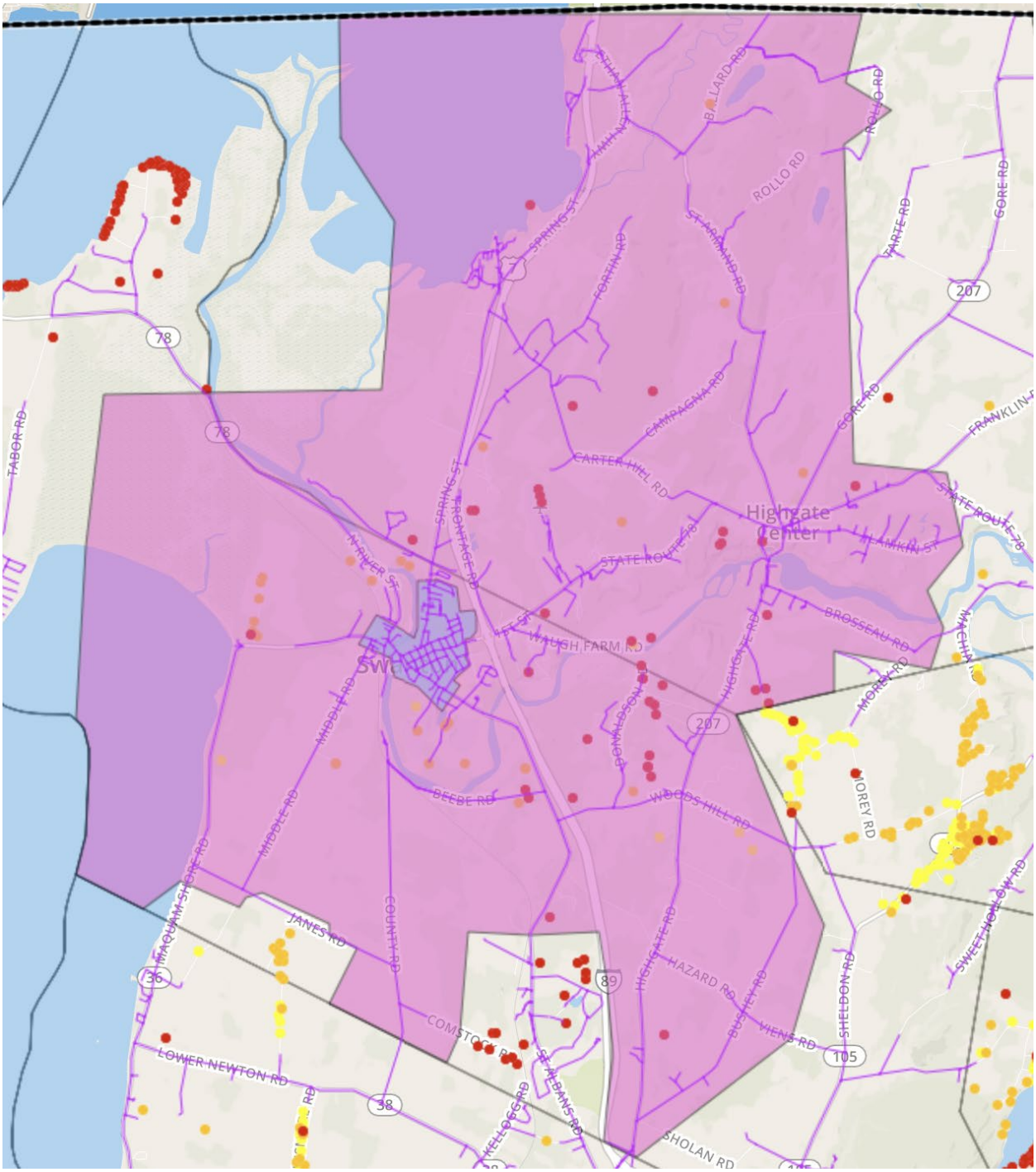


Figure 15: Ludlow Electric Dept – Shaded in Yellow

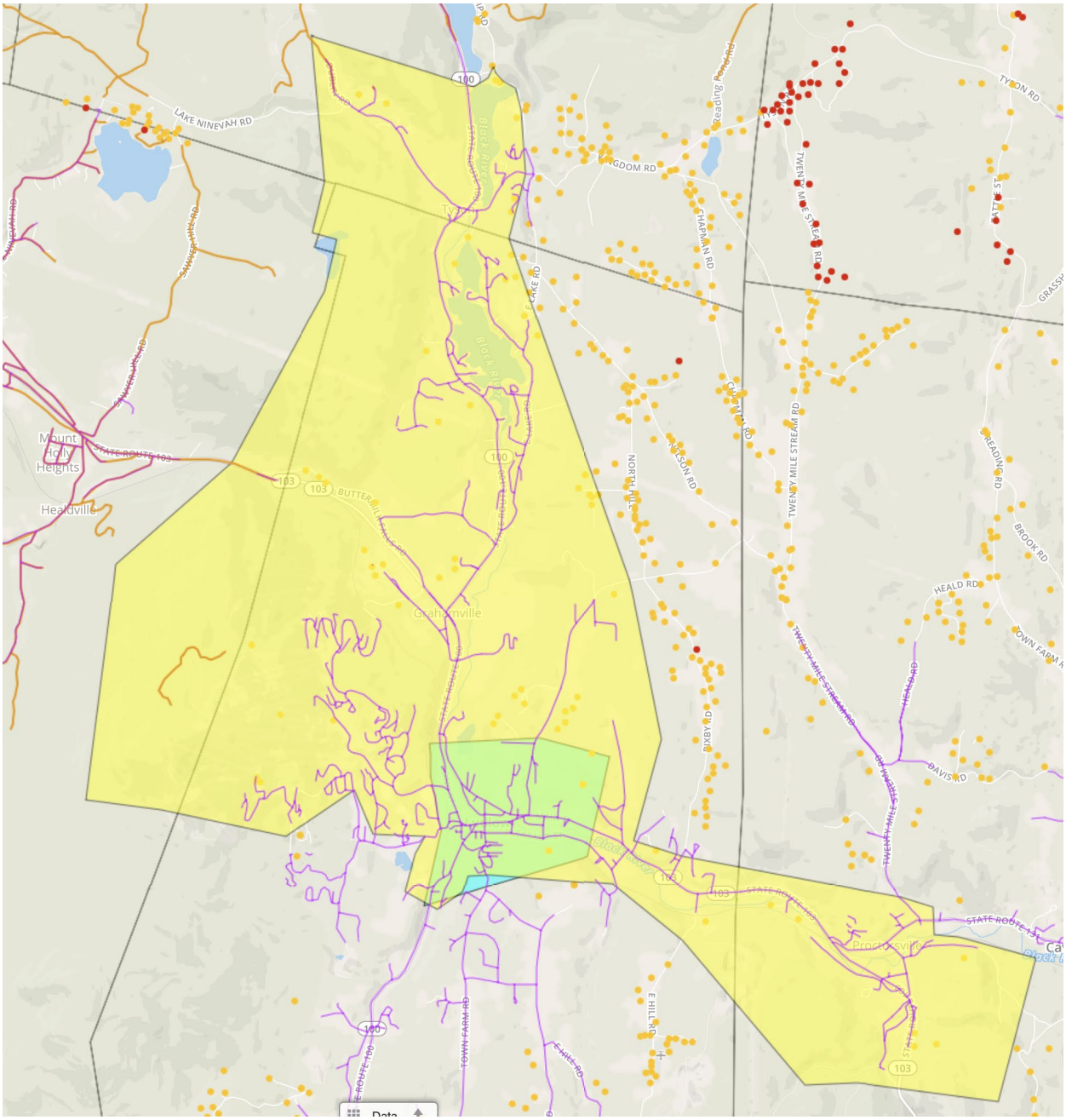


Figure 16: Green Mountain Power – Shaded in Purple

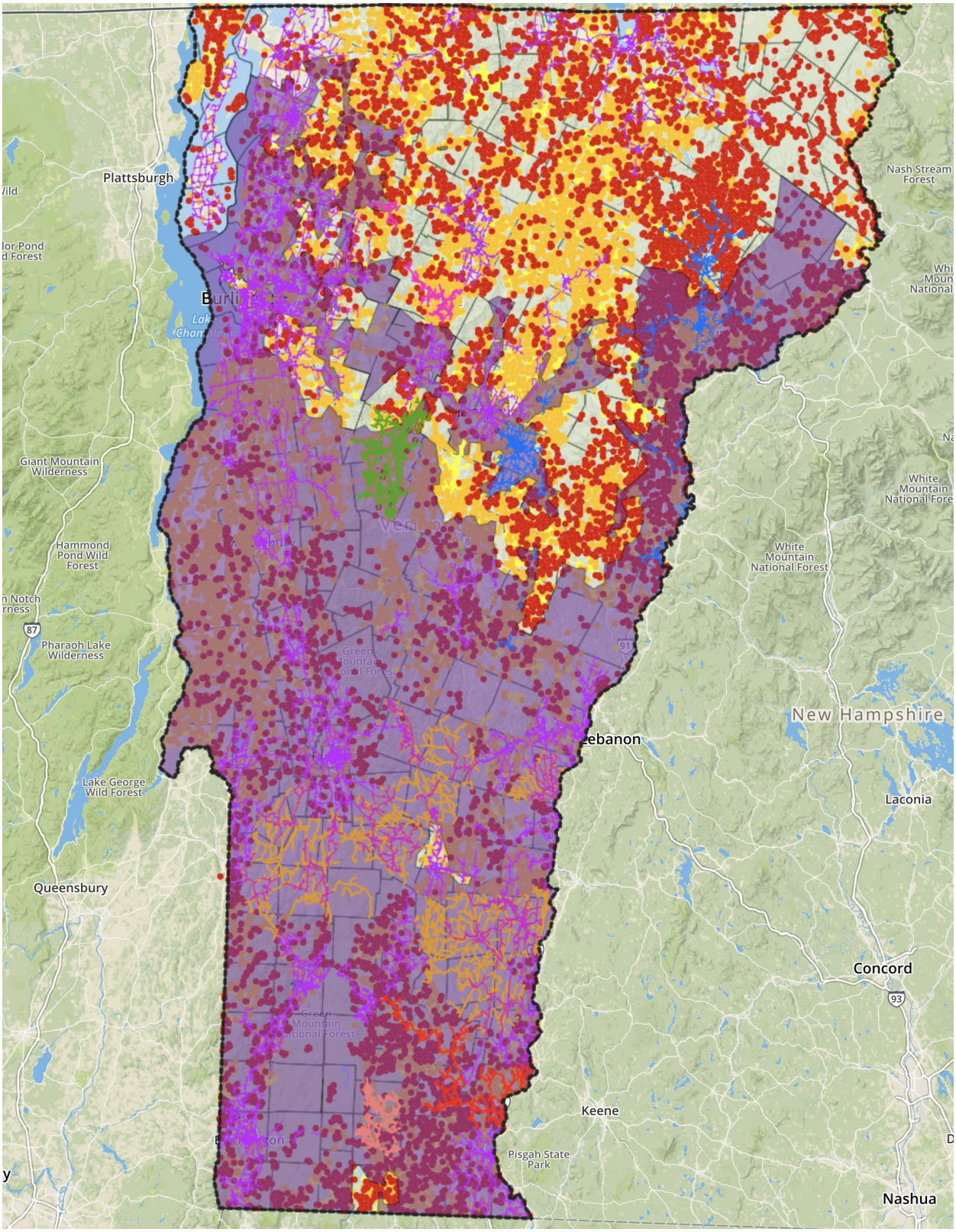
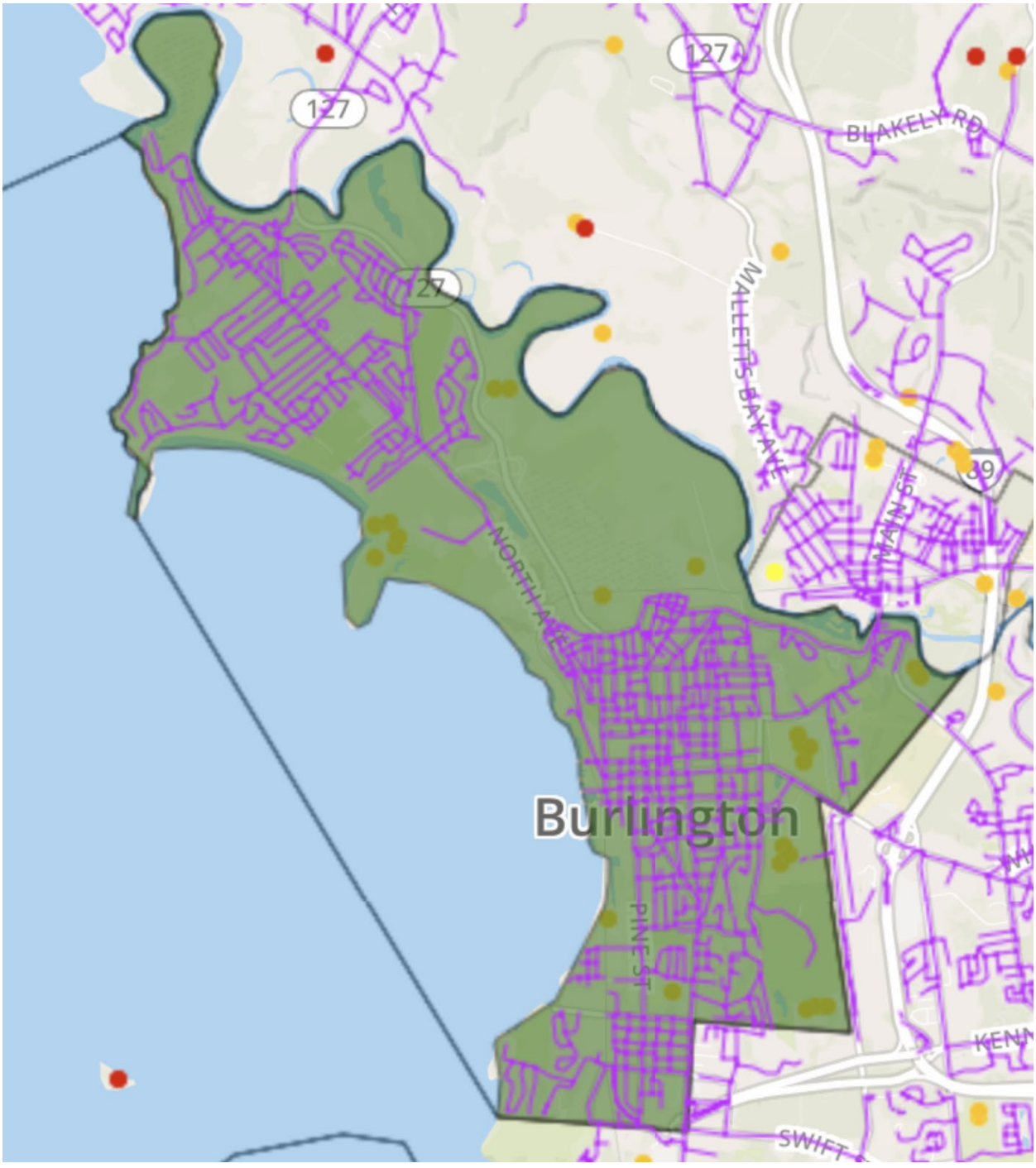


Figure 17: Burlington Electric Dept – Shaded in Green



Potential Advantages and Disadvantages of Fiber Deployment by Electric Distribution Utilities

The Broadband Deployment Act requires this Report to consider the "potential advantages of serving utilities' internal data needs and expanding fiber for providing broadband service."[51] Accordingly, our Survey of electric companies asked: "What are the potential advantages of serving the Utility's internal data needs with a fiber-optic communications network and expanding the Utility's fiber to provide broadband service?" This question is intended to solicit the electric utility's views on the potential advantages for fiber deployment to serve both the utility's internal data transmission and internet access needs as well as provide broadband service to the community.

Advantages

Municipal Electric Departments

Common observations included fiber networking may be beneficial for:

- Supporting the operation of AMI systems (advanced metering infrastructure including smart meters and smart grid);
- Supporting the operation of SCADA systems (supervisory control and data acquisition) used to monitor and control infrastructure;
- Generating new revenues;
- Security applications;
- Data transfers and connectivity;
- Increased reliability and resiliency for electric distribution services; and,
- Improvement to customer service.

However, some utilities noted that they do not have in-house expertise related to fiber and/or broadband service/operations. Consequently, the lack of knowledge about the realities of these resources makes it very difficult to accurately estimate costs/disadvantages and revenues/advantages. There is a view that more information about the equipment, service models, maintenance, operations, etc. would be necessary before a utility can adequately assess how it would work with existing operations/staff.

[51] Broadband Deployment Act, Sec. 11(a).

Electric Cooperatives

Vermont Electric Cooperative responded that it already uses fiber for internal data needs and finds certain advantages:

1. Real-time Supervisory Control and Data Acquisition (SCADA) data/control from apparatus online and in substations.
2. Interconnection between electric utility Control Centers.
3. Automated outage detection (e.g., Metering Infrastructure-AMI and Fault Detection and Location-FDNL).
4. Increased ability to redefine work options and flexibility for employees (e.g., working from remote locations).
5. Increased use of video conferencing to reduce/eliminate travel between locations for meetings.
6. Increased use of "cloud" computing and data storage to reduce Information Technology overheads/costs.
7. Redundancy in Internet Service Provider connections to improve reliability.
8. If broadband is fiber-optic based, it improves cyber security (e.g., more difficult for physical wire-tapping, packet siphoning, data breach, speed of data encryption, etc.)
9. Increased telecommunications and radio connectivity.
10. Increased economic development (e.g., higher revenue through increased electricity sales).

VEC has a "robust fiber network that connects each of its four main facilities, 34 substations, and a number of line apparatus." However, VEC has not analyzed whether there are advantages to VEC from expanding broadband services. To the extent that broadband deployment results in economic growth within VEC's service territory, that could be an advantage to VEC.

Washington Electric Cooperative provided an extended answer to this question which is attached in full as Appendix V.

VELCO offered broad comments:

- As an electric transmission company, VELCO's primary focus is transmission grid reliability. Thus, it was in service of securing and enhancing grid reliability that the company constructed its fiber-optic network. Today, that network serves as a critical asset that helps to enable safe, efficient, and reliable transmission grid operations throughout the state. More broadly, VELCO's vision is to create a sustainable Vermont through our people, assets, relationships and operating model. Facilitating improved broadband services across Vermont is a key part of this vision.

- As a "transmission-only" company many of the survey questions do not apply to VELCO as they appear to be geared much more to the distribution utilities in the state. Additionally, VELCO has already given permission to Magellan to share previous VELCO broadband research and analysis with the Department. Regardless, the company is committed to serving as a trusted partner in broadband deployment. To that end, a brief overview of VELCO's network follows.
    - The VELCO backbone comprises over 1,500 fiber miles throughout Vermont and 300 on-net locations. Additionally, the network passes through over 170 towns in the state. The network's reliability is enhanced by utilizing unique routes. For instance, most recently a new fiber-optic cable was installed across the top of Lake Champlain. The network also continues to grow and deploy state-of-the-art technologies. In anticipation of future bandwidth requirements, the Dense Wave Division Multiplexing ("DWDM") equipment can be upgraded to provide 100 GB wave services throughout the state. VELCO's commitment to Vermont remains as strong today as when the company was formed in 1956. We are continually improving our ability to serve the citizens of Vermont.
- VELCO has an existing network thus answers below pertain to expansion to facilitating broadband service delivery.
    - Expansion could create new revenues that would offset transmission costs.
    - Expansion could help our distribution utility owner/customers increase services to their customers.
    - Expansion could help address Vermont's broader economic, environmental, healthcare, education and demographic needs.

Investor Owned Utilities

Green Mountain Power "owns and operates a reasonable amount of fiber already to connect communications capabilities between our district offices, to our generation facilities, to our substation facilities and to intelligent grid devices. GMP also leverages an extensive fiber network owned/operated by VELCO." GMP sees advantage from "dedicated bandwidth, reliable connectivity, theoretically, improved broadband access for our customers who lack it."

Disadvantages

Our survey of electric companies also asked, "What are the potential disadvantages of serving the Utility's internal data needs with a fiber-optic cable communications network and expanding the Utility's fiber to provide broadband service?" This question is intended to solicit the electric utility's views on the potential disadvantages for fiber deployment to serve both the utility's internal data transmission and internet access needs as well as provide broadband service to the community.

Municipal Electric Departments

There were many common observations regarding the disadvantages of fiber-optic cable deployment that were expressed by the municipal electric departments. Emblematic of these concerns:

> *Providing broadband service would require distribution companies to launch a completely different business model than they are currently managing in an already saturated market. Finding new customers to cover expenses will be difficult. In addition, utilities would be building a business model from the bottom up, not purchasing a turn-key operation with a proven track record. There will be difficulties in obtaining the necessary funds for equipment, construction, design, expertise and training.*

> *During an outage, fiber cannot be repair/spliced as expediently as an electric conductor. Repair of fiber requires a controlled environment with lighting, heat, power, fusion splicer within a splicing enclosure being a camper shell equivalent in the bed of a truck, if the fiber will reach the road. If not, a tent in the right-of-way. What about deep snow, snowshoe in with electric repair material, pack it out and pack in the fiber repair material. Human and fleet resources will be that location for a very extended period, electric restoration will suffer. Give 1st priority to electric and 2nd to fiber? Customer with restored power will want restored fiber immediately thereafter.*

Expressed concerns include:

- Large/Increased debt and debt cost;
- Uncertain cost recovery;
- Attracting and retaining skilled labor, and at what cost;
- Lack of familiarity, new industry;
- New marketing and development costs;
- The territory is already served by telecom companies;
- Heavy additional investment requirements;
- Exposure to technology change/obsolescence;
- Impacts on electric rates;
- Lack of broadband specific experience, tools and training;
- Service restoration priority conflicts, fiber or electric?

- High cost per mile, not cost-effective;
- The reality that current customers have difficulty paying their electric bill.

Electric Cooperatives

Vermont Electric Cooperative has not yet studied this question in detail but provided a "best guess" ranking "based on our current understanding of what a broadband build-out using fiber would entail."

1. Significant financial investment for installation/rollout with a long return on investment timeframe.
2. Related to 1, significant unknowns related to number of members who would actually sign-up for service (e.g., revenue risk for capital investment).
3. Related to 1 and 2, broadband access is already available to approximately half of our members, with the result being that only a subset of VEC members would stand to benefit from VEC implementing broadband. This would be a particular cross-subsidy problem if all VEC ratepayers were to fund the broadband effort.
4. Significant financial investment in make-ready costs in certain areas to accommodate attachments with a long return on investment timeframe.
5. Conflicts with current regulatory and legal restrictions (e.g., revenue from provision of electric service may not be spent on nonelectric activities; separate accounting required for unregulated subsidiaries).
6. Increase in employee head count or creation of separate entity to handle broadband business (e.g., operations, maintenance, customer support, etc.)
7. No internal need for enhanced broadband as VEC already made an investment in fiber that meets our current needs.
8. Distraction from VEC's primary mission of providing low cost, reliable electricity.
9. Competition with other entities providing broadband services in certain areas. This includes Consolidated Communications, which is a joint owner of approximately 30 percent of VEC's poles and an important business "partner" to VEC.
10. Outage restoration challenges (e.g., limited companies in state that can handle fiber splicing).

Washington Electric Cooperative referred to its response to Question 1 regarding feasibility study work attached here as Appendix V.

VELCO sees potential disadvantage from:

1. Loss of focus on core services mission of grid reliability.
2. Unforeseen market impacts that hurt credit rating and so add costs to owner/customers and all Vermont ratepayers.

Investor-Owned Utilities

Green Mountain Power identified disadvantages in order of impact as "cost short and long term; under-utilized asset, possible distraction from DU's primary mission; and non-core competence for DU."

Discussion

The electric companies saw many advantages to fiber deployment in the electric distribution system including support for advanced metering infrastructure, Smart Meters and Smart Grid applications, support of real-time data from SCADA systems for operating and reliability purposes, supporting increased reliability and resiliency, improved cyber-security, and potential for increased revenues and support for economic development which would increase sales. The electric companies also identified a number of disadvantages and concern many of which relate to financial risk and resource issues. The perceived financial risks stem from implications of a new line of business with heavy investment requirements, and how this all might impact electric rates. As shown in the financial projections below, significant capital investment would be required which suggests additional debt with related debt service costs. Also, there is uncertainty at present regarding investment cost recovery as well as gearing up operationally with the necessary trained staff and marketing/development costs. Concern also exists regarding potentially competing with telecom companies.

The advantages and disadvantages will have different weights and meanings for each company, and it appears it would be necessary for each electric company to make its own assessment and analysis of needs, prospects, costs and any other issues to reach conclusions. These are the items that would be assessed in a more detailed feasibility study for which the Broadband Deployment Act provides funding. There does not appear to be a "one size fits all" solution to extending internet services to Vermont's unserved areas but individual feasibility studies as contemplated by the Broadband Deployment Act would provide a concrete assessment of the issues in a particular geographic area while highlighting feasible options to the extent they exist. In particular, local demographic characteristics are crucial as several of the electric companies observe there are crucial differences in age, income, and education distribution as well as differences in poverty and unemployment levels. We noted these significant differences in our review of 2017 American Community Survey data from the U.S. Census Bureau for the individual municipal utility

Compatibility of Broadband Service with Existing Electric Service

The Broadband Deployment Act requires this Report to consider "the compatibility of broadband service with existing electric service".[52] Accordingly, our Survey of electric companies asked, "Would broadband service be compatible with the utility's existing electric service?" This question sought views on the extent to which providing broadband service is compatible with an electric utility's existing electric service mission.

Compatibility

Municipal Electric Departments

The predominant response to this question was the two services are "not at all" compatible or that perhaps somewhat compatible but there are many incompatibilities.

Electric Cooperatives

Vermont Electric Cooperative states it "is currently staffed to provide reliable electric service to our members in a cost-effective way. If our business expands to include provision of broadband, which is a completely different business model, we would have to add staff or contractors with expertise and training to carry out that business – in all existing functional areas (e.g., engineering, member service, and finance) and in new functional areas such as sales and marketing. We don't believe that one functional area for providing electric service is necessarily compatible with the needs of a broadband provider. We can identify certain areas of incompatibility that may need to be addressed.

1. Legal and regulatory compliance. 30 V.S.A 3047 may need to be amended to the extent that VEC would be using revenues from its regulated activities to fund or support any non-electric activities, which is currently prohibited. Also, the requirement to have separate books for a non-regulated affiliate may present barriers.
2. With respect to field work, there may be safety codes and requirements that are different for workers in the electric space and those in the communications space. There may also be union issues that make provision of both types of services incompatible since electric workers and telecom workers are members of two different unions.
3. In-home labor – Electric utilities do not have the ability to provide services to members beyond the meter. However, providing broadband to the home will require technicians to install, configure, maintain, and troubleshoot issues with

[52] Broadband Deployment Act, Sec. 11(a).

equipment (e.g., modems) within the home including in-home wiring (e.g., coax, Ethernet, and wireless).

4. Outage restoration – It is unknown the impact of outage restoration activities. VEC's core business is to restore power as safely and quickly as possible with broadband and other communications being secondary. For example, there is a lack of skilled technicians and companies in the northern Vermont area to perform these tasks (e.g., contractors) as internal labor focuses on electrical restoration.

Washington Electric Cooperative stated it was unsure regarding compatibility or incompatibility, and again referenced its Q1 response regarding feasibility study work contained in Appendix V.

Investor-Owned Utilities

Green Mountain Power sees broadband as being somewhat compatible with existing electric service but there would be many incompatibilities.

Cost Impact of Incompatibilities

Our Survey of electric companies also asked, "Please list the functional areas (e.g. billing, customer service, maintenance, engineering) where you believe incompatibilities would have a significant impact in terms of cost, staffing, and time required to resolve them."

Municipal Electric Departments

Comments on incompatibilities generally and functional areas where electric and broadband are not compatible include:

- Engineering;
- Maintenance;
- Personnel/staffing/attraction and retention;
- Management expertise;
- Operations and vehicles;
- Billing/customer service/help desk; and,
- Service restoration priorities.

Electric Cooperatives

Vermont Electric Cooperative stated its "current business model (e.g., providing electricity) is different from providing broadband and related services. While it is true that hanging wire and installing poles are part of our core business, the impact of expanding into providing broadband services, from a labor and cost perspective, is significant as we cannot divert resources to broadband at the sacrifice of providing safe, reliable, and low cost electric service."

Washington Electric Cooperative stated "More detail is necessary to fully answer this question. See above answer to Q1 feasibility study work. All of the listed elements (billing, customer service, maintenance, engineering) will have to be assessed as part of various models of deployment and potentially ramped up internally and externally to provide full service. New employees, additional resources in all areas may be necessary." Further, "WEC believes it is precluded from sharing the financial risk with the electric consumer. Cost and expenses would have to be allocated according to business function and benefit."

VELCO states it would not enter the retail market for provision of broadband services.

Investor-Owned Utilities

Green Mountain Power stated "with a couple exceptions, delivery of broadband services would be a new competence for GMP. The level of service provided would dictate how much (dark fiber vs full broadband service, etc.). Back office functions are tailored to regulated services, not market competitive offerings. Sales and solicitation to customers for unregulated services is not a current competency. Much of our fiber network work currently is outsourced to firms specializing in that skill."

Discussion

The electric companies found very limited compatibility between electric operations and broadband operations. Two comments made by respondents highlight the incompatibilities:

If you live next to a doctor, do you know medicine as a result of the proximity of habitation? This is a misconception that because power and communication occupy space on the same pole that they are similar businesses. Both services are suspended on a pole via a bolt, the similarity ends there.

Leasing dark fiber to existing broadband service providers is a much different business model than the Utility trying to gear up to become a broadband service provider. The latter requires an entirely new business model with staff and equipment that do not exist today necessitating creation of new department.

The business perspective provided by the electric companies makes clear that there are very limited compatibilities between electric service and broadband service, and the incompatibilities appear to be costly and significant. The compatibilities appear to be very high level in nature, such as both are utility services upon which the public relies to be "always-on", both use poles and lines for supporting infrastructure, and both have similar functional requirements at a high level. However, the business models and industries are very different and separate books and separate work forces would be required for the different lines of business. Electric companies do not provide in-home services behind the meter, while broadband internet services do require technicians in the home to install, configure, maintain, and troubleshoot issues with equipment (e.g., modems) within the home including in-home wiring (e.g., coax, Ethernet, and wireless). Furthermore, it would likely be costly to address the various incompatibilities stemming from engineering, maintenance, staffing and field workers, management expertise, operations and vehicles, billing and customer service and helpdesk functions as well as service restoration priorities. Ultimately broadband internet service delivery would represent a "new competence" for an electric company to integrate into its operations. The chosen business model (i.e., provider of dark fiber, or provider of retail services) would dictate how significant the effort would need to be to achieve the "new competence". It seems clear that any policy decision to encourage electric companies to participate in some manner in providing broadband services and/or infrastructure should not depend on the sense that the two lines of business are compatible.

Smart Grid technologies

The smart grid is the network of smart meters, plus technology within the electricity grid and its components with two-way communications and two-way power flow to:

- Quickly detect outages to minimize the impact on the rest of the system;
- Allow power to be distributed more efficiently and reliably;
- Integrate highly variable renewable energy sources, like wind and solar;
- Manage electricity generation flow from centralized power generating stations out to consumers or from consumers and businesses back into the grid; and,
- Facilitate the integration of electric vehicles.

Survey Responses

How does the Utility define Smart Grid?

As there are different thoughts on the subject of "Smart Grid." This question seeks to obtain perspectives from Vermont's electric utilities on the definition of "Smart Grid" and related subjects.

Municipal Electric Departments

Municipals offered the following comments regarding Smart Grid and its definition:

- "Grid Automation"
- "Ability of the grid to regulate itself, grid automation, self-healing, automated switches and relays controlling the grid automation without human intervention, meter data management, outage management deployed using radio frequency mesh with 3G/4G cellular backhaul."
- "Two-way communication. Radio frequency mesh network, cellular. Customers are currently using WiFi and/or available broadband to remotely manage their home devices which we do not provide. In addition, customers already have the ability to see their electric usage (on a day behind, not real-time basis) and to adjust their usage to capture savings via our website."
- "Generally speaking, we view it as the ability for customers to see their usage in real time and ultimately to use data to make energy consumption decisions."
- "Ability for utility to monitor system, i.e. transformer load, reclosure load, buss amperage, etc."
- "Ability to receive data from system devices (e.g. switches, reclosers, load and voltage data, reclosers). Potential for remote control of these devices which could improve distribution grid management, increase end-user service reliability and shorten outage durations."

Municipals see value to this "if cost effective and other functional concerns are addressed", it "could replace the need for other communications infrastructure in the future".

Electric Cooperatives

Vermont Electric Cooperative "sees Smart Grid as a connected grid that allows for visibility and device management from the substation down to the members home. This includes things such as SCADA to our substations and field devices, outage management and meter reading via our AMI, and flexible load management to shift load."

VELCO offers a basic definition of Smart Grid: "using multi-polar data and information to improve grid operations and customer service."

Investor-Owned Utilities

Green Mountain Power has an "all of the above" definition of Smart Grid. "We currently have almost 12 MWs of customer-owned capacity connected to our control platforms via customer broadband. We have another 8 MWs of grid-scale storage connected to our control platforms by utility fiber."

Would customers have modern capabilities to remotely access connected home devices to manage energy consumption, and access to new Utility applications to see usage statistics, and take advantage of savings offered by the Utility?

Municipal Electric Departments

See above responses.

Electric Cooperatives

Vermont Electric Cooperative states "all of our members are already capable of viewing their usage via a smartphone app or our website. For those with limited or poor internet access some of the larger bandwidth devices such as home security cameras may be out of reach. Managing energy consumption does not require a broadband network as most of the communications require low bandwidth; however increased speed enhances the ability to offer more behind the meter applications by providing a more reliable and convenient connection."

Is there value to the Utility from having a fiber-optic cable network for private communications and Internet access for the Utility?

Municipal Electric Departments

See other responses.

Electric Cooperatives

Vermont Electric Cooperative states "Yes. Our current SCADA system relies heavily on our fiber-optic cable network. It's a very reliable communications network than ensures that we maintain visibility over the system to keep outage durations low and provide the best reliability we can."

Washington Electric Cooperative refers to its response to Q1 regarding feasibility study (Appendix V).

VELCO answers in the affirmative.

Investor-Owned Utilities

Green Mountain Power states there is value "to the extent those services are not available from a commercial provider or are not competitive in cost."

Does the Utility currently have or plan to deploy Smart Meters?

This question is designed to elicit information on Smart Meter plans.

Municipal Electric Departments

The municipals who are VPPSA (Vermont Public Power Supply Authority) members are participating and investigating in Smart Meters through a VPPSA RFP. "There are currently few smart meters in VPPSA member territory and there is an ongoing evaluation process at the VPPSA level to determine anticipated AMI investment. A formal RFP for a VPPSA wide system is expected to be issued by the end of 2019."

Electric Cooperatives

Vermont Electric Cooperative states "VEC has been operating its present Aclara based AMI system since 2005. The system relies on powerline carrier (PLC) signals communication to provide two-way communications between the VEC substations and meters. Data backhaul from the substation is currently provided using a mix of fiber-optic cable, private carrier Ethernet, or cellular. VEC utilizes this system for 99% of demand usage metering and outage monitoring on residential, small commercial and industrial consumers."

Washington Electric Cooperative has deployed AMI (Power Line Carrier).

Investor-Owned Utilities

"GMP has 100% of its 265,000 customers with smart meters since 2013."

Discussion

Deployment of the fiber-optic cable in the electric distribution system that is necessary for Smart Grid applications will also tend to create fiber-optic capacity that could be used for broadband services. This should be considered in the planning and development of Smart Grid deployment as well as funding strategies per the discussion below.

Technical and Safety Considerations of Attaching Communications Facilities in the "Electric Safety Space"

The Broadband Deployment Act requires this Report to consider "any financial consequences and any technical or safety issues resulting from attaching communications facilities in the *electric safety space* as opposed to the communications space of distribution infrastructure."[53] Accordingly, the Survey of electric companies asked, "In your opinion, would attaching communications facilities in the electric safety space have financial consequences or result in technical or safety issues, as opposed to attaching in the communications space?" This question sought specific views on the viability of attaching communications in the "electric safety space" in response to the Act's requirement that the Report address "any financial consequences and any technical or safety issues resulting from attaching communications facilities in the electric safety space as opposed to the communications space of distribution infrastructure."[54] Definition and use of the "electric safety space" for attachment of communications facilities is addressed in more detail below, but it should be noted here that use of the term is not accurate as the National Electric Safety Code does not include the term "electric safety space." The electric companies provided their responses in terms of the "electric power zone", "energized space", or "electric space."

Municipal Electric Departments

The municipal electric departments broadly oppose placement of fiber-optic cable in the electric power zone.

They uniformly see significant issues with attachment of communications facilities in the electric space on utility poles. These issues are financial, technical and safety related. In sum, such attachment is viewed as an unsafe practice that creates liability and other issues.

Electric utility professionals know that adequate space is required to help prevent injury or death. Access to that energized space is limited to a 1st Class Line Worker with qualified backup on the ground or a properly supervised Line Worker plus a 1st Class Line Worker supervising on the ground.

[53] Broadband Deployment Act, Sec. 11(a), *emphasis added*.
[54] Broadband Deployment Act, Sec. 11(a).

There is a safety issue when fiber is placed in the electrical space. Only qualified linemen can work in this area. This creates a personnel shortage.

Reference Safety: This method of operation is much more expensive, and the alternative to de-energize and ground the line, which also requires the same personnel. Staff costs increase; de-energizing reduces income. Increasing cost and reducing income makes the venture more costly for customers and not as competitive.

- Safety is the most important consideration.
- This would create additional maneuvering of obstructions for maintenance of a high hazard utility. Fiber in the electric space will be in the way constantly, an added complication to resolve outages or make improvements.
- More items in the electrical space hinders work in the electrical space thus taking longer to compete work. Longer time equals more money.
- Liability for "downtime" if fiber is broken/disabled. For example, if the E911 system is dependent on fiber and then fiber isn't available, there could be financial penalties associated with 3rd party contracts.
- Fiber in the energized space is yet another "thing" to interfere with bucket movement and it does impact safety.
- Fiber in the energized space, dependent on type of fiber and mounting configuration is another source of current carrying potential.
- Fiber in the electric space could create another path to the ground which could potentially bring nominal voltages into houses.
- It creates the need for specially trained employees and contractors. Line workers need electric-space qualifications to work on fiber in the electric space. Vermont lacks adequate line workers. Increase the need for line workers and the labor expense increases – more costly for customers and less competitive.
- Pole upgrades potentially required, electric outages are required for repair and upgrade. Additional anchors and braces may be required. The National Electric Safety Code (NESC) is apparently silent regarding the use of the neutral as a messenger for fiber. The increased cross-sectional area may adversely increase ice accretion and wind loading on the neutral.
- Electrical rated fiber is more expensive than regular communications fiber.

Electric Cooperatives

Vermont Electric Cooperative found Financial, Technical, and Safety concerns, and opposes installation of fiber-optic cable in the electric power zone:

Financial:

- Installation of any communications facilities in the electric space will require certified individuals to conduct such installation (e.g., certified to work in electric space.) These certified individuals cost more than those individuals installing communication equipment in the communications space.
- Communications equipment in the electric space also increases complexity for electric outage restoration (e.g., either slows electric outage restoration – revenue, or increased cost for mobilization/demobilization of additional crews to revisit areas to restore communications facilities.)
- Because we jointly own 30 percent of our poles with Consolidated Communications, it is likely that they would require pole attachment fees be paid even for lines in the electric space. At least this is a source of uncertainty at this time, as Consolidated has previously objected to the placement of third-party attachments (NorthLink fiber) in the electric space.
- ADSS, which would be the type of fiber required if placed in the electric space, per NESC, is not as reliable as (more susceptible to tree damage) and more expensive than the metal clad fiber that would be hung in the communications space. This may have an impact on cost of service.

Technical:

With a couple exceptions, delivery of broadband services would be a new competence for VEC. The level of service provided would dictate how much competence needed (e.g., dark fiber versus full broadband service). Our current technical capabilities – in finance, in IT, in member service -- are tailored to regulated services, not market competitive offerings and there are significant differences in operating a business in a competitive marketplace.

- We would need to address how telecom facilities in the electric space would be operated, maintained and repaired.
- Due to potential impact to Vermont Electric Cooperative's electric facilities, internal certified individuals are required to be present during all projects (e.g., switching, tag holder, inspection, etc.)

Safety:

Due to safety considerations of installing and maintaining communications equipment in the electrical space, OSHA and Vermont Electric Cooperative allow only certified individuals to conduct work in the electric space.

- VEC only allows trained, VEC employed First Class Line Workers and Substation Technicians to hold tags for switching and outages due to the potential impact on electric reliability.
- Broadband cables and equipment attachments need to meet the NESC, which fully contemplates these types of attachments including antennas.

Washington Electric Cooperative states "the issues and details of attachment will trigger many issues. That said, work on the feasibility study will help guide us as to the best practices and outcomes. Therefore, please see the response to Q1 pertaining to WEC's interest in performing a feasibility study and business plan. Issues we can identify at this point include but are not limited to the following.

- 1st class line worker may be required if equipment is in the electric space (expensive and training necessary)
- Cable in the electric space requires different types of fiber (no steel support equipment can be included) and this set up as less reliable than steel-based fiber
- If in the electric space, minimize make ready costs (cheaper for make ready expense)
- Unfair competition claims could be triggered
- If attached in electric space and have a major outage that is FEMA eligible non-regulated activities in this space would not be covered."

VELCO's response is "all of the above" (financial, technical and safety), stating

- "Only qualified electrical workers can work in this space which increase costs due to the depth of qualifications and training required."
- "Special engineering considerations are required to locate equipment in this space."
- "The dangers of locating communication equipment in this space can never be underestimated. Communication workers are at risk of incorrectly identifying the safety requirements and qualifications to work on fiber assets that exist in electric space, among many of the safety concerns."
- "Placement of communication cable in the electric space introduces a cable which the qualified electric worker must maneuver around. This may impede the safety space and thus, create a safety concern for those qualified electric workers."

Investor-Owned Utilities

Green Mountain Power sees issues with "all of the above" regarding attachment in the "electric safety space." "Depending on how the PUC might order the treatment of costs for utility broadband services would dictate financial issues. How does the cross-subsidy issue get addressed? Technically, GMP or contractors would have to develop more skill or more scale to manage such infrastructure. Safety is of the utmost concern and we would not promote fiber facilities in the electrical space wherever possible. It is not likely that electrical line crews would be able to master fiber optic and broadband service skills in addition to their electrical knowledge base. You cannot have non-rated workers in the electrical space at all. So, we would not support locating in the electrical space."

Discussion

First, the National Electric Safety Code (NESC)[55] does not include the term "electric safety space" so this discussion will be in the context of the electric supply space. However, NESC does define a "communications worker safety zone", which is the "clearances specified in Rules 235C and 238 … between the facilities located in the supply space and facilities located in the communications space."[56] The National Electric Safety Code provides this diagram of spaces on a utility pole.[57]

Figure 18: Communications Space

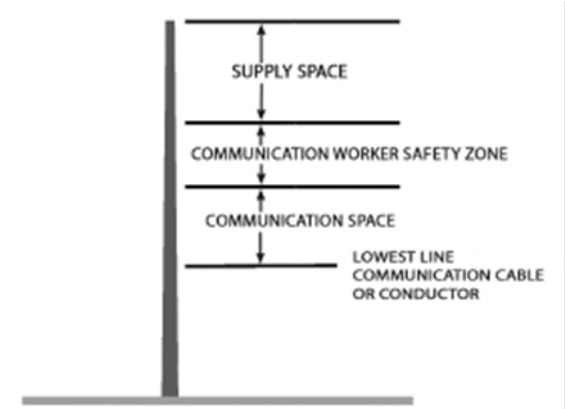


Figure D-1—Communication space

[55] *Ibid*. From an electric utility perspective, the NESC is the standard for safe installation, operation and maintenance of electric power and communications lines and equipment.
[56] 2017 National Electric Safety Code, C2-2017, IEEE, at page 163.
[57] 2017 National Electric Safety Code, C2-2017, IEEE, at page 8.

There are types of fiber-optic cable that can be placed in the supply space – for example ADSS (All-dielectric self-supporting) cable or OPGW (Optical ground wire). ADSS is a type of fiber-optic cable that is strong enough to support itself between structures without using conductive metal elements. Therefore, an Engineering Report prepared for MAW Communications found "ADSS cable operates under different rules for clearance from supply cables than conductive communication cables because it is dielectric (non-conductive) and does not require a messenger."[58] The professional opinion of the engineers preparing the Report is that "The fiber-optic network installed and maintained by MAW Communications and identified by PPL as exigent safety risks are not public safety risks" and "The fiber-optic network installed and maintained by MAW Communications and identified by PPL as exigent safety risks are not utility worker safety risks".[59]

As with all engineering questions there are trade-offs between this type of placement versus a strand and lash method for placement of more traditional fiber-optic cable. A significant advantage of ADSS fiber in the electric supply space is that there is minimal make-ready required, which means less upfront capital and a faster initial deployment. It is faster because it is not necessary to wait for third party make-ready to get done, but also because of how it is installed. With strand and lash, it is necessary to install the messenger wire first and then come back and place the fiber and lash it to the messenger wire. With ADSS, the installation is essentially just one step. ADSS tends to be a little more expensive (5-10%) than traditional fiber. A significant obstacle or disadvantage is that anyone who works on the ADSS plant will need to be a certified lineman, which drives up the labor cost. Also, because there is no strand, the splice closures have to be attached directly to poles and the drops are then coming directly off the poles as well. Not only does this cause clutter on the pole, it also requires that the splicers and drop installers be certified linemen as well (placing fiber, splicing/closure installation, and drops are usually all separate truck rolls). To avoid this, a common practice is that the splice closure gets brought down into the communications space (sometimes even below existing communications).

Strand and lash is generally more scalable, as you can overlash additional cables on your existing bundle as is needed to expand the network. There is also anecdotal evidence that ADSS requires more maintenance (especially over time) as those cables tend to sag and end up sitting on top of the communications facilities down in the communications space, and some of the survey respondents confirm this suggestion.

[58] Engineer's Report of the Safety of MAW Communications Fiber Optic Installation, Prepared by Daryl L. Ebersole, P.E., and Jeffrey M. Kobilka, P.E., January 7, 2018, The Experts Robson Forensic, at page 2. ("Engineer's Report", attached as Appendix VI.)
[59] Engineer's Report, at page 8.

The electric companies in their survey responses raise a number of important concerns regarding placement of fiber-optic facilities in the electric supply space and emphasize the primacy of safety for the public and the linemen who maintain and operate the facilities. As stated by VELCO, "the dangers of locating communication equipment in this space can never be underestimated." The companies state fiber in the electric space is "one more" obstruction or complication to maintenance or restoration work; fiber provides another potential path to ground and current carrying potential; and other operating concerns. Also, in cases where the electric company uses poles jointly owned with communications companies there may be objections to placement of this fiber without paying pole attachment fees.

The survey responses also make clear a significant issue can be anticipated in rural Vermont especially for attracting, paying, and retaining the specially trained and qualified employees and contractors required for this specialized work. These qualified workers are expensive and difficult to attract at a time when Vermont lacks an adequate base of line worker.

These questions would need to be effectively addressed to make placement of fiber in the electric supply space truly feasible.

Cost Estimates for Construction of Distribution Network

The Broadband Deployment Act requires this Report to consider "the financial investment necessary to undertake the provision of broadband service."[60] Accordingly, our Survey of electric companies asked, "Has the utility engaged in preliminary planning to estimate capital investment required to undertake the provision of broadband service?" The object of this question was to determine whether electric utilities had conducted their own studies to estimate investment required for provision of broadband service.

Survey Responses Regarding Feasibility Studies

Municipal Electric Departments

One municipal electric department had conducted an initial feasibility study and found the potential payback period for return of investment to be too long and too uncertain. The other 13 departments had not conducted such a study.

Electric Cooperatives

Vermont Electric Cooperative has not made such an estimate.

[60] Broadband Deployment Act, Sec. 11(a).

Washington Electric Cooperative has not conducted such a study but estimates its cost at $90,000 for one which addresses serving all customers.

VELCO refers to its feasibility analyses conducted for VELCO by Magellan Advisors.

Investor Owned Utilities

Green Mountain Power has not gone through the process to estimate capital investment required to provide broadband services, observing "there is not clarity yet on what level of broadband services the utility would be expected to deliver. That is important to understanding costs."

Cost Estimates

The Broadband Deployment Act requires this Report to consider "the financial investment necessary to undertake the provision of broadband service."[61] Magellan Advisors used the Broadband GIS data provided by DPS to perform engineering and financial analysis to estimate the cost of constructing fiber-optic network distribution facilities to serve these 80,802 underserved locations, consisting of:

Table 1: Unserved and Underserved Locations by Distribution Utility

Distribution Utility	Served 10/1	Served 4/1	Underserved	Total 10/1, 4/1, Underserved
Village of Jacksonville Electric Dept.	324	207	105	636
Washington Electric Co-op	2,197	4,637	1,455	8,289
Village of Hardwick	883	1,709	137	2,729
Village of Barton	325	790	156	1,271
Village of Enosburg Falls	235	497	108	840
Village of Lyndonville Electric Dept.	395	857	1,405	2,657
Vermont Electric Co-op	5,021	8,910	4,870	18,801
Village of Morrisville Water & Light Dept.	422	622	84	1,128
Town of Stowe Electric Dept.	401	564	26	991
Village of Orleans	37	81	32	150
Green Mountain Power	9,819	24,562	8,447	42,828
Village of Hyde Park	45	78	22	145
Village of Johnson	8	42	15	65
Village of Northfield	0	107	1	108
Ludlow Electric Light Dept.	0	65	0	65

[61] Broadband Deployment Act, Sec. 11(a).

Swanton Village Electric Dept.	7	24	38	69
Burlington Electric Dept.	0	30	0	30
	20,119	**43,782**	**16,901**	**80,802**

Fiber Feeder Distribution Plant

DPS has made the high-level calculation of the cost to deploy networks capable of providing broadband with speeds of 25/3 based on estimate information received during three Connectivity Initiative Grant rounds, and estimated "The average cost is approximately $2,800 per site, which means, for 80,800 locations, the cost would be upwards of $230 million."[62] Other key information assisted in the development of cost estimates for this Study.

In a 2017 project, Magellan Advisors conducted a high-level engineering study for Morrisville Water and Light Department ("MWL") to deploy fiber to the home broadband services to its electric service territory. The engineering included fielding of Morrisville's pole line infrastructure, make ready, pole-loading and undergrounding needed to install a fiber distribution plant passing all homes and businesses in Morrisville's electric service territory.

Magellan's cost estimates included all fiber distribution construction, huts, fiber drops, headend equipment and home equipment needed to provide internet services (and optionally voice) to customers. Magellan found that the average cost per passing in Morrisville's territory was $3,621. This cost was based on regionalized construction estimates for materials and labor to build the plant, which relied on Morrisville's electric plant GIS information to estimate the proportion of aerial and underground infrastructure needed for fiber to the home. That analysis indicated that approximately 92% of the construction would use aerial placement and 8% would use underground placement. The $3,621 cost per passing included a 20% construction contingency. This cost per passing included not only the outside plant construction, but also the headend and equipment costs needed to build the broadband network.

Since MWL would be considered a new provider, these capital expenses would be relevant to the overall deployment, whereas, an existing provider would not typically incur these costs, as they would already own and operate such resources. In the MWL case, $2,280,000 was estimated in the total construction costs for headend and electronics costs, which equates to $572 per home passed. Removing these costs from the total cost per passing would yield a reduction from $3,621 to $3,050, which is within 9% of the $2,800 cost estimate developed by DPS. These estimates also are within a reasonable range of the average cost per passing found in the engineering study, as shown in the following section.

[62] Report to the General Assembly on the Activities of the Connectivity Division for Fiscal Year 2019; Vermont Department of Public Service, dated April 26, 2019, at page 10.

Electric plant GIS data is a useful measure of the linear infrastructure required for construction of fiber to the premise infrastructure. As derived below in Table 2, distribution utilities in Vermont reported that on average, 91.5% of their distribution plant mileage used aerial placement and 8.5% utilized underground placement. This aerial/underground split was utilized to determine high-level costs for construction of the fiber to the premise infrastructure necessary to provide access to the 80,802 households with less than 25/3 service. Table 2 illustrates the electric distribution plant footage utilized as the basis for projecting how much fiber distribution plant footage would be required to serve all 80,802 addresses.

Table 2: Aerial and Underground Plant Footage[63]

Distribution Utility	Aerial Plant Footage	Underground Plant Footage
Burlington Electric Dept.	369,600	327,360
Swanton Village Electric Dept.	554,400	42,240
Ludlow Electric Light Dept.	274,560	73,920
Village of Johnson	137,280	10,560
Town of Stowe Electric Dept.	633,600	57,522
Village of Orleans	183,586	17,054
Village of Enosburg Falls	559,680	0
Village of Morrisville Water & Light Dept.	966,240	89,760
Village of Hyde Park	348,480	47,520
Village of Lyndonville Electric Dept.	2,127,840	0
Green Mountain Power	74,461,365	6,935,755
Village of Jacksonville Electric Dept.	264,000	0
Vermont Electric Co-op	12,914,880	1,668,480
Village of Hardwick	1,483,680	174,240
Village of Barton	934,560	5,280
Washington Electric Co-op	6,732,000	132,000
Total Plant Footage	**102,945,751**	**9,581,691**
Percent Aerial/Underground	**91.5%**	**8.5%**

Based on the current distribution plant mileage reported, the proportion of total plant footage was estimated to serve the 80,802 locations with fiber-to-the-premises infrastructure. Table 3 illustrates the total fixed capital costs for fiber feeder distribution plant (inclusive of telecommunications shelters), headend facilities, headend electronics and field electronics necessary to provision broadband services to the 80,802 underserved and unserved locations.

[63] Page 45 of Vermont Electric Utilities 2018 Annual Reports filed with the DPS by each electric utility. The Annual Report for the Village of Northfield did not contain this data, so it is omitted from these tables.

These are considered the fixed capital costs required to pass all 80,802 locations. They do not include variable capital costs such as fiber drops and home equipment, which are a function of the number of customers that subscribe to service. These costs are calculated separately in the following sections.

Appendix VIII provides detailed unit costs for aerial and underground construction through which an average cost per mile was calculated for these two placement methods. Construction costs include a 20% contingency. The results of the costing analysis follow in Table 3.

Table 3: Cost per Premise Passing – All Electrics

Distribution Utility	Aerial Feeder Distribution	Underground Feeder Distribution	Total Feeder Distribution	Headend Costs	Total Fixed Capital Costs	Cost Per Passing
Burlington Electric Dept.	$6,914	$17,701	$24,615	$380,000	$404,615	$821
Swanton Village Electric Dept.	$76,925	$16,941	$93,865	$380,000	$473,865	$1,360
Ludlow Electric Light Dept.	$61,801	$48,094	$109,896	$380,000	$489,896	$1,691
Village of Johnson	$97,564	$21,693	$119,257	$380,000	$499,257	$1,835
Town of Stowe Electric Dept.	$1,587,250	$416,516	$2,003,766	$380,000	$2,383,766	$2,022
Village of Orleans	$310,971	$83,500	$394,471	$380,000	$774,471	$2,630
Village of Enosburg Falls	$2,236,825	$0	$2,236,825	$380,000	$2,616,825	$2,663
Village of Morrisville Water & Light	$2,566,657	$689,181	$3,255,838	$380,000	$3,635,838	$2,886
Village of Hyde Park	$332,291	$130,974	$463,265	$380,000	$843,265	$3,195
Village of Lyndonville Electric Dept.	$7,820,146	$0	$7,820,146	$380,000	$8,200,146	$2,943
Green Mountain Power	$107,392,858	$28,913,853	$136,306,711	$4,560,000	$140,866,711	$3,183
Village of Jacksonville Electric Dept.	$1,908,720	$0	$1,908,720	$380,000	$2,288,720	$3,001
Vermont Electric Co-op	$46,811,188	$17,480,269	$64,291,458	$2,280,000	$66,571,458	$3,420
Village of Hardwick	$7,024,172	$2,384,353	$9,408,525	$380,000	$9,788,525	$3,448
Village of Barton	$4,309,571	$70,377	$4,379,947	$380,000	$4,759,947	$3,446
Washington Electric Co-op	$36,227,942	$2,053,248	$38,281,190	$760,000	$39,041,190	$4,618
	$218,771,795	**$52,326,700**	**$271,098,495**	**$12,920,000**	**$284,018,495**	**$3,355**

***Village of Northfield plant data was not found in the research.*

Total costs to pass all 80,802 addresses are estimated at $284 million with an average cost per premise of $3,335 across all addresses. This cost includes a 20% construction contingency for both aerial and underground construction. The cost per passing average is heavily influenced by the two largest distribution utilities, GMP and VEC.

GMP and VEC contain the greatest number of underserved and unserved locations, which also require the greatest amount of new construction to reach these locations. The service territories of these two organizations represent 76% of total underserved and unserved addresses in Vermont with 61,629 unique addresses. The total cost to reach these addresses is estimated at $207 million or 73% of the costs required to serve all 80,802 addresses.

GMP's cost per premise is slightly below the average at $3,183 while VEC's cost per premise is similar at $3,420. WEC, the next largest distribution utility in terms of underserved and unserved addresses has a cost per passing of $4,618, which increases the overall average across all distribution utilities.

For smaller distribution utilities, many fell under the average and ranged from $2,706 to $3,465, as shown in Table 4 below. Several distribution utilities only had a small number of underserved and unserved addresses, which were immaterial to the overall costs for new construction. Examples include Burlington Electric Department, Swanton Village Electric Department, Ludlow Electric Light Dept, Village of Johnson, Village of Orleans and Village of Hyde Park.

Table 4: Cost per Passing

Distribution Utility	Underserved and Unserved Addresses	Cost Per Passing
Burlington Electric Dept.	30	$821
Swanton Village Electric Dept.	69	$1,360
Ludlow Electric Light Dept.	65	$1,691
Village of Johnson	65	$1,835
Town of Stowe Electric Dept.	991	$2,022
Village of Orleans	150	$2,630
Village of Enosburg Falls	840	$2,663
Village of Morrisville Water & Light Dept.	1,128	$2,886
Village of Hyde Park	145	$3,195
Village of Lyndonville Electric Dept.	2,657	$2,943
Green Mountain Power	42,828	$3,183
Village of Jacksonville Electric Dept.	636	$3,001
Vermont Electric Cooperative	18,801	$3,420
Village of Hardwick	2,729	$3,448
Village of Barton	1,271	$3,446
Washington Electric Cooperative	8,289	$4,618

Variance in the cost per premise is a function of two factors in each distribution utility:

1. Total plant mileage in relation to the total addresses to pass with fiber infrastructure. Higher plant mileage coupled with lower density in terms of customers per mile of plant yielded higher cost; and,

2. The amount of underground construction required to reach these premises. For distribution utilities with a greater percentage of underground distribution plant, higher costs were projected for fiber plant to reach these addresses.

Fiber Drops and Home Equipment

In addition to the fiber feeder distribution plant costs discussed in the prior section, fiber drops and home equipment are necessary to connect subscribers to the network. These costs are considered variable capital costs and include both fiber line extensions to reach individual addresses and any home equipment needed to establish service, such as optical network terminals, wireless gateways and associated wiring.

These costs are influenced by the length of the fiber drop from each pedestal to each premise. In most cases, the 80,802 underserved and unserved addresses are in rural areas with greater distances between homes than in more urbanized areas where premises are closer together or lots are smaller in format. Larger lots and greater distances between lots require the use of longer fiber drops to reach each premise. Whereas an average fiber drop length in an urbanized environment may be 100 - 150 feet, fiber drop lengths in many of Vermont's rural areas were measured at 300 feet or more. This increases the cost of the materials and labor to install each fiber drop.

For the cost analysis, an average fiber drop and home equipment cost of $1,610 per premise was utilized to estimate total variable capital costs. This average cost includes materials and labor to install a 300-foot fiber drop to each premise for $1,095. Home equipment costs include $260 for an optical network terminal, $55 for an uninterruptable power supply, $80 for a wireless gateway to provide in-home internet service, $70 for inside wiring changes within the home and $50 for installation and testing. Magellan utilized market rates for these labor and materials items from recent fiber to the home installation projects completed in 2018.

Fiber drop and home equipment costs vary with the total number of subscribers that sign up for service. Therefore, they are calculated independently of fiber feeder distribution costs, based on expected take rates for service. Table 5 illustrates the expected fiber drop and home equipment costs based on take rates for service between 30% and 60%.

Table 5: Take Rates, Drop and Home Equipment Costs

Distribution Utility	**Take Rate**						
	30%	**35%**	**40%**	**45%**	**50%**	**55%**	**60%**
Village of Jacksonville Electric Dept.	$307,188	$358,386	$409,584	$460,782	$511,980	$563,178	$614,376
Washington Electric Co-op	$4,003,587	$4,670,852	$5,338,116	$6,005,381	$6,672,645	$7,339,910	$8,007,174
Village of Hardwick	$1,318,107	$1,537,792	$1,757,476	$1,977,161	$2,196,845	$2,416,530	$2,636,214
Village of Barton	$613,893	$716,209	$818,524	$920,840	$1,023,155	$1,125,471	$1,227,786
Village of Enosburg Falls	$405,720	$473,340	$540,960	$608,580	$676,200	$743,820	$811,440
Village of Lyndonville Electric Dept.	$1,283,331	$1,497,220	$1,711,108	$1,924,997	$2,138,885	$2,352,774	$2,566,662
Vermont Electric Co-op	$9,080,883	$10,594,364	$12,107,844	$13,621,325	$15,134,805	$16,648,286	$18,161,766
Village of Morrisville Water & Light	$544,824	$635,628	$726,432	$817,236	$908,040	$998,844	$1,089,648
Town of Stowe Electric Dept.	$478,653	$558,429	$638,204	$717,980	$797,755	$877,531	$957,306
Village of Orleans	$72,450	$84,525	$96,600	$108,675	$120,750	$132,825	$144,900
Green Mountain Power	$20,685,924	$24,133,578	$27,581,232	$31,028,886	$34,476,540	$37,924,194	$41,371,848
Village of Hyde Park	$70,035	$81,708	$93,380	$105,053	$116,725	$128,398	$140,070
Village of Johnson	$31,395	$36,628	$41,860	$47,093	$52,325	$57,558	$62,790
Ludlow Electric Light Dept.	$31,395	$36,628	$41,860	$47,093	$52,325	$57,558	$62,790
Swanton Village Electric Dept.	$33,327	$38,882	$44,436	$49,991	$55,545	$61,100	$66,654
Burlington Electric Dept.	$14,490	$16,905	$19,320	$21,735	$24,150	$26,565	$28,980
	$38,975,202	**$45,471,069**	**$51,966,936**	**$58,519,314**	**$64,958,670**	**$71,454,537**	**$77,950,404**

Middle Mile Connectivity

"Middle mile" facilities are those which connect the local "last mile" distribution networks to the "Internet" or the large backbone networks between major cities operated by large telecommunications providers such as Consolidated Communications, Comcast and other cable companies, FirstLight, CenturyLink/Level 3, AT&T, etc. In this case "middle mile" facilities would be needed to connect any fiber networks constructed in the electric companies' local distribution areas to the Internet backbone networks to access "the rest of the world." Thus, the financial feasibility analysis below must consider the investment costs for constructing necessary facilities (generally the local distribution network), costs for middle mile connectivity, Internet/ISP costs, and operating costs.

The Department developed an inventory of all 349 electric utility substations in Vermont. This effort, in addition to identifying the locations of the substations of all electric utilities, also determined that 90% of these substations are served by utility-owned fiber optic communication facilities. These facilities were installed by the utilities and are used to monitor and control the electric grid. This information will be published on the Department website. There may be excess capacity in the fiber facilities serving these substations that could be used by broadband utilities. The Department is exploring a possible proposal where existing utility owned fiber optic facilities could be employed to facilitate broadband deployment. Specifically, utilities could offer heavily discounted "backhaul", or the lease of existing fiber facilities, from substations in unserved areas to interconnection points with other broadband providers. This could lower the cost of deploying service in unserved areas, and thus improve the business model for these challenging projects.

Potential Use of VELCO Fiber Network

VELCO is a cooperative owned by its member electric distribution companies. VELCO "manages a transmission system consisting of 738 miles of transmission lines from 115 kV to 450 kV direct current, 55 substations, a 200 MW back-to-back high-voltage direct current converter and over 13,000 acres of rights-of-way. To monitor and control this system VELCO uses extensive fiber-optic communication networks."[64] The VELCO fiber-optic network spans the entire state, serving essentially all population centers in cities and towns in Vermont, through its member distribution utilities. The VELCO telecommunication system is modern, and connects transmission, sub-transmission, and distribution infrastructure with approximately 250 substation termination points in Vermont. The telecommunication system is generally configured into three large geographic rings and lateral connections off those rings. VELCO is open to using capacity on the lateral connections to support broadband services provided by electric companies but is not in favor of using any of the capacity on the fiber-optic rings due to concerns regarding commitment of capacity, potential impact on reliability, potential impacts on

[64] https://www.velco.com/about/history

staffing requirements and other concerns stemming from use of the ring capacity outside VELCO's core mission.

Potential Use of State of Vermont Fiber Cable

The Broadband Technologies Opportunity Program funded the development of fiber-optic connectivity in Vermont originally under the auspices of the Vermont Telecommunications Authority (VTA) which sunsetted in 2015. That fiber is now owned and operated by the DPS which has completed several additional "middle mile" projects such that "the State now owns or licenses over 300 miles of fiber optic cable."[65] These facilities serve two geographic regions: The Northeast Kingdom and the Upper Valley.

These networks are open access, meaning that anyone can lease and light strands of dark fiber at standard rates. Vermont Electric Cooperative uses the Northeast Kingdom Network to manage its electric utility operations. ECFiber uses the Upper Valley Network to bring broadband to Upper Valley residents. The Upper Valley Network was designed to meet the needs of last-mile residents, as the network winds through rural back roads and contains fiber splice enclosures at regular and predictable intervals. This network should be better understood as a last mile fiber project.[66]

Magellan Advisors was provided with mapping of these fiber routes, and this fiber can be considered in more detailed costing of the Conceptual Network of the potential provision of broadband services by Vermont's electric distribution companies.

Financial Analysis and Feasibility

The Broadband Deployment Act requires this Report to consider "the financial risk to electric companies [of providing broadband service]."[67] Accordingly the Magellan Advisors survey asked, "What are the key financial risks that the Utility associates with providing broadband service, in order of significance?"

Take Rates

The "take rate" in the context of the internet service industry is the percentage of households passed by the distribution network expected to subscribe to internet service. Take rates are a fundamental driver of financial feasibility for all broadband networks. Providers make investments in broadband networks in cases when they are assured that enough customers will subscribe to cover their costs and achieve a return on investment. Similarly, distribution utilities must have confidence that if they invest in broadband networks, enough customers will subscribe

[65] 2018 Vermont Telecommunications Plan, at page vi. ("Vermont Telecommunications Plan").
[66] *Ibid*., at page 29.
[67] Broadband Deployment Act, Sec. 11(a).

to cover their costs. While distribution utilities are less concerned with generating a return on investment, they are concerned with generating enough revenue to cover all expenses. If a network were unable to do so, it would require them to borrow more to cover the shortfall, which could negatively affect their bond rating and/or debt borrowing capacity.

Take rate estimation is not an exact science. Take rates are influenced by the following factors:

1. Service Pricing
2. Household Income
3. Educational Attainment
4. Households with Children
5. Age of Head of Household
6. Service options in addition to Internet access, assuming available substitutes in the market
7. Demographics of the population
8. Successful execution of sales and marketing strategies

Table 6 illustrates a range of municipal and cooperative electric utility organizations that have deployed retail broadband systems. Take rates for these four systems range between 87% at a high and 39% at a low. Organizations that had been in business for at least several years were selected to present mature take rates.

Table 6: Take Rates

	Morristown Utilities	**Cedar Falls Utilities**	**Arrowhead Electric Cooperative**	**Roanoke Electric Cooperative**
State	Tennessee	Iowa	Minnesota	North Carolina
Type	Municipal Electric Utility	Municipal Electric Utility	Electric Cooperative	Electric Cooperative
Geography	Rural/Urban	Rural/Urban	Rural	Rural
Total Premises (Homes & Businesses)	14,500	15,000	5,500	14,000
Capital Required	$20.2M	$15.5M	$20.1M	$31.2M
Take Rate	39%	87%	60%	40%
Funding	$20 million general obligation bond provided by the City for the project.	$15.04 million of electric utility revenue bonds, collateralized by broadband system revenues only, with no collateral provided by electric, gas or other utilities. Internal cash was also utilized to finance a portion of the total funding.	USDA grants and low interest loans totaling $16 million (2010); Cook County provided $4 million through its 1% sales tax fund.	CFC Financing One Community Development Block Grant has so far been obtained and REC is actively exploring other potential funding sources. Applications submitted $4 million State Grant; More will be requested from USDA Re-Connect Grant[68]

[68] https://www.cooperative.com/programs-services/bts/Pages/Broadband-Co-op-Case-Studies.aspx

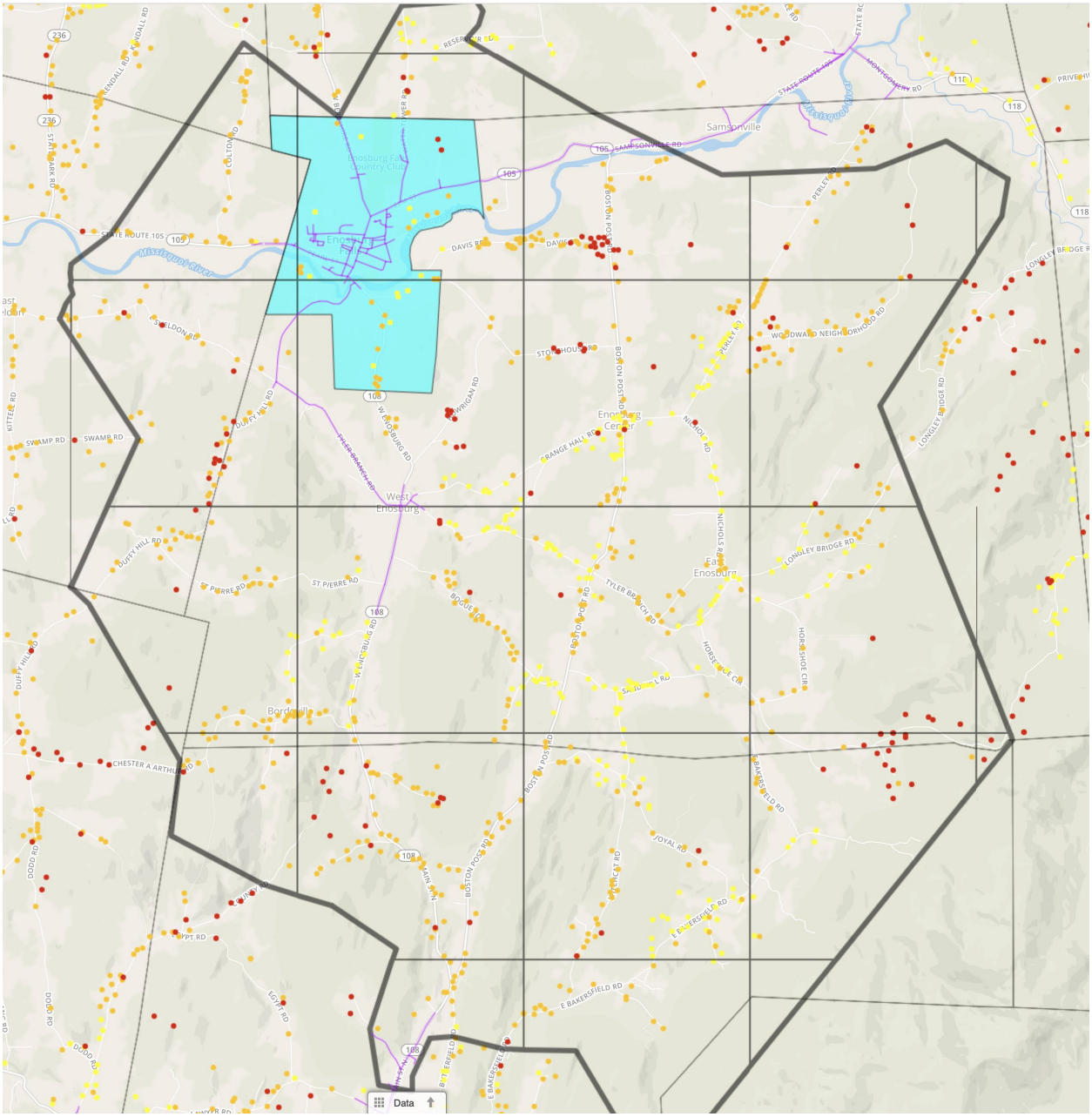
Impact of Cable Availability on Take Rates

An additional consideration is whether take rates for service would be lower in cases where a competitive cable operator exists. In these cases, cable service may provide higher speed service than the incumbent telecommunications carrier. This would afford households and businesses another choice and potentially faster service. When faced with a new competitor in its market, an existing cable provider could lower prices to protect market share, which could reduce take rates for a distribution utility providing service directly or via a partnership with another ISP.

To determine whether cable services would be a competitive threat to existing distribution utilities serving underserved and unserved addresses, an analysis of each DU was performed to determine where a competitive cable offering existed in close proximity to underserved and unserved address points. **The findings indicated that most underserved and unserved addresses did not have a cable operator with infrastructure in close proximity**.

In these cases, it would be unlikely for a cable operator to extend its plant to serve existing underserved and unserved addresses given the high cost and low revenue opportunity to connect a few more addresses. Additionally, it is likely that the cable operator would have already extended its plant to serve these addresses if it found a viable business opportunity to do so. For example, Figure 19 illustrates the penetration of cable infrastructure within the Village of Enosburg Falls electric service area. The electric service boundary is shown by the heavy black border. The Village of Enosburg Falls village boundary is shown within the aqua polygon. Comcast's cable infrastructure is shown by the pink shaded lines. Dots shown in red, yellow and orange correspond to the address points for underserved, at least 4/1 service and at least 10/1 service. As the map illustrates, the majority of these dots fall outside the village boundary and at some distance from existing cable infrastructure. In fact, the closest dot is about 870 feet from existing cable infrastructure, which would require a significant plant extension to reach it.

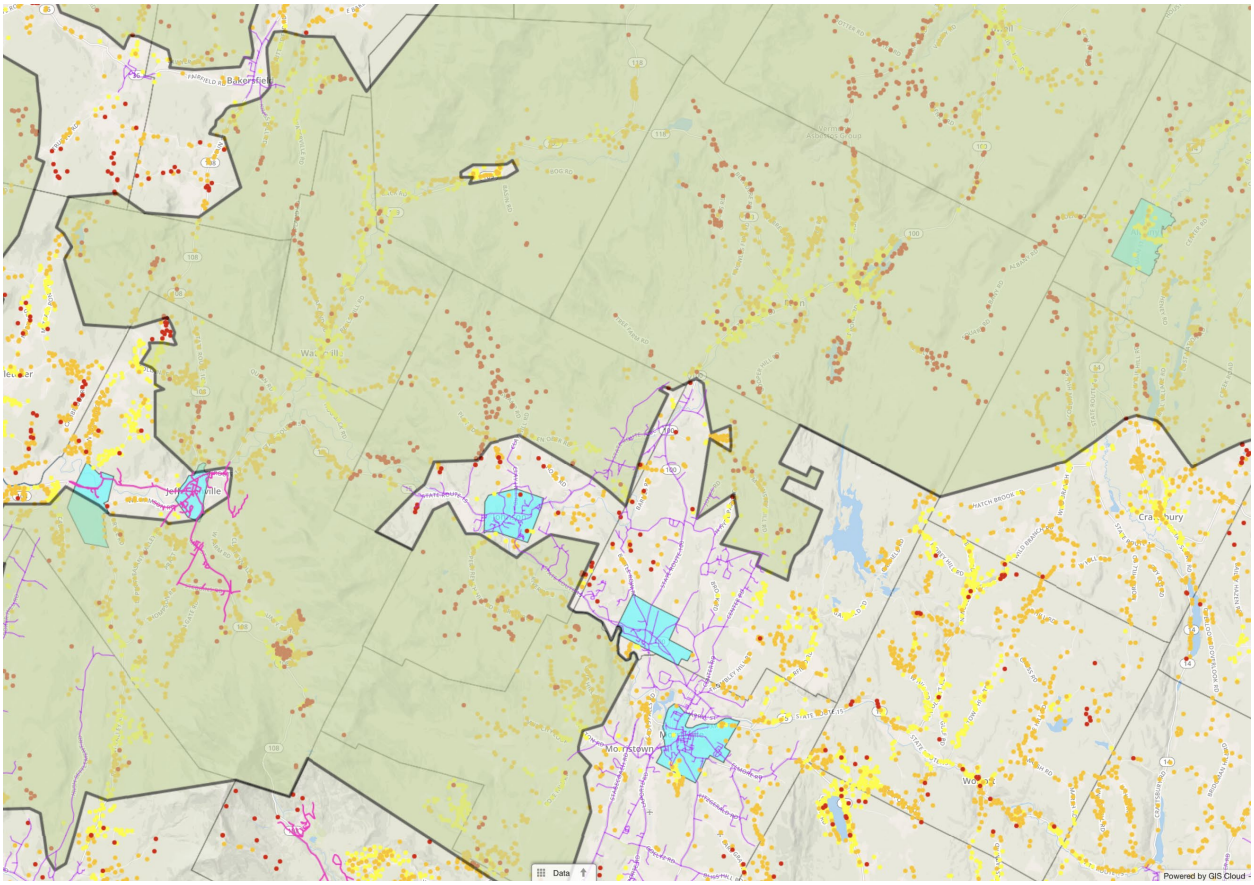
Figure 19: Enosburg Falls Unserved Locations Versus. Cable Boundaries and Plant



On a larger scale, the same trend appears when analyzing Vermont Electric Cooperative's ("VEC") service territory. Figure 20 illustrates the central portion of VEC's territory surrounding the Town of Johnson. As in the prior figure, VEC's border is shown by the heavy black border and green shaded regions are within its territory. Pink lines show cable infrastructure in the area. In VEC's case surrounding the Town of Johnson, cable infrastructure rarely extends into the cooperative's territory and the small portions that do extend into VEC's territory are not in close proximity to underserved or unserved address points. These address points are not being served

by cable today. Therefore, if a distribution utility were to deploy its own infrastructure, it would be unlikely to find competition from a cable operator in the area. **As these maps illustrate, cable services are rarely available where underserved and unserved address points exist today**. **This analysis was performed for each DU and in the majority of cases, it was found that cable operators did not have infrastructure in close proximity to underserved or unserved address points**.

Figure 20: Johnson Unserved Locations Versus. Cable Plant



Financial Analysis

To assess financial feasibility of distribution utilities providing broadband services, the following methodology was utilized:

1. Provide separate financial feasibility analyses for different scenarios. Scenario 1-A considers the financial feasibility of DUs deploying service to only underserved and unserved addresses in their service areas, while Scenario 1-B assesses that same scenario but using a partnership of the DU and an existing ISP partner. Scenario 2 models a deployment whereby a DU may desire to serve its entire customer base rather than only underserved and unserved customers, which is customary for many DUs.
2. Utilize the cost estimates for network construction to determine the total capital investment required for each distribution utility.
3. Model operating costs for wholesale internet and telephone services, network operations, pole attachment fees, plant maintenance and general and administrative expenses as a percent of revenue in the pro forma. Use established broadband utility profit and loss statements to model these costs.
4. Model reserve requirements with commonly used metrics for renewal and replacement.
5. Utilize an average residential take rate of 45% to determine the total number of subscribers from underserved and unserved households.
6. Utilize an average commercial take rate of 30% to determine the total number of subscribers from underserved and unserved businesses.
7. Utilize an average revenue per user ("ARPU") of $50 per month for residential internet and $25.99 per month for residential phone service. Assume only 1/3 of residential customers take residential phone service. This yields a residential ARPU of $57.80.
8. Utilize an ARPU of $80 per month for commercial internet and $100 per month for commercial phone service. Assume only 50% of the commercial customers take commercial phone service. This yields a blended ARPU of $130 per month.
9. Assume a portion of the capital investment is funded by grants while a portion is funded through financial instruments available to distribution utilities. The base case includes 75% of the capital investment being funded by grants and 25% being funded by distribution utility funding vehicles.
10. Assume 20, 25- and 30-year terms on the portion of capital investment funded by loans to the distribution utility.
11. Assume a 3.5% interest rate over these terms on the portion of capital investment funded by loans to the distribution utility. Vary this rate to determine what range is feasible to finance new investments.
12. Model the free cash flows, which are defined as the annual balance of cash after all operating expenses are paid, all capital expenditures have been made, all debt (principal and interest) has been serviced and all set asides (reserves) have been established. If

positive free cash flow remains on a year-after-year basis, it is a strong indication that the investment is feasible.

13. Provide an internal rate of return ("IRR") as a measure of whether the investment yields a break-even at minimum, which would be evidenced by a 0% IRR, below a break-even, which would be evidenced by a negative IRR or above a break-even, which would be evidenced by a positive IRR. The IRR is a barometer for whether the investment made generates sufficient revenues to cover all costs over the investment term.

Explanation of the Financial Dashboard

Figure 21 is a financial dashboard that models the results of the broadband financial analysis and summarizes key metrics in an easy to understand tool that front-ends the actual financial model for the project. The dashboard is broken down into multiple columns:

Column 1: Name of each distribution utility
Column 2: Underserved/unserved households in the distribution utility's electric service area
Column 3: Number of households subscribing to service, based on the expected take rate
Column 4: Underserved/unserved businesses in the distribution utility's electric service area
Column 5: Number of businesses subscribing to service, based on the expected take rate
Column 6: Cost Per Passing – The total cost to pass each premise in the distribution utility's electric service area
Column 7: Capital Funding – The total capital funding required for the distribution utility to provide broadband services
Column 8: Operations Funding – The total startup funding needed to support the broadband business, such as early hiring, training, sales marketing and other operational costs
Column 9: Total Funding – Total of capital and operational funding
Columns 10 – 13: The four colored columns at the right of the figure illustrate the resulting IRR percentages for each distribution utility investing in broadband to serve underserved and unserved addresses in its territory. Each column has a specific term for the financing of the project and the columns provide 15, 20-, 25- and 30-year periods. This indicates how longer terms on financing positively impact IRRs. Positive IRRs are shown in green, negative IRRs are shown in red.

Note: A significantly negative IRR is displayed as "-100%" in cases were the cash flows are so negative that the financial model cannot solve for an IRR.

Scenario 1-A: Service Deployment Only to Unserved/Underserved Addresses in the Electric Serving Area with Retail Service Provision by the Utility

Figure 21: Financial Results – Distribution Utility Retail Service Provision, Unserved and Underserved Addresses Only

Distribution Utilities Providing Broadband Services												
Distribution Utility	Underserved/Unserved Households	Underserved/Unserved Expected Subscribers	Underserved/Unserved Businesses	Underserved/Unserved Expected Subscribers	Cost Per Passing	Capital Funding	Operations Funding	Total Funding	15 Year IRR	20 Year IRR	25 Year IRR	30 Year IRR
Village of Jacksonville Electric Dept.	525	236	111	33	$ 3,001.13	$ 2,749,502	$ 1,357,723	$ 4,107,225	-100.00%	-100.00%	-100.00%	-100.00%
Washington Electric Co-op	6361	2852	1728	518	$ 4,618.31	$ 45,046,536	$ 2,004,642	$ 47,051,177	-9.41%	-4.95%	-2.49%	-0.98%
Village of Hardwick	2049	922	680	204	$ 3,447.59	$ 11,765,646	$ 399,891	$ 12,165,537	-4.21%	-0.55%	1.37%	2.49%
Village of Barton	745	335	526	158	$ 3,446.06	$ 5,680,786	$ 183,576	$ 5,864,362	-3.55%	0.01%	1.87%	2.94%
Village of Enosburg Falls	764	344	76	23	$ 2,662.89	$ 3,225,405	$ 108,457	$ 3,333,861	-3.84%	-0.23%	1.65%	2.74%
Village of Lyndonville Electric Dept.	2086	939	571	171	$ 2,943.22	$ 10,125,142	$ 362,354	$ 10,487,496	-3.97%	-0.34%	1.55%	2.65%
Vermont Electric Co-op	13855	6235	4946	1484	$ 3,419.56	$ 80,192,491	$ 2,685,178	$ 82,877,670	-3.96%	-0.34%	1.55%	2.65%
Village of Morrisville Water & Light Dept.	975	439	153	46	$ 2,896.37	$ 4,453,063	$ 155,775	$ 4,608,838	-4.24%	-0.58%	1.34%	2.47%
Village of Stowe Electric Dept.	908	409	83	25	$ 2,021.96	$ 3,101,739	$ 71,684	$ 3,172,423	-0.14%	2.94%	4.47%	5.33%
Village of Orleans	123	55	27	8	$ 2,629.80	$ 883,145	$ 65,740	$ 948,885	-100.00%	-100.00%	-100.00%	-100.00%
Green Mountain Power	34019	15309	8809	2643	$ 3,182.64	$ 171,855,115	$ 5,575,643	$ 177,470,758	-3.47%	0.08%	1.93%	3.00%
Village of Hyde Park	139	63	6	2	$ 3,194.92	$ 948,316	$ 59,982	$ 1,008,297	-100.00%	-100.00%	-100.00%	-100.00%
Village of Johnson	58	26	7	2	$ 1,834.71	$ 546,349	$ 40,323	$ 586,672	-100.00%	-100.00%	-100.00%	-100.00%
Village of Northfield	100	45	8	2	$ -	$ 458,246	$ 18,254	$ 476,500	-6.36%	-2.38%	-0.24%	1.03%
Ludlow Electric Light Dept.	52	23	13	4	$ 1,690.69	$ 538,987	$ 408,470	$ 945,457	-100.00%	-100.00%	-100.00%	-100.00%
Swanton Village Electric Dept.	50	23	19	6	$ 1,360.36	$ 523,856	$ 29,592	$ 553,448	-21.14%	-14.74%	-10.92%	-8.42%
Burlington Electric Dept.	10	5	20	6	$ 820.51	$ 426,350	$ 28,026	$ 454,376	-100.00%	-100.00%	-100.00%	-100.00%
Total	63019	28359	17783	5335	$ 3,355.09	$ 342,559,672	$ 13,555,310	$ 356,119,983				

Financial Highlights – Scenario 1-A

Overall Observations
Several distribution utilities have very few underserved and unserved addresses. These include:

- Village of Orleans – 123 households, 27 businesses
- Village of Hyde Park – 139 households, 6 businesses
- Village of Johnson – 58 households, 7 businesses
- Village of Northfield – 100 households, 8 businesses (borderline)
- Ludlow Electric Light Dept – 52 households, 13 businesses
- Swanton Village Electric Dept. – 50 households, 19 businesses
- Burlington Electric Dept. – 10 households, 20 businesses

In these cases, it would likely be challenging for a distribution utility to provide broadband services, given the small number of customers and the high fixed costs to deploy the network, headend and operations. However, distribution utilities with few underserved and unserved addresses could work with existing broadband providers (cable and telecommunications companies) to extend existing facilities where feasible to connect these residents. Distribution utilities could build new fiber in conjunction with their existing electric projects to connect underserved and unserved addresses, leasing this infrastructure to existing providers. For the nine other distribution utilities, feasible business cases exist, depending on the term of the financing available to each organization.

- A 20-year minimum debt instrument needs to be used to achieve positive IRRs for any of the distribution utilities at a 3.5% interest rate.
- Using a 20-year term on debt, three distribution utilities achieve positive IRRs, including:
  - Village of Barton
  - Town of Stowe Electric Department[69]
  - Green Mountain Power
- Increasing the debt term from 20 to 30 years enables additional distribution utilities to achieve positive IRRs, including:
  - Village of Hardwick
  - Village of Barton
  - Village of Enosburg Falls
  - Village of Lyndonville Electric Dept
  - Vermont Electric Cooperative

[69] The Town of Stowe Electric Department provided comments on this Report which among other things addressed the sensitivity of financial model results to inputs and assumptions. Those comments are attached as Appendix IV.

    - Village of Morrisville Water and Light
- Feasibility is tied to the availability of grant funding. The financial model assumes 75% of all capital expenditures paid for through grants. Reducing this proportion below 75% results in fewer feasible deployments.
- Increasing the proportion **of grant funding also allows distribution utilities with the most rural geographies to achieve a positive IRR.**
- Increasing grant funding from 75% to 80% enables Washington Electric Cooperative to achieve a positive IRR in 30 years. Washington Electric Cooperative has the highest cost per passing of all distribution utilities in the study and the most rural profile in terms of the underserved and unserved population.

Take Rate Sensitivity

Business cases for all distribution utilities are sensitive to take rate fluctuations. Lower take rates yield lower recurring revenues to cover fixed costs. Table 7 illustrates the resulting IRRs when take rates are varied from 30% to 60% over the 30-year term for each distribution utility. As Table 7 illustrates, when take rates are 30% most distribution utilities are achieving negative returns on their broadband systems, meaning that additional investment would be required to meet their cash needs.

The implication for distribution utilities is that they must be able to sign up a large percentage of their market to achieve financial sustainability. Distribution utilities considering providing broadband should conduct quantitative market research to determine the demand for high-speed broadband services, willingness to pay and specific features of the services that consumers find desirable.

Table 7: Residential Take Rate Variability – Impact on Feasibility

Residential Take Rate >	30%	35%	40%	45%	50%	55%	60%	65%	70%
Washington Electric Co-op	-5.05%	-3.99%	-3.06%	-2.21%	-1.44%	-0.73%	-0.08%	0.52%	1.09%
Village of Hardwick	-1.52%	-0.63%	0.18%	0.91%	1.58%	2.20%	2.77%	3.31%	3.81%
Village of Barton	-0.18%	0.37%	0.88%	1.35%	1.79%	2.20%	2.59%	2.95%	3.30%
Village of Enosburg Falls	-2.33%	-1.01%	0.14%	1.16%	2.07%	2.89%	3.64%	4.34%	4.98%
Village of Lyndonville Electric Dept.	-1.47%	-0.53%	0.31%	1.07%	1.76%	2.40%	2.98%	3.53%	4.03%
Vermont Electric Co-op	-1.26%	-0.41%	0.36%	1.07%	1.72%	2.32%	2.87%	3.39%	3.87%
Village of Morrisville Water & Light Dept.	-2.32%	-1.11%	-0.05%	0.89%	1.74%	2.51%	3.22%	3.87%	4.48%
Town of Stowe Electric Dept.	0.31%	1.59%	2.71%	3.71%	4.60%	5.40%	6.14%	6.81%	7.43%
Green Mountain Power	-1.27%	-0.28%	0.60%	1.40%	2.13%	2.79%	3.41%	3.98%	4.51%

**Distribution utilities with very few underserved or unserved addresses have been omitted from this table*

As take rates increase from 30% to 70%, IRRs improve as a result of the additional revenues to cover costs. This enables more financially sustainable networks than at lower take rates. Many municipal utilities and coops strive to achieve a 40-45% take rate for their deployments in combined rural and urbanized environments. For example, Morristown Utilities in Tennessee has achieved a 40% take rate in a community of 13,000 customers in a mixed urban/rural geography. Arrowhead Electric Cooperative has achieved a 60% take rate in a predominately rural community of 5,500 members.

Pricing Sensitivity

Achieving sustainable market pricing for services is also critical in the overall financial feasibility of distribution utilities providing broadband. Table 8 illustrates this sensitivity by varying the monthly price for internet services from $40 per month to $80 per month while fixing the take rate at 45%. At $40 per month, only Stowe Electric Dept is able to achieve a positive IRR. At $50 per month, Village of Barton and Green Mountain Power gain positive IRRs. At $60 per month, all distribution utilities but Washington Electric Cooperative are able to achieve positive IRRs. At $70 per month, all distribution utilities achieve positive IRRs. However, increases in pricing may also reduce take rates and a delicate balance between price and demand is critical for any provider to maximize its financial sustainability.

Table 8: Residential Price Sensitivity – Impact on Feasibility

Residential Internet Monthly Pricing>	$40.00	$50.00	$60.00	$70.00	$80.00
Washington Electric Co-op	-7.71%	-4.95%	-2.80%	0.96%	2.33%
Village of Hardwick	-2.63%	-0.55%	1.22%	4.32%	5.58%
Village of Barton	-1.44%	0.01%	1.31%	4.07%	5.05%
Village of Enosburg Falls	-3.00%	-0.23%	2.02%	5.38%	6.92%
Village of Lyndonville Electric Dept.	-2.54%	-0.34%	1.51%	4.65%	5.96%
Vermont Electric Co-op	-2.35%	-0.34%	1.38%	4.44%	5.67%
Village of Morrisville Water & Light	-3.19%	-0.58%	1.56%	4.89%	6.37%
Town of Stowe Electric Dept.	0.32%	2.94%	5.15%	8.22%	9.82%
Green Mountain Power	-2.14%	0.08%	1.96%	5.08%	6.41%

**Distribution utilities with very few underserved or unserved addresses have been omitted from this table*

Scenario 1-B: Distribution Utility Partnership with Existing Providers Service Only to Unserved and Underserved Addresses in Electric Serving Area

As an alternative to providing broadband services directly, distribution utilities could develop partnerships with existing broadband providers to bring new services to underserved and unserved communities in Vermont. Providing retail broadband services is a significant operational undertaking for electric utilities and many choose to partner with providers rather than provide services themselves. Some examples include:

- Middle Tennessee Electric Membership Corporation ("MTEMC") – Invested in a local Tennessee telephone cooperative to build out fiber-optic infrastructure throughout its rural regions. MTEMC provided the capital to extend the fiber-optic plant while United Communications provided retail services, operations and management of the network.
- Chippewa Valley Electric Cooperative ("CVEC") - Collaborated with Citizens Connected telephone cooperative to expand its existing service area with new fiber-to-the-home infrastructure. This joint venture expands broadband access to rural communities in CVEC's Cornwall, WI area.

These partnerships often rely on the local distribution utility to finance construction of the fiber plant through grants, USDA Rural Utility Service ("RUS"), CoBank and CFC loans and other federal programs aimed at upgrading rural infrastructure. In many cases, the distribution utility

remains a passive owner of the infrastructure while the telephone cooperative or broadband provider delivers all services and manages the system, either using a revenue sharing agreement, co-investment agreement or indefeasible rights of use agreement (capital lease).

Rather than the distribution utility collecting all revenue, revenues generally flow to the operator who pays the distribution utility in revenue share fees or lease fees. Therefore, the distribution utility is reliant on the experience and capabilities of the operators to ensure that the network meets the needs of the community and generates sufficient revenues to cover its costs, generate a return (if it is a for-profit operator) and meets the payment obligations to the utility for use of the infrastructure.

Table 9: Scenario 1-B: Distribution Utilities Partnering with Existing Providers Service Provided Only to Unserved and Underserved Addresses

	Distribution Utilities Providing Broadband Services											
Distribution Utility	Unserved/Unserved Households	Underserved/Unserved Expected Subscribers	Unserved/Unserved Businesses	Underserved/Unserved Expected Subscribers	Cost Per Passing	Capital Funding	Operations Funding	Total Funding	15 Year IRR	20 Year IRR	25 Year IRR	30 Year IRR
Village of Jacksonville Electric Dept	525	236	111	33	$ 3,001.13	$ 2,222,109	$ 690,667	$ 2,912,776	-100.00%	-100.00%	-100.00%	-100.00%
Washington Electric Co-op	6361	2862	1728	518	$ 4,698.31	$ 42,365,560	$ 2,172,807	$ 44,538,367	-10.52%	-5.86%	-0.49%	1.59%
Village of Hardwick	2049	922	680	204	$ 3,447.59	$ 10,753,200	$ 364,228	$ 11,117,428	-3.65%	-0.07%	3.13%	4.56%
Village of Barton	745	335	526	158	$ 3,446.06	$ 5,006,232	$ 143,174	$ 5,149,405	-2.12%	1.24%	4.07%	5.36%
Village of Enosburg Falls	764	344	76	23	$ 2,662.89	$ 2,660,735	$ 50,372	$ 2,711,107	-0.57%	2.56%	5.07%	6.22%
Village of Lyndonville Electric Dept	2086	939	571	171	$ 2,943.22	$ 9,129,382	$ 209,243	$ 9,338,626	-1.41%	1.85%	4.53%	5.75%
Vermont Electric Co-op	13855	6235	4946	1484	$ 3,419.56	$ 73,555,359	$ 2,425,799	$ 75,981,158	-3.38%	0.16%	3.29%	4.69%
Village of Morrisville Water & Light Dept	975	439	153	46	$ 2,886.37	$ 3,811,649	$ 102,255	$ 3,913,903	-1.61%	1.67%	4.40%	5.63%
Village of Stowe Electric Dept	908	409	83	25	$ 2,021.96	$ 2,492,074	$ 5,124	$ 2,497,198	3.95%	6.49%	8.22%	9.02%
Village of Orleans	123	55	27	8	$ 2,629.80	$ 460,382	$ 13,081	$ 461,464	-1.53%	1.74%	4.45%	5.68%
Green Mountain Power	34019	15309	8809	2643	$ 3,182.64	$ 157,409,726	$ 4,786,150	$ 162,195,877	-2.62%	0.81%	3.76%	5.09%
Village of Hyde Park	139	63	6	2	$ 3,194.92	$ 534,712	$ 21,192	$ 555,904	-5.36%	-1.51%	2.14%	3.71%
Village of Johnson	58	26	7	2	$ 1,634.71	$ 151,285	$ 416	$ 151,701	4.11%	6.63%	8.34%	9.13%
Village of Northfield	100	45	8	2	$ -	$ 53,217	$ (22,249)	$ 30,968	43.52%	43.74%	43.77%	43.78%
Ludlow Electric Light Dept	52	23	13	4	$ 1,639.69	$ 141,923	$ 72,566	$ 214,490	-100.00%	-100.00%	-100.00%	-100.00%
Swanton Village Electric Dept	50	23	19	6	$ 1,393.36	$ 127,865	$ (5,981)	$ 121,884	11.76%	13.45%	14.33%	14.70%
Burlington Electric Dept	10	5	20	6	$ 820.51	$ 39,338	$ (5,776)	$ 33,622	22.90%	23.77%	24.07%	24.17%
Total	**63019**	**28359**	**17783**	**5335**	**$ 3,355.09**	**$ 340,972,909**	**$ 11,063,068**	**$ 321,975,977**				

Financial Highlights – Scenario 1-B

- Scenarios where distribution utilities partnering with existing providers yield more feasible financial scenarios for many of the organizations under study. Whereas only one distribution utility achieved a positive IRR in 20 years when providing broadband directly, many utilities achieved a positive IRR in the partnership model. This is a result the following:
  - Lower capital costs – distribution utilities do not generally invest in the headend, electronics or home equipment in a partnership model, these services are procured by the partner.
  - Lower operating costs – since the partner bears the costs of operations, the distribution utility's operating costs are significantly lower in the range of 25% versus 60% in the model where distribution utilities provide services directly.
  - Existing providers already maintain scale in operations, reducing the overall startup inefficiencies that add time and cost to distribution utilities providing services directly.
- Extending the term from 20 to 25 years enables nearly all distribution utilities to achieve positive IRRs when partnering with existing providers.
  - Only the most rural providers such as WEC require several more years to achieve a positive IRR.
- Extending the term from 25 to 30 years enables all distribution utilities to achieve positive IRRs when partnering with existing providers.
- The overall economic model of partnerships allows small distribution utilities to shift operational risk, cost and investment to providers that have already incurred these costs and have scaling capacity.
- Distribution utilities continue to own and maintain fiber plant infrastructure, or alternatively could contract fiber plant maintenance to the partner if they chose to do so.
- Distribution utilities shift all sales and marketing functions to existing providers who already have the capabilities to provide such services. This enables more efficient uptake of services across the distribution utility market rather than requiring distribution utilities to build sales and marketing organizations.

Financial Highlights – Comparing Scenarios 1-A and 1-B

A side-by-side comparison of the financial performance of the two business models provides insight to which are more feasible for certain distribution utilities. Every distribution utility is included in this comparison, including those that only have a small number of underserved and unserved addresses in their regions.

In most cases, the partnership option provides stronger financial results than in cases where distribution utilities provide services directly. This assumes that providers are willing to share a reasonable share of gross revenues with each distribution utility, between 40 - 50%. As every partnership is different, each distribution utility could solicit information from existing providers in its area to determine interest and viability of deploying services in a partnership model.

Table 10: Financial Comparison of Business Models – 25 Year Term

	Distribution Utility Providing Services	Distribution Utility Partnering with Existing Providers
Village of Jacksonville Electric Dept.	-100.00%	-100.00%
Washington Electric Co-op	-2.64%	-0.46%
Village of Hardwick	1.15%	3.13%
Village of Barton	1.64%	4.07%
Village of Enosburg Falls	1.42%	5.07%
Village of Lyndonville Electric Dept.	1.30%	4.53%
Vermont Electric Co-op	1.33%	3.29%
Village of Morrisville Water & Light Dept.	1.12%	4.40%
Town of Stowe Electric Dept.	4.17%	8.22%
Village of Orleans	-100.00%	4.45%
Green Mountain Power	1.70%	3.76%
Village of Hyde Park	-100.00%	2.14%
Village of Johnson	-100.00%	8.34%
Ludlow Electric Light Dept.	-100.00%	-100.00%
Swanton Village Electric Dept.	-11.01%	14.33%
Burlington Electric Dept.	-100.00%	24.07%

Scenario 2: Service Deployment to the Entire Electric Service Area

Financial Highlights – Scenario 2

In some cases, DUs may desire to serve their entire electric service territories, instead of only the underserved and unserved addresses within them. In these cases, DUs would require a deployment of fiber to the premises infrastructure to cover all addresses in their service areas, which would increase the total number of premises passed in their area, require more capital and potentially generate additional revenues for them.

Under this scenario, they would overbuild existing areas that already had 25/3 or greater speeds established, which would place them into competition with both cable companies and telecom providers. In these instances, DUs would need to carefully consider the impact of deploying services in the competitive environment and the risks of doing so. In underserved and unserved areas, DUs could achieve high levels of take rates as no substitute services exist. In served areas, DUs would face competition from cable and telecom providers if overbuilding their existing networks.

This may have varying impacts and realized take rates will be highly dependent on how each DU executes its business plan in response to competition. In one case, the DU may successfully compete to win customers and achieve high take rates, on par with the take rates it achieves in underserved and unserved areas. In the case where the DU is less successful at executing its business plan, it may achieve lower take rates. Execution of a DU business plan may include successfully selling, marketing, pricing and managing its services in the competitive environment.

Another aspect of deploying into the current served environment is the capital required. Whereas the underserved and unserved environments can be substantially funded by grants, the served areas may not have such access to funding. In some cases, a portion of a currently served area may be eligible for certain federal programs; however, the majority of capital required may have to be sourced through traditional utility and municipal financing vehicles.

Higher levels of capital investment will require higher levels of debt service and revenues must be sufficient to cover such debt service (as well as operating costs and reserves). Therefore, DUs should be confident that the demand for broadband services exist in each individual community to ensure enough customers will sign up to cover such fixed costs. Many DUs have done so and achieved take rates that are sufficient to become financially sustainable and even generate excess revenues that can be utilized to fund other programs. (See Table 6 for examples of several DUs that have done so).

To assess the high-level feasibility of DUs deploying retail broadband service to their entire service area, the financial model was modified to include all currently served addresses and all DU plant footage that would be required for a fiber to the premise deployment. By incorporating these two factors, the financial model presents the costs, revenues and overall financial feasibility of each DU deploying across its entire service area.

Table 11 illustrates total costs to deploy across each DUs service area, including all underserved, unserved and served addresses. Total costs to pass all 303,836 addresses is estimated at $809,834,290.

Table 11: Cost per Passing – Scenario 2: Deployment to Entire Electric Service Area

	Aerial Feeder Distribution	Underground Feeder Distribution	Total Feeder Distribution	Headend Costs	Total Fixed Capital Costs	Cost Per Passing
Village of Jacksonville Electric Dept.	$1,603,800	$0	$1,603,800	$380,000	$1,983,800	$3,119
Washington Electric Co-op	$40,896,900	$2,362,891	$43,259,791	$760,000	$44,019,791	$3,954
Village of Hardwick	$9,013,356	$3,119,016	$12,132,372	$380,000	$12,512,372	$3,003
Village of Barton	$5,677,452	$94,516	$5,771,968	$380,000	$6,151,968	$3,088
Village of Enosburg Falls	$3,400,056	$0	$3,400,056	$380,000	$3,780,056	$2,489
Village of Lyndonville Electric Dept.	$12,926,628	$0	$12,926,628	$380,000	$13,306,628	$2,547
Vermont Electric Co-op	$78,457,896	$29,866,938	$108,324,834	$2,280,000	$110,604,834	$2,950
Village of Morrisville Water & Light Dept.	$5,869,908	$1,606,766	$7,476,674	$380,000	$7,856,674	$2,560
Village of Stowe Electric Dept.	$3,849,120	$1,029,683	$4,878,803	$380,000	$5,258,803	$1,839
Village of Orleans	$1,115,283	$305,285	$1,420,568	$380,000	$1,800,568	$2,813
Green Mountain Power	$452,352,792	$124,154,777	$576,507,569	$4,560,000	$581,067,569	$2,708
Village of Hyde Park	$2,117,016	$850,641	$2,967,657	$380,000	$3,347,657	$3,046
Village of Johnson	$833,976	$189,031	$1,023,007	$380,000	$1,403,007	$2,123
Ludlow Electric Light Dept.	$1,667,952	$1,323,219	$2,991,171	$380,000	$3,371,171	$1,615
Swanton Village Electric Dept.	$3,367,980	$756,125	$4,124,105	$380,000	$4,504,105	$1,253
Burlington Electric Dept.	$2,245,320	$5,859,969	$8,105,289	$380,000	$8,485,289	$732
Total	**$625,395,435**	**$171,518,856**	**$796,914,290**	**$12,540,000**	**$809,454,290**	

***Village of Northfield plant data was not found in the research.*

Table 12 compares the cost per passing for the underserved/unserved addresses in each DU territory to the cost per passing for all addresses in each DU territory. In most cases, the cost per passing is lower covering served addresses. This is expected as a result of served addresses generally falling within higher-density areas with a greater number of premises per mile of distribution plant. A few exceptions exist including Village of Jacksonville Electric Dept, Village of Orleans and Village of Johnson. These exceptions may be due to plant data records or other service area specific issues.

Table 12: Cost per Passing – Comparison of Underserved/Unserved Addresses to the Entire Service Area

-	**Underserved/Unserved Addresses Cost Per Passing**	**Total Service Area Cost Per Passing**
Village of Jacksonville Electric Dept.	$3,001	$3,119
Washington Electric Co-op	$4,618	$3,954
Village of Hardwick	$3,448	$3,003
Village of Barton	$3,446	$3,088
Village of Enosburg Falls	$2,663	$2,489
Village of Lyndonville Electric Dept.	$2,943	$2,547
Vermont Electric Co-op	$3,420	$2,950
Village of Morrisville Water & Light Dept.	$2,886	$2,560
Village of Stowe Electric Dept.	$2,022	$1,839
Village of Orleans	$2,630	$2,813
Green Mountain Power	$3,183	$2,708
Village of Hyde Park	$3,195	$3,046
Village of Johnson	$1,835	$2,123
Ludlow Electric Light Dept.	$1,691	$1,615
Swanton Village Electric Dept.	$1,360	$1,253
Burlington Electric Dept.	$821	$732

Table 13 illustrates the results of the financial analysis under Scenario 2 where a DU deploys broadband to its entire service area. Columns 2 and 3 illustrate the original "Underserved/Unserved Area Only" deployments contemplated in the first scenario.

Columns 4 and 5 illustrate the financial results of each DU deploying to all addresses within its service area, including the underserved and unserved addresses. The results generally indicate stronger financial performance as evidenced by the higher IRRs in both cases where the DU provides services directly and through a public-private partnership. These stronger IRRs are a direct result of the marginal revenues generated by higher density areas – those areas where more customers exist for each mile of plant deployed.

Table 13: Financial Comparison of Deployment and Business Models – 25 Year Term

	Underserved/Unserved Area Only		Entire Service Area	
	Distribution Utility Providing Services	Distribution Utility Partnering with Existing Providers	Distribution Utility Providing Services	Distribution Utility Partnering with Existing Providers
Village of Jacksonville Electric Dept.	-100.00%	-100.00%	-100.00%	-100.00%
Washington Electric Co-op	-2.64%	-0.46%	16.11%	19.28%
Village of Hardwick	1.15%	3.13%	17.74%	21.54%
Village of Barton	1.64%	4.07%	18.48%	22.59%
Village of Enosburg Falls	1.42%	5.07%	13.64%	16.72%
Village of Lyndonville Electric Dept.	1.30%	4.53%	6.15%	10.17%
Vermont Electric Co-op	1.33%	3.29%	4.21%	5.27%
Village of Morrisville Water & Light Dept.	1.12%	4.40%	6.14%	7.18%
Town of Stowe Electric Dept.	4.17%	8.22%	9.19%	12.98%
Village of Orleans	-100.00%	4.45%	-100.00%	-1.99%
Green Mountain Power	1.70%	3.76%	3.16%	4.09%
Village of Hyde Park	-100.00%	2.14%	-100.00%	-7.07%
Village of Johnson	-100.00%	8.34%	-100.00%	8.89%
Ludlow Electric Light Dept.	-100.00%	-100.00%	-100.00%	-100.00%

Swanton Village Electric Dept.	-11.01%	14.33%	5.98%	16.54%
Burlington Electric Dept.	-100.00%	24.07%	21.28%	26.75%

One key aspect of this analysis is that it utilizes the same take rate for the served addresses as the unserved addresses, with a 45% take rate for residential customers and a 30% take rate for business customers. These take rates are supportable through evidence from other DUs that have deployed in their communities; however, it is also important for DUs to understand how competition from existing cable companies and telecoms could negatively impact these take rates.

For example, if a cable operator offered a market-wide promotion discounting its internet services by $20 per month for the next 12 months, a new DU entrant may struggle with convincing customers to take its own offer. Promotional tactics have often been used by existing providers to "protect their turf" when a new utility or municipal provider is planning to enter the market. In some cases, these promotional offers come with lock-in periods, keeping potential customers in contracts with expensive buy-out clauses. If successful, these tactics result in fewer customers signing up for service and lower take rates for the utility or municipal provider.

Table 14 illustrates the results of varying the take rates within the served address portion of each DUs service area over the 25-year term. A range of 20% to 60% was utilized to model take rate possibilities in areas where existing providers would potentially compete with new DU entrants. As shown, the risk of lower take rates in the 20% - 30% range result in a number of DUs lacking sufficient customers and revenues to generate a positive IRR.

Table 14: Residential Take Rate Variability – Impact on Feasibility

	20%	25%	30%	35%	40%	45%	50%	55%	60%
Village of Jacksonville Electric Dept.	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%
Washington Electric Co-op	11.72%	12.79%	13.81%	14.77%	15.45%	16.11%	16.96%	17.78%	18.57%
Village of Hardwick	11.80%	13.30%	14.68%	15.98%	16.88%	17.74%	18.85%	19.90%	20.90%
Village of Barton	12.62%	14.09%	15.46%	16.74%	17.63%	18.48%	19.58%	20.63%	21.62%
Village of Enosburg Falls	3.70%	6.51%	8.88%	10.95%	12.35%	13.64%	15.26%	16.75%	18.13%
Village of Lyndonville Electric Dept.	-100.00%	-6.18%	-1.01%	2.37%	4.40%	6.15%	8.20%	10.00%	11.64%
Vermont Electric Co-op	-100.00%	-100.00%	-9.27%	-2.94%	-0.05%	2.21%	4.66%	6.75%	8.58%
Village of Morrisville Water & Light Dept.	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-11.22%	-3.24%	0.82%	3.79%
Village of Stowe Electric Dept.	-100.00%	-7.76%	0.08%	4.48%	7.03%	9.19%	11.70%	13.91%	15.88%
Village of Orleans	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%
Green Mountain Power	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%
Village of Hyde Park	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%
Village of Johnson	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-8.69%	-1.66%
Ludlow Electric Light Dept.	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%	-100.00%
Swanton Village Electric Dept.	-100.00%	-100.00%	-100.00%	-4.08%	2.03%	5.98%	9.96%	13.19%	15.94%
Burlington Electric Dept.	-100.00%	3.72%	10.76%	15.75%	18.73%	21.28%	24.31%	26.92%	29.22%

Financial Risks and Position of the Electric Companies

As part of our financial feasibility analysis Magellan Advisors began with a high-level assessment of the financial position of the electric companies in Vermont based on 2018 Annual Report data as filed with the DPS. All electric companies in Vermont are regulated by the Vermont Public Utility Commission – Green Mountain Power is under an Alternative Regulation Plan while Vermont's cooperatives and municipal electric companies are rate base/rate of return regulated. The cooperatives tend to have higher investment levels and corresponding debt from federal lenders such as the Rural Utilities Service[70] than do the municipal electric companies which tend to have minimal debt. The financial standing of the municipal electric companies naturally closely align with the financial capacity of the town or village, all of which tend to have good debt ratios. In particular the survey responses of the municipalities generally express a keen awareness of financial risk and cautious attitudes toward incurring additional debt.

Vermont's municipal utilities are supported by the Vermont Public Power Supply Authority, or VPPSA, which is a "joint action agency established by an act of the Vermont General Assembly"[71] that is managed and governed by its members. As such it "has broad statutory powers that enable it to provide such services as may be required in support of the activities of its member municipal utilities and to market its services to non-member utilities as it deems appropriate. … VPPSA provides its members with a broad spectrum of joint action services such as: power aggregation, financial support, IT support, rate planning support and legislative and regulatory representation."[72] It appears that under this broad authority VPPSA *could* provide a service to its members that included owning fiber-optic facilities on behalf of the members and providing service to its members on a fee basis. VPPSA *could* issue indebtedness for broadband projects so long as the effort benefits the member electric department and is tied to how a utility delivers electric energy to its customers. Clearly the members would have to find it in their interest to undertake a broadband program, and there would have to be agreement to pay for any investments before VPPSA could proceed.

[70] VEC has a debt ratio of approximately 50%, and WEC has a debt ratio of approximately 60%.
[71] https://vppsa.com/about-vppsa/.
[72] *Ibid*.

Survey Responses
Municipal Electric Departments

Is the technical human resource available locally? If not, how do we entice the resource to move to a small town and retain them?

The utility makes large investments and a lack of enough people signing up for service can't pay the bills. Added risk to the utility.

Too much competition to recover the cost of building the system out for the small number of customers in our territory. Example – the outcome of Burlington Telecom, a high-density area not being able to overcome the vast competition or obstacles.

Municipals see many financial risks including:

- "Uptake - what percent of customers actually sign on to fiber/broadband service" given the area is already served
- "Insufficient uptake to support fixed staffing/equipment costs"; "what percentage of customers will actually sign on to fiber/broadband service"
- "Cost per mile already seems to be an issue with basic electric service. Low density broadband seems to increase financial risk."
- "Given the existing coverage of broadband in the service territory, it is likely that subscription rates to the broadband services would be insufficient to cover costs of deployment and operation." "Rate recovery including carrying costs (new equipment/infrastructure)"
- "Debt Maintenance using the electric utility as collateral"; "Putting our 123-year-old electric utility at risk. Part of Vermont's brand is small and local. The local power company will be at risk due to debt load."
- "Staffing of properly trained employees to meet new service requirements"; "access to properly trained labor pool"; "training for current employees"
- "Costs associated with marketing and development"; "software and billing system"

Electric Cooperatives

Vermont Electric Cooperative started "there are too many uncertainties surrounding this question to provide an adequate answer. Some of these uncertainties include cost recovery, rate of return, performance requirements/penalties, broadband business regulated or un-regulated, and impact to electric utility regulation, impact on electric utility brand/reputation, cost impact during major storm recovery efforts and many others." Nonetheless, VEC offered its perceptions regarding key financial risks:

- Level of investment required to provide broadband service.
- Level of existing competition.
- Business may never achieve profitability or will take too long to reach profitability.
- Lack of sufficient users of new broadband service (uptake).
- Negative financial impact on the electric cooperative.
- Regulatory risk of cost shift from electric to broadband.
- Areas in territory that have no chance to recover costs because of density.
- Potential for churn of customers between businesses.
- Technology obsolescence.
- Maintenance costs to serve could be underestimated including storms.

Washington Electric Cooperative stated its view on key risks:

- Cost effective business model – if we were not able to make it work will the debt be owned by WEC ratepayers? Defaulting on debt and not meeting lender metrics would lead to bankruptcy and potential cost impacts to electric ratepayers. This would impact WEC's future ability to borrow.
- WEC also notes that it must maintain 85% of its revenue from members. If more than 15% comes from grants this could jeopardize our 85/15 tax exempt status. Therefore, there are limits as to how many grant dollars we can use under current federal law. However, work is underway at the federal level to change this IRS law and issue.
- WEC is not aware if FEMA dollars would be accessible.
- All the above risk items are important, and it is difficult to rank one above the other as any one could be a fatal flaw to moving ahead. Need a feasibility to assess and layout issues.

Risks perceived by **VELCO** include "Unforeseen telco market impacts that end up hurting VT Transco credit rating and so add costs to owner/customers and all Vermont ratepayers."

Investor Owned Utilities

Green Mountain Power sees many risks including "cost recovery, rate of return, performance requirements/penalties, is this a regulated or un-regulated aspect of utility business? Impact on utility brand/reputation, cost impact during major storm recovery efforts. And many others."

Discussion

Financial risk circumstances and implications vary depending on the type of electric utility. The municipal electric departments' financial standing aligns closely with the financial capacity of the town or village, which tend to have good debt ratios while the electric departments carry little or no debt. The municipal electric departments are not borrowers from the federal Rural Utilities Services programs, while the two larger electric cooperatives are RUS borrowers and carry typical debt levels, as does Green Mountain Power. Overall the electric utilities see many risks which must be addressed including significant investment implying significant debt, low customer densities and take rates against high fixed operating/staffing and investment costs, attracting and retaining the needed pool of technically skilled employees, uncertain or deferred break-even and cost recovery, competition and technological change, negative impacts on non-profit status, and regulatory disallowances.

Impact on Electric Rates

The Broadband Deployment Act requires this Report to consider "the impact [of providing broadband service] on electric rates."[73] Accordingly, the Magellan Advisors survey of the electric companies in Vermont asked whether "the Utility foresee[s] an impact on electric rates as an outcome of providing broadband service?"

Survey Responses

Municipal Electric Departments

Municipal responses here were evenly divided between foreseeing an impact on electric rates and being unsure whether or not there would be an impact.

- "If regulations and statutes provide for utilities to integrate these services into the existing business plans, additional funds will be needed to install new equipment and build a fiber network, train or hire specialized personnel, upgrades to the existing systems and funding for software and other technology upgrades. Since it is already a competitive market, the potential outliers the utility may pick up as customers will likely not cover the cost of the upgrades, up-keep and personnel which will lead to financial losses thereby affecting the electric rates."

[73] Broadband Deployment Act, Sec. 11(a).

Reasons for concern that there would be an impact include:

- Cost of new equipment, inventory and storage area, investment in new equipment and related carrying costs;
- Additional cost for more qualified personnel;
- Liability costs;
- "Anticipated small market for broadband amongst our customers since we our service area is already largely served by Comcast"; and,
- Concern that "utilities may be required to recover some percentage of cost through electric rates. It was done for Efficiency Vermont."

Electric Cooperatives

Vermont Electric Cooperative is unsure about electric rate impacts given it "has not completed a feasibility study or business plan to provide an adequate answer to this question. Based on high level conversations with other cooperatives, broadband is not expected to be profitable for at least 12 years, if not more. The impact to electric ratepayers is uncertain, at best."

Washington Electric Cooperative stated that "by state law [it] is not authorized to cross subsidize electric rates with telecom income. If the business model fails, the electric rate payer could be on the hook. The answer to this and many of the questions posed would be answered by a detailed feasibility study and business plan. WEC needs more information to respond. See answer to Q1 [Appendix V] for more details."

VELCO is unsure on questions regarding rate impacts.

Investor Owned Utilities

Green Mountain Power states it is unsure regarding rate impacts. "Rate impact could only be known with more definition of what the utility services and costs would be and the regulatory treatment of them. We can see provision of broadband, depending on the model and treatment, having the ability to both increase or decrease rates, potentially."

Discussion

Vermont has long-standing regulatory and statutory policy that prohibits cross-subsidization of services as explained in more detail below. Provision of broadband services should not have any different treatment – cross-subsidy of broadband services by electric services should not be permitted. The Commission's authority and cost allocation rules should be sufficient to prevent cross-subsidies. Also "ring fencing" practices can be employed to separate accounting, funds, and financing between electric services and broadband services. As described in the section

above on compatibilities and incompatibilities of electric operations vs. broadband operations, the unique costs of the broadband operation would need to stand on their own. Regulatory provisions appear adequate to prevent an impact on electric rates from inclusion of broadband costs.

Regulatory Barriers to the Provision of Broadband Service by Electric Companies

Included in the Broadband Deployment Act are findings regarding the essential nature of broadband to Vermont and findings that the Federal Communications Commission's "light touch" deregulatory approach to broadband are insufficient to further broadband deployment in Vermont.

> The FCC's regulatory approach is unlikely to achieve the intended results in Vermont. The policy does little, if anything, to overcome the financial challenges of bringing broadband service to hard-to-reach locations with low population density. However, it may result in degraded broadband quality of service. The State has a compelling interest in preserving and protecting consumer access to high quality broadband service.[74]

To explore one potential means for further expanding broadband deployment in Vermont the Broadband Deployment Act requires the DPS Commissioner, in consultation with the Public Utility Commission, to consider the question of "regulatory barriers to the provision of broadband service by electric companies."[75] Accordingly, the Magellan Advisors survey of the electric companies in Vermont asked this question to obtain their thoughts and positions on whether there are "legal or regulatory obstacles that prevent or make it difficult for the Electric Utility to provide broadband" (listing any identified barriers in order of significance). Responses of the electric companies are summarized below. The responses suggest this report must address the regulatory implications of cross-subsidy concerns, rights-of-way and easement concerns, separation of funds concerns, and concerns that the electric utility charter does not include broadband.

[74] Broadband Deployment Act, Sec. 1(5).
[75] Broadband Deployment Act, Sec. 11(b).

Survey Responses

Municipal Electric Departments

The municipals offered numerous comments on this subject, including:

- Concerns over "direct competition with existing broadband entities in the service area", "is there freedom to compete in the marketplace"; unsure whether Charter allows this, "Village Charter that authorizes Village to operate electric utility does not reference broadband service."
- "Developing and maintaining cost controls between electric and broadband";
- "Accounting - Separation between broadband and electric utility funds?"
- "Currently regulations do not permit the intermingling of electric funds with other funds. This essentially would require funding for a "start-up" business with no way to provide verification that the funds would be repaid."
- "Ratepayers would need to approve the addition of the services as a separate entity."
- "Public Power Utilities need ratepayer approval for large funding."
- "Right of way issues, dependent on easement"

Electric Cooperatives

Vermont Electric Cooperative indicates there are legal or regulatory obstacles making it difficult for an electric utility to provide broadband service:

1. Vermont statute 30 V.S.A. §3047 prohibits cooperatives from using income from regulated activities to fund non-regulated operations.
2. There is longstanding Vermont policy that non-regulated (e.g., competitive) subsidiaries of regulated utilities must establish separate books of account and that any contributions by the regulated utility (personnel, etc.) must be allocated to the non-regulated subsidiary. This creates accounting complexities for the regulated utility and loads up overheads on the non-regulated subsidiary.
3. Regulated electric utilities are expected to provide high quality services to their members/ratepayers. Diversion of business focus or resources to a non-electric business could threaten the quality of that service.

Washington Electric Cooperative stated "need a feasibility to assess and layout issues. Broadband is an unregulated business model and with it comes many risks, all of which are important."

VELCO sees potential obstacles from:

- Potential right-of-way challenges;
- Surety of cost recovery for broadband service-related expenses; and,
- Changes to FCC and/or North American Reliability Corporation operating requirements.

Investor Owned Utilities

Green Mountain Power observes that broadband service is "Not in distribution utility charter at this time. Would require a regulatory ruling to extend the utility charter to deliver these services, unless it is done as an un-regulated activity."

Financial Risks and Cross-subsidization of Broadband by Electric Operations

A primary concern of many commenters is the potential or actuality of cross-subsidization of broadband services by electric service operations, to the detriment of electric ratepayers. A related concern is financial risks or negative financial impacts to the electric operation from investment for entry into broadband operations. The fear is that funds from electric operations would be used to support broadband investment and operations, leaving the electric operation starved of funds to that extent as well as exposed to financial problems and risks from the broadband operation. Magellan Advisors believes these concerns should be taken seriously, and electric rates and electric operations should not be jeopardized by any operation to provide broadband infrastructure by an entity related to the electric utility. It is clear why concerns regarding financial jeopardy to electric utility operations are especially important in Vermont given the history of distressed public utilities and bankruptcies in Vermont that have been addressed by the Vermont PSB in the past three decades.

Vermont Public Service Board[76] Cases on Distressed/Bankrupt Public Utilities

Consolidated cases regarding Vermont Electric Cooperative, Vermont Public Service Board Order dated December 30, 1993.

These cases addressed VEC's proposed Debt Restructuring Agreement (DRA) and an initial proposed 19.06% rate increase. The PSB rejected the DRA and related proposed rate increase because it committed VEC to a path that was not viable, required payment from ratepayers for power plants that were imprudently constructed and not used and useful, creates unacceptable risk that VEC will be unable to provide adequate and reliable service to consumers, and many of the specific provisions are inconsistent with public policy or the general good of Vermont.[77] Over a 14 year period ending in 1985, VEC borrowed over $58 million to invest "in eight nuclear power plants, six of which were never completed, and two of which were completed

[76] The Vermont Public Service Board is now known as the Vermont Public Utility Commission or PUC.
[77] Order; Docket No. 5630 regarding Investigation of Vermont Electric Cooperative, Inc.'s request to increase its rates in the overall amount of 19.06%, to take effect February 18, 1993; Docket No. 5631 regarding Investigation into DPS/NYPA tariff filing re: 29.9% rate increase to its "VEC service territory" customers; and, Docket No. 5632 regarding the Petition of Vermont Electric Cooperative, Inc. and Vermont Electric Generation and Transmission Cooperative, Inc. to restructure its long-term debt and to issue notes, mortgages, and guarantees in connection therewith; dated December 30, 1993 at page 5. (the "VEC Order")

many years beyond schedule, far over budget, and at costs that far exceeded their value to VEC."[78] The Board concluded the DRA "appears to be a lengthier and more expensive path to probable default, followed by foreclosure, sale, or bankruptcy. We have carefully examined the extensive and conflicting testimony upon the likely results of rejecting the proposed DRA. Upon the evidence we can only conclude that none of the likely consequences of rejecting the DRA appear worse than approval of the DRA as presently drafted."[79] The Board specifically considered the possibility VEC would enter bankruptcy and concluded "Electric cooperatives in other states have emerged from such proceedings with significantly better results than the proposed DRA."[80] In rejecting the DRA, the Board observed that "At this point, the parties in interest have a range of potential options for returning the Cooperatives to a sound financial basis or otherwise providing reliable utility services to VEC's members at just and reasonable rates. Those options are also discussed [in the Order], together with a statement of financial limitations and essential principles that must guide any further action by VEC's Trustees and creditors."[81] The Board retained continuing jurisdiction of the case and set deadlines for reports by VEC to the Board regarding further actions. VEC's financial distress over a long period of time clearly also stressed the regulatory process over many years and created problems for VEC customers (also its owners), VEC itself, and policy makers in Vermont including the PSB and DPS.

Green Mountain Power Rate Increase Requests, Vermont Public Service Board Orders dated January 23, 2001 and February 27, 1998

Green Mountain Power filed for a 16.7% increase in rates on June 16, 1997.[82] The Board issued its Order on February 27, 1998 allowing a 3.61% rate increase, including exclusion of power costs from a contract with Hydro-Quebec that were deemed imprudent.[83] Green Mountain Power (GMP) filed for another significant rate increase on March 8, 1998 on the heels of this Order. The Board found that GMP was in "considerable financial distress", "the Company's access to capital has been limited", and that GMP was exposed to bankruptcy.[84] GMP had requested a 12.9% rate increase along with other consumer-affecting changes in rate design, and the PSB granted a 3.42% rate increase based on a settlement agreement between DPS and GMP including a Third Memorandum of Understanding. The roots of GMP's financial distress began

[78] VEC Order, at page 7.
[79] VEC Order, at page 9.
[80] *Ibid*.
[81] VEC Order, at page 73.
[82] Order, Docket No. 5983, in the Matter of a Tariff filing of Green Mountain Power Corporation requesting a 16.7l5% rate increase, to take effect July 31, 1997, dated February 27, 1997, at page 6. ("Green Mountain Power Order I").
[83] Green Mountain Power Order I, at page 265.
[84] Order; Docket No. 6107, In the Matter of a Tariff filing of Green Mountain Power Corporation requesting a 12.9% rate increase, to take effect June 22, 1998; dated January 23, 2001, at page 2. ("the Green Mountain Power Order II").

in the late 1980's with diversification into unregulated ventures.[85] The PSB found "GMP's efforts to diversify into the various unregulated subsidiaries, and particularly [Green Mountain Energy Resources], required GMP to divert an increasing share of its resources away from the provision of basic retail electrical service to its new operations. These resources included the attention of management, the transfer of expertise, and capital. Although the unregulated operations remained small relative to the size of the overall corporation, as the number and scope of the investments became more significant, the unregulated subsidiaries still required GMP to transfer increasing sums of money."[86] Green Mountain Power's financial distress over a long period of time clearly also stressed the regulatory process over many years and created problems for GMP customers, GMP and its shareholders, and policy makers in Vermont including the PSB and DPS. Emblematic of such an extended series of financial issues is that two of the three PSB commissioners that started the case were no longer Board members by the time the case was decided.

Cross-subsidization and Separation of Funds between Broadband and Electric Operations

While the extensive economic literature on the subject of cross-subsidization will not be addressed in depth here, the economist's view is that subsidy-free prices for a particular service fall between a ceiling of the "stand-alone" cost of providing that service independently and a floor of the incremental costs caused by providing that service in addition to other services provided by the company. More generally it is "the idea that one set of customers receives favorable prices at the expense of other customers."[87] As applied here the cross-subsidy concern is that electric service customers would pay higher rates to support lower prices for the broadband operation if provided through the electric utility directly or indirectly.

Vermont Statutes directly bar electric cooperative from cross-subsidization: "the electric revenues received from regulated activities of a cooperative shall not subsidize any nonelectric activities of the cooperative. A cooperative shall adopt cost allocation procedures to ensure that the electrical distribution revenues received from regulated activities of a cooperative do not subsidize any of the nonelectric activities and that costs attributable to any nonelectric activities are not included in the cooperative's rates for electric service. A copy of the cost allocation procedures shall be available to the public upon request."[88] The Broadband Deployment Act[89] specifically removed the ban previously existing in 30 V.S.A. § 3047 that "Nonelectric activities

[85] Green Mountain Power Order II, at page 5.
[86] *Ibid*.
[87] "Industry Structure and Pricing: The New Rivalry in Infrastructure"'; Mark Jamison, Ph.D., Kluwer Academic Publishers, 1999, at page 111.
[88] 30 V.S.A. § 3047.
[89] Broadband Deployment Act, Sec. 12.

of the cooperative shall not be financed by loans or grants from the Rural Utilities Service of the U.S. Department of Agriculture or any successor federal agency."

Beyond a statutory bar, such a cross-subsidy has long been contrary to Vermont regulatory policy. According to the Commission's Order in a Vermont Gas case, "longstanding Vermont regulatory policy mandates that rates charged to a utility's customers must reflect the costs attributable to those same customers and that, unless specifically authorized by statute, cross-subsidization between groups is not permitted."[90]

Further, "this Board's ratemaking policy generally has been based upon assigning costs to the customers who cause those costs. In applied terms, this policy has meant that cross-subsidies, in which a class of customers pays above their costs in order to provide a discount to other customers, have generally been proscribed unless (1) authorized by legislation, or (2) there are other benefits to the subsidizing class."[91] At the same time, the Commission acknowledged that ratemaking does involve some cross-subsidization.

> Board policy disfavors cross-subsidization, but to make ratemaking feasible, some cross-subsidy nonetheless exists. For example, we allocate the cost of electric and natural gas distribution service generally, not based upon the actual costs of lines to serve customers that are farther out in the distribution system. This occurs even though it is known that some customers are farther out on the distribution system and therefore are more expensive to serve. Similarly, the costs associated with the electric and natural gas transmission systems are allocated to all customers.[92]
>
> In the case of service extensions by Vermont Gas, invariably, the revenues in the early years of a Project (such as the expansion to Jericho) will not cover the incremental carrying costs of the Project. Rather, VGS has typically examined such projects to determine whether the incremental revenues will exceed carrying costs after ten years. This reflects the fact that the natural gas pipeline is a long-lasting investment and, over time, the newly served customers will provide contributions to fixed costs of the overall system and thereby benefit all customers. Certainly, in these cases, in the short term, the existing customers effectively contribute to the new customers. Nonetheless, we have not considered this to be an impermissible cross-subsidy.[93]

This is similar to an expansion project to provide broadband capacity in that it would be a long-lasting investment and revenues may not cover the incremental carrying costs in the early years.

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[90] Vermont Public Service Board, In the matter of the Petition of Vermont Gas Systems, Inc. for a certificate of public good authorizing the construction of the "Addison Natural Gas Pipeline", Docket 7970, Order dated December 23, 2013, at page 142. ("Vermont Gas").
[91] *Ibid*.
[92] *Ibid*., at page 143.
[93] *Ibid*.

Finally, cross-subsidization of broadband services via electric rates is also in conflict with important state policy objectives to transition to use of electric service from renewable energy sources to be a leader in global climate change efforts. Higher prices for electricity would contradict and impede achievement of these policy objectives.

Other Barriers

Provision of broadband services by electric distribution utilities, whether retail provided directly to consumers or wholesale infrastructure provided to retail entities, would occur under various limitations in the present statutory and regulatory framework absent policy changes by the Vermont General Assembly and the Vermont Public Utility Commission.

Electric Utility Charter does not Include Broadband

Some survey respondents stated they were unsure whether the electric utility charter included provision of broadband services, or not. This barrier is very specific to the individual distribution utility and the potential need for any charter amendments would have to be addressed as part of any feasibility study that is conducted to consider the provision of broadband services whether infrastructure/dark fiber or retail services.

Rights-of-Way and Easements[94]

Commenters note the possibility of challenges regarding the use of electric facilities located in public rights-of-way and easements for attachment of communications fiber if distribution utilities were to decide to do so to provide broadband infrastructure for retail or wholesale use. In particular, VELCO sees potential obstacles from rights-of-way challenges based on its experience. VELCO sought a Certificate of Public Good (CPG) from the Vermont Public Service Board as required by 30 V.S.A. § 248(a) prior to construction of a new transmission facility. The Board granted this certificate in January 2005 for construction of a transmission line along a 35-mile corridor, to increase system reliability. VELCO also planned to install fiber-optic cable on the transmission towers for internal communications and also with "excess capacity", additional fibers which could be used to trade with parties for fiber access where VELCO did not have the needed fiber cables. The Board approved the Certificate of Public Good for the new transmission facility but declined to approve the installation of additional fibers as part of the planned project. Several parties challenged the Board's CPG approval in court, and VELCO challenged the Board's rejection of the plan for installation of additional fibers. These appeals were joined in a case before the Vermont Supreme Court which upheld the Board's decision to grant the certificate and thereby grant the easement for an electrical-

[94] The following discussion does not constitute a legal opinion and should not be construed as such. Questions about interpretation or applicability of these or other provisions of federal or Vermont law should be referred to legal counsel.

transmission line across the property of certain landowners. [95] The decision also granted VELCO the right to install the additional fibers as part of the project plan. The Supreme Court concluded that:

> VELCO's primary purpose of installing the OPGW[96] is a public use because it is necessary for maintenance of the line, and the incidental benefit of having excess capacity to lease or trade does not invalidate the public use. Although we do not disagree with the Board's finding that the excess lines are not *necessary* for VELCO's maintenance of its electrical grid because the capacity in other parts of the state could be purchased, there is also no evidence to contradict VELCO's assertion that its purpose in acquiring the excess capacity is to trade for capacity in other areas where VELCO does not have fiber-optic wires. As VELCO explains, the communications capacity it derives will be used to further its public purpose of providing reliable electrical service throughout the state. This incidental benefit derives from and does not interfere with the public use of the line. Thus, the benefit VELCO will accrue from this increased capacity is incidental to and consistent with the line's primary purpose of providing increased capacity and reliability to the electrical-transmission network in the state.[97]

The Supreme Court further stated:

> We disagree that VELCO is taking more than it would need to accomplish its legitimate propose. As the Board found, VELCO must install an OPGW in the corridor to maintain the safety and reliability of the network. The only question is whether VELCO can install twenty-four or seventy-two fibers within the wire. Installing seventy-two fibers in the OPGW increases the diameter of the OPGW by a dimension nearly imperceptible to the naked eye, and does not take any more property from the Grices than the OPGW with twenty-four fibers. The increased capacity and ability to trade excess capacity generated from the seventy-two fibers does not expand the taking and imposes no additional burden to the easement and therefore is allowed as an incidental benefit to the public good served as the primary purpose of the condemnation action.[98]

Since the Supreme Court decided the issue of 24 strands vs. 72 strands on a practical basis that the difference is de minimis from a legal perspective, it did not address VELCO's additional arguments supporting its installation.[99] It should be noted that the term "excess capacity" applied to fiber-optic cables is somewhat misplaced. While one could take a narrow view at a particular point in time that a fiber-optic cable sheath containing multiple fibers contains some fibers that are not in use there are reasonable economic and engineering factors to explain why this should be considered normal and acceptable. First, fiber strands come in sheaths of multiple fiber strands and different pricing applies to sheaths with differing numbers of fiber strands. It is reasonable given economics and engineering practices to size-up the cable sheath for future use

[95] Grice v. Vermont Elec. Power Co., Inc., 184 Vt. 132 (2008).
[96] Optical Ground Wire, a fiber optic cable which combines the functions of grounding and communications.
[97] Grice v. Vermont Elec. Power Co., Inc., 184 Vt. 132 (2008), at paragraph 35.
[98] Grice v. Vermont Elec. Power Co., Inc., 184 Vt. 132 (2008), at paragraph 36.
[99] Grice v. Vermont Elec. Power Co., Inc., 184 Vt. 132 (2008), at paragraph 37.

and future opportunities particularly since 90% or more of the cost of fiber facilities is placement and infrastructure cost, not the cost of the fiber itself. Given this and the relative cost of fiber sheaths with more fibers it is reasonable to size-up the fiber sheath for more strands. Second, the increments of fiber strands included in a fiber sheath are standard numbers of strands – currently counts of 12, 24, 48, 96, 144, 288 and 432 strands – so it is not practical or reasonable from an engineering perspective to install just the number of fiber strands that will be "lit" after installation. Additional fiber strands are intentionally included in planning and engineering for fiber placement for a variety of valid engineering and economic reasons including capacity for spares (20% is a standard engineering design measure), which is not "excess capacity" in any context in the telecommunications engineering environment.

This Supreme Court decision appears friendly to the notion that electric distribution utilities could use infrastructure in the rights-of-way and on easements to attach fiber-optic cable for use in "last mile" broadband connections for retail or wholesale use if the fiber is also needed to support the utilities' electric operations. Nevertheless, policymakers in Vermont may wish to consider more specific statutory language, particularly if they want electric utilities to have broader authority in this area. Several states have enacted provisions to clarify this issue, as follows:

- Alabama: **HB 400, Broadband Using Electric Easement Accessibility Act**, enacted May 23, 2019, codifies existing law that electric cooperatives have the ability to offer broadband service and that their easements are valid for that use.
- Colorado: **SB19-107**, enacted June 3, 2019, Broadband Infrastructure Installation, concerns electric utility easements, installation of broadband facilities in easements, broadband suppliers' provision of broadband using facilities, notice requirements and conditions.
- Georgia: **SB 2 and SB 17**, effective April 26, 2019 clarifies that electric and telephone cooperatives are able to provide broadband service. The change to SB 2 allows electric cooperatives to use their easements which have been used for electric service to extend the easements to also apply to equipment and lines needed to supply broadband service.
- Georgia: **SB 2**, entitled an Act to amend Title 46 of the Official Code of Georgia Annotated, relating to public utilities and public transportation, so as to specifically authorize **electric membership corporations and their affiliates** to provide broadband services; to provide for definitions; to authorize certain financing and partnerships for the provision of broadband services; to prohibit cross-subsidization between the provision of broadband services and an electric membership corporation's natural gas activities or electricity services activities; to provide for related matters; to provide for an effective date; to repeal conflicting laws; and for other purposes.

- Maryland: **SB 634**, April 30, 2019, Electric Cooperatives - Powers - Conducting or Communications Facilities, underscores how electric cooperatives can use their easements to provide broadband.
- North Carolina: **Senate Bill 310, Electric Co-op Rural Broadband Services**, Enacted May 30, 2019; An act removing restrictions prohibiting electric membership corporations and their subsidiaries from seeking federal grant funds to provide telecommunications and broadband services, authorizing such corporations and their wholly owned subsidiaries to use easements held by the corporations to supply telecommunications and broadband services, and providing for the manner in which claims related to the expanded use of easements by such corporations shall be resolved.
- Indiana: **SB 478**, June 8, 2017, "**Facilitating Internet Broadband Rural Expansion (FIBRE) Act**. The law allows electric cooperatives with easements for electric lines to use the same easements for fiber infrastructure.
- Tennessee: In April 2017, the Tennessee Broadband Accessibility Act was signed into law. The law allows electric co-ops in the state to provide, through a subsidiary, broadband and other similar services within their service territory. In March 2018, **SB 1646** was enacted. The law clarifies that an electric co-op can use existing infrastructure for delivery of high-speed internet access. The law stated that "any easement owned, held, or otherwise used by the cooperative in pursuit of a primary purpose may be used for any secondary purpose."

The bill text for each bill listed above is attached as Appendix VII for convenient reference.

Legislative Proposals

The Broadband Deployment Act requires "the DPS Commissioner in consultation with the Public Utility Commission to … develop legislative proposals to address those [regulatory barriers to the provision of broadband service by electric companies]."[100]

Magellan Advisors believes there is merit to exploring statutory clarification that electric distribution utilities could use infrastructure in the rights-of-way and on easements to attach fiber-optic cable for use in "last mile" broadband connections for retail or wholesale use if the fiber is also needed to support the utilities' electric operations. A number of other states have recently enacted provisions to clarify this issue, and the bill texts are included as Appendix VII for reference.

We note the DPS Final Draft 2018 Vermont Telecommunications Plan contains two additional reforms that could enhance the ability of Communications Unions to flourish. First, there is a

[100] Broadband Deployment Act, Sec. 11(b).

conflict from Communications Unions operating as a business that generates commercially sensitive information while its member/owners are subject to Vermont's Public Records Act. Communications Unions by their operation generate commercially sensitive information such as subscriber specific information, subscriber counts, usage date and billing information, and engineering records including maps. No other telecommunications providers must disclose this type of commercially sensitive business information to the public, yet the Public Records Act may not be clear that such records of a Communications Union are exempt from disclosure requirements. We agree with DPS that a clear statement in the Public Records Act specifically exempting Communications Unions from these types of disclosures would provide beneficial guidance.[101]

The second suggested reform would address the fact that "Vermont law currently prohibits towns from using taxpayer money to fund the capital expenditures and operations of a municipal telecommunications facility."[102] Currently municipalities are prohibited from pledging tax dollars to fund telecommunications plant although revenue-backed bonds are allowed.[103] The Broadband Deployment Act addressed this issue in two parts. First, 24 V.S.A. § 1913 is amended to add provisions allowing a municipality to enter into a public-private partnership to provide telecommunications services, contracting with a private entity to operate and manage communications plant owned or co-owned by the municipality. Second, the Act provided "The Secretary of Administration or designee, in collaboration with the State Treasurer or designee and the Executive Director of the Vermont Municipal Bond Bank or designee, shall investigate the use of general obligation bonds by a municipality to finance capital improvements related to the operation of a communications plant."[104] The Report concluded that while state and local policy leaders see municipal bonding as a powerful tool for broadband expansion funding, it recommends a "wait and see" approach to observe the impact of other tools adopted in the Broadband Deployment Act including the establishment of more Communications Union Districts before lifting the bond restriction.[105] We concur with this recommendation.

The Public Interest

The Broadband Deployment Act requires that "the Commissioner, in collaboration with representatives from each electric company, shall evaluate whether it is in the public interest and also in the interest of electric companies for electric companies to:

[101] Vermont Telecommunications Plan, at page 51.
[102] Vermont Telecommunications Plan, at page 51, citing 24 V.S.A. § 1913.
[103] 24 V.S.A. § 1913(c); and, Secretary of Administration's Report on Use of General Obligation Bonds for Municipal Telecommunications Plant at page 1.
[104] Broadband Deployment Act, Sec. 14.
[105] *Ibid*.

> (1) make improvements to the distribution grid in furtherance of providing broadband service in conjunction with electric distribution grid transformation projects;
> (2) operate a network using electric distribution and transmission infrastructure to provide broadband service at speeds of at least 25 Mbps download and 3 Mbps upload; and
> (3) permit a communications union district or other unit of government, nonprofit organization, cooperative, or for-profit business to lease excess utility capacity to provide broadband service to unserved and underserved areas of the State."[106]

Accordingly, the Magellan Advisors survey of the electric companies in Vermont asked whether it "would serve the interest of the public and the electric utility to make improvements in the electric distribution grid to support provision of broadband service in conjunction with grid transformation projects?" The object of this question was to assess viewpoints of the jurisdictional electric utilities regarding whether inclusion of broadband-capable fiber infrastructure in the electric utility grid would be in the public interest, and in the electric utility's interest. The survey also provided an open-ended opportunity to "share any other information or issues of concern that you would like to share with the Department of Public Service as it relates to Electric Utilities entering the Broadband space, whether directly or indirectly." Numerous electric companies took the opportunity to share additional information and concerns. We agree there is not a "one-size-fits-all" solution to extending broadband service to underserved and unserved areas of the state as local circumstances and demographics vary across the State of Vermont. More detailed feasibility studies are required for any area considering further deployments which studies would include consideration of local demographic characteristics including age, income, educational distributions, as well as the presence of households with children, and poverty and unemployment levels.

[106] Broadband Deployment Act, Sec. 11(b).

Survey Responses

Municipal Electric Departments

Municipal Electric Departments generally were unsure that inclusion of broadband capable infrastructure in the electric utility grid was in the public interest based on substantial uncertainty over cost and take rates.

There may be opportunities for electric utilities to support broadband rollout to underserved areas, but there is not a "one-size-fits-all" solution. Size and location of the electric distribution utility will have a significant effect on the decision to install fiber for broadband communications. The skill sets differ for the electric and communication facilities.

Comments included:

- We see many customers struggle to pay basic utility costs.
- Resident survey needed to identify interest or potential adoption rate.
- Unknown commitment/interest from ratepayers to take on this project.
- The costs associated with upgrades and how that impacts rates must be quantified. Need to understand the magnitude of upgrades needed and how the ROI would work out.

Municipal Electric Departments generally believed that inclusion of broadband capable infrastructure in the electric utility grid did not serve the electric utility's interest.
Comments included:

- Ratepayer referendum or survey needed to pin down ratepayer desire.
- Our communication needs are currently served by communication/cable companies.
- Grid transformation projects on our systems has created a loss of revenue for the electric utility.
- We need our own investments and we are not seeing a growth in revenue which seems related to highly regulated land use and goals for load reduction including energy efficiency.
- Our system has been extensively upgraded over the course of the last two decades and we do not anticipate any major grid transformation projects in the foreseeable future. The Legislature should probably spend some time in the NEK with our large senior, poverty and vulnerable population.
- Given the technical nature of providing broadband service, it would not appear on the surface to be advantageous to attempt to compete in the marketplace, however there is potential for cost recovery of distributing last mile dark fiber and leasing that to the

existing broadband service providers in the marketplace and this may even attract new competitors to the region.

- I have not seen or heard data suggesting my customers want the Department involved in broadband - and frankly I have not seen or heard any data suggesting my customers want broadband extended to them at all. I think some solid data on what my customers really want – instead of what a small group of highly vocal/special interests people want – would be logical and a very helpful first step in this matter. Figure out if there is in fact a problem before trying to find solutions...
- Electric utilities are not geared up for providing broadband services in a competitive marketplace. From [one DU's] perspective, the maximum benefit with minimal risks comes from leasing fiber to a third party to provide broadband services. Morrisville's connection to the VELCO fiber network will increase the competitiveness of broad services since services can be transmitted in from other geographic areas. We have the skills to install fiber. We don't have the skills to terminate it into the customer's premises. Morrisville is concerned about the legal ramifications of providing broadband services in competition with existing broadband service providers. It is likely Charter changes are needed and existing broadband services providers are likely to challenge the Charter changes, whether justified or not, which could result in significant legal fees for our electric customers to cover. In addition, technology changes could have a major impact on the way broadband services are provided. We are not geared up to monitor these technology changes. We could end up with fiber that was installed becoming obsolete and having to write it off as a loss.
- Another DU states it currently has broadband throughout almost its entire service territory. It is provided mostly by Comcast and there is some duplication already with Consolidated Communications. Orleans would look to Comcast for broadband service and believes entering into this business as a third entity really doesn't make much sense. Orleans believes it will have the necessary capabilities for smart grid or other advanced electrical needs by using investments already available on our infrastructure by others. It seems very high risk for our electric utility to get into this business. Why risk ratepayer dollars on an investment that is currently working very well such as Comcast. Duplication of same service would not benefit Vermonter's.
- This is already an extremely competitive market in the Stowe area. We would be competing against multiple established broadband providers such as Stowe Cable, FirstLight/Sovernet, V-Tel, and Consolidated Communications to name a few. With such a saturated market it only stands to reason that forcing a small utility to participate in broadband service would not benefit our ratepayers, only hurt them. It would be impossible for a new, small-scale broadband venture to be cost effective in our service area.

- The concern with providing broadband service to our customers is do they need the service with the already existing Xfinity, Consolidated services available to them now. If we could provide the service, would it be competitive enough for our customers.

Electric Cooperatives

Vermont Electric Cooperative believes it would serve the public interest as follows:

1. VEC spends $7.5 million annually in capital investment on our distribution grid. To the extent that we can align VEC investments and project timelines to enhance broadband availability, this should be considered.
2. Grid transformation projects have the potential to provide member electric bill savings and broadband may aid the implementation of these projects.

Vermont Electric Cooperative believes fiber for broadband would serve the electric utility interest given grid transformation projects along with flexible load management can provide the electric utility with flexibility to save on transmission costs during peak events. Vermont Electric Cooperative also offered the caution that "There may be other unknown risks associated with an electric utility entering into a telecommunications business and regulatory model."

Washington Electric Cooperative stated, "The way we understand this question, the answer is "it depends." To be in the public interest it must be cost effective and sufficient customer participation must occur. The answer to this and many of the questions posed would be answered by a detailed feasibility study and business plan. Therefore, WEC needs more information to respond. See answer to Q1 for more details [provided as Appendix V]. That said, we believe it could help us with our AMI systems. WEC uses Power Line Carrier and high-speed broadband may help with an updated or new system."

Investor Owned Utilities

Green Mountain Power is unsure on the "public interest" question, stating "Much of GMP territory is broadband served already. You can make a case for public interest." Regarding the electric utility interest, GMP's response is "generally, would say no but there might be some operating improvement possible were this to happen. But it would not be a big operating breakthrough for us." Green Mountain Power further stated it "does not have provision of broadband services to customers on its strategic plan. We believe commercial broadband providers better serve this space. We are happy to engage with the PSD on this evaluation."

Grants, Loans & Funding Opportunities for Vermont Electricity Distributors

The Broadband Deployment Act adds to the toolkit available to communities that want to expand access to broadband services. The additions include expanding grant programs to as one means to address lack of access to capital including establishment and funding of the Broadband Innovation Grant program to fund feasibility studies for interested communities, funding of technical assistance grants to Vermont municipalities through the ThinkVermont Innovation Initiative, funding and creation of a Broadband Expansion Loan Program in the Vermont Economic Development Authority with loans authorized up to $4 million, increased funding for the Connectivity Initiative, adding funding for a Rural Broadband Technical Assistance Specialist to assist Communications Unions and other government units or organizations in expanding broadband service, .In addition, the Broadband Deployment Act also directed study of allowing municipalities to issue general obligation bonds to support municipal deployment of broadband services, and allowed municipalities to enter public/private partnerships to provide broadband services.

Federal programs through USDA/RUS and FCC are also still focused on Vermont. Importantly from a federal funding perspective, the Broadband Deployment Act[107] specifically removed the ban previously existing in 30 V.S.A. § 3047 that "Nonelectric activities of the cooperative shall not be financed by loans or grants from the Rural Utilities Service of the U.S. Department of Agriculture or any successor federal agency."

Municipalities have an expanding array of state and federal funding sources. Further details regarding the large array of grants, loans and funding mechanisms are provided in Appendix IX.

Survey Responses

Magellan Advisors first sought a sense of funding alternatives from each electric company in Vermont if fiber for broadband were to be deployed. Our Survey of electric companies asked them to rank-order broadband funding alternatives based on their sense of priority among:

- Internal Funding
- Bonds – General Obligation
- Bonds – Revenue
- Commercial Loan
- Cooperative Bank Loan (e.g. CoBank, CFC, other Cooperative Lender)
- USDA Rural Utilities Service Electric Program Loan

[107] Broadband Deployment Act, Sec. 12.

- USDA Rural Utilities Service Grant Programs
- Other USDA Rural Development Funding (List)
- Other Federal Agency Grants (e.g. Commerce, Energy)
- FCC - Connect America Fund Subsidies
- FCC – E-Rate Schools & Libraries Discounts
- FCC - Rural Health Care Fund Discounts
- State Grants
- Nonprofit Foundation Grants
- Tax Advantaged Investment Programs
- Other funding (Describe)

Municipal Electric Departments

Broadly, there was a preference for use of state grants and Rural Utilities Service grants, although also there were some that would not use this type of funding. Among those that responded there was division over whether internal funds should be used or not. Some favored use of Revenue or General Obligation bonds while others were not in favor of such funding methods. Comments included:

- We believe that Vermonters, whether taxpayers or ratepayers, would be best served by a separate, independent service cooperative(s) utilizing federal funds and operated by those with the unique skill set of this competitive business. Electric distribution utilities could work with this separate cooperative(s) for efficient deployment provided that there is no safety risk or negative financial impact to the utility.
- Because we believe most [Village] customers already have access to broadband (most are within the Comcast/Xfinity service area), we question the equity of [the Village] taking on debt that would be spread to all [Village] customers while only a very small number would benefit. Therefore, we would be interested in other grant funding sources (no repayment required) that do not require [the Village] to incur debt.

Electric Cooperatives

Vermont Electric Cooperative believes it is "not in a position to answer this question. There are simply too many unknowns to provide an adequate ranking. As we consider a feasibility study, it would be useful to understand the views of the Department of Public Service and the Public Utility Commission as to whether certain [funding] options above are preferred or disfavored."

Washington Electric Cooperative stated it "notes that the feasibility study and business plan will help guide us through various funding sources and loans best suited for WEC. We don't know all intricacies and details of the various sources. We do believe significant grants dollars

will be needed to make the model work but we are not certain as to which entities we will work with." It foresees funding through state grants, non-profit foundation grants and USDA Rural Utilities Service programs.

Investor Owned Utilities

Green Mountain Power states it would use internal funding.

Known Issues with Federal and State Broadband Coverage Maps

Conducting a broadband feasibility study and developing a broadband business plan requires solid data on broadband coverage. FCC broadband data has been seriously flawed for years, which has inhibited broadband studies and funding of broadband plans. On August 22, 2019, the FCC issued a final rule establishing the Digital Opportunity Data Collection and Modernizing the FCC Form 477 Data Program. The FCC's rule came on the heels of over a decade of increasing concern by communities and lawmakers alike that the FCC's broadband availability maps submitted by carriers were flawed, overstating the degree of broadband coverage and crippling the effectiveness of grant programs to fund broadband infrastructure in unserved areas.

Earlier in the year FCC Commissioner Jessica Rosenworcel conceded that the agency didn't know for sure where the needs for broadband were most acute, calling it "embarrassing" and "shameful." Rosenworcel said, "Our maps simply do not reflect the state of deployment on the ground. We have a digital divide in this country with millions of Americans who lack broadband where they live. If we want to fix this gap and close this divide, we first need an honest accounting of high-speed service in every community across the country."

While the FCC was reporting more than 24 million people lacking access to broadband at home, a study by Microsoft found that 162.8 million Americans were not using the internet at high speeds, a problem that may be rooted in affordability as well as lack of availability.

Part of the problem is how the rules for collecting data are stated. Under the rules the FCC considered an **entire** census block as "served" with broadband if a carrier reported that a **single** premise in the census block had broadband connectivity. The problem was amplified when census blocks, some which of which are quite large, were rolled up into census tracts.

Many state broadband maps have also relied on this self-reported carrier data, inaccurately categorizing unserved areas as served, and rendering them ineligible for billions of state and federal funding for broadband infrastructure and service provisioning. **Notably, Vermont has been the exception to this practice – Vermont policymakers have available accurate data regarding unserved locations in the state due to the efforts of DPS and its partners**.

States, communities and elected officials across the U.S. have been reporting this problem for over a decade. Without accurate coverage maps, funds have not flowed to problem areas.

The FCC's Digital Opportunity Data Collection ("DODC") shifts data reporting from the FCC's 477 form, which the FCC has acknowledged is deficient, and requires broadband service providers to submit granular maps of the areas with broadband-capable networks. The DODC will incorporate mobile voice and improvement of satellite broadband reporting. The Commission's decisions require the submission of coverage polygons, sharpen the definition of fixed broadband service availability and facilitate public input through crowdsourcing to collect public input on the accuracy of broadband availability data.

The FCC's decision not to immediately amend Form 477 to include the DODC provision has created a concern that more than 477 filings would have to be submitted during the time the new policy is being implemented.

Funding Strategies

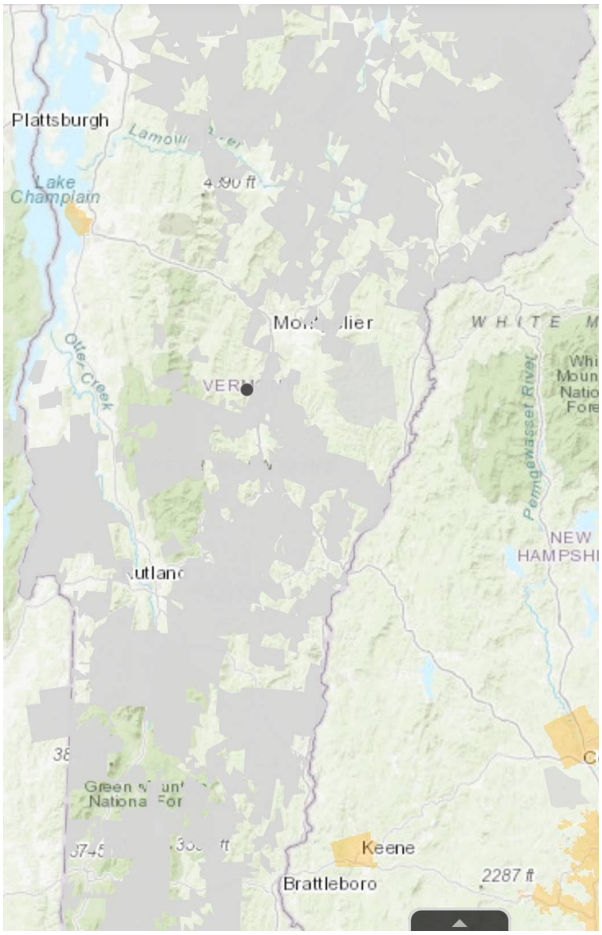
A distribution utility considering deployment of smart grid/broadband infrastructure should engage an expert advisor with comprehensive experience in planning, capital formation, deployment management and operational management of broadband ventures, and especially rural broadband ventures, as well federal contract administration and compliance management, to develop a feasibility assessment and comprehensive business plan before moving forward with deployment.

A primary broadband funding source for Vermont is the USDA/RUS "ReConnect" program. Over $1 billion in FY 2019 and FY 2020 was authorized to the U.S. Department of Agriculture Rural Utilities Service Telecommunications Program ("RUS Telecom Program") for the ReConnect. ReConnect provides grants and/or loans for new broadband infrastructure needed to provision Internet service at a minimum speed of 25/3 Mbps to areas unserved with Internet access at a speed of 10/1 Mbps. (See Appendix IX for a more detailed description of the ReConnect program.)

However, unless a waiver is granted by the RUS Telecom Program, Internet Service Providers in Vermont, other than VTel and VTel Wireless, may not apply for ReConnect grants and loans for unserved and underserved premises covered by a 2010 RUS Telecom "Broadband Initiatives Program" ("BIP") grant and loan to VTel and VTel Wireless to provision Internet service of only 768/200 Kbps.

Areas of Vermont ineligible for RUS ReConnect grant/loan applications (absent a waiver), other than from VTel and VTel Wireless, are shaded in gray in the RUS map shown below.

Figure 22: RUS Map Vermont



VTel and VTel Wireless did not apply for funding during the $550 million RUS ReConnect grant and loan opportunity in FY 2019, which is now closed. If the companies do not apply for ReConnect funding of $550 million available in FY 2020, and if RUS does not allow other applicants, this condition will continue to exist until the loan agreement between RUS and VTeL and VTel Wireless is retired on or before on September 20, 2025 -- after over $1.1 billion in broadband infrastructure funding authorized to the ReConnect Program has run out. The State of Vermont should not allow itself to be closed out from this funding opportunity. DPS should share with RUS the results of the DPS 2019 drive-by speed test which showed that VTel Wireless service was not available in a percentage of all locations tested in the BIP funded service area, and request that RUS allow an RUS or other licensed engineer to verify service availability in the funded area, or accept the results of a nonbiased consumer survey to verify coverage availability and speed, or both. DPS should seek the opportunity to demonstrate that areas of the VTel Wireless BIP loan-funded service area have no service from VTel Wireless, so

that an applicant could look for the clusters of unserved homes and apply for funding to serve those areas. It is obviously unfair to Vermonters to flag nearly 85% of the state as ineligible for ReConnect. The request should include that the RUS Administrator extend the deadline for ReConnect applications to allow for a consumer survey in Vermont and other areas that dispute broadband availability maps.

Funding strategies also exist for Electric Distribution Utilities:

1) Utilize existing electric DU fiber not funded by RUS to offer broadband service directly or partner with Internet service providers and/or communications union districts to provide access to fiber or lightwaves for that purpose;

2) If RUS is open to considering actual drive-test coverage results, apply for RUS ReConnect funds for construction of broadband infrastructure by the DU in partnership with an experienced ISP operator (required by the ReConnect Program rules) and in collaboration with Communications Union Districts where they exist. Electric DUs may lease fiber or lightwaves to the ISP partner or communications union district, and/or enter into a revenue sharing agreement. The electric DU construct and own the network, perform pole make ready and provide for pole attachments in the electric power zone space or communications space, at its option.

3) Apply for RUS Electric Program loans to build new "Smart Grid" infrastructure and lease excess fibers to Internet Service Providers (including VTel and VTel wireless) and/or Communications Union Districts where they exist for broadband service;

4) If VTel and VTel Wireless do not apply for ReConnect funds, and RUS does not grant a waiver, Electric DUs who cannot make a feasible business case without grant funding for smart grid fiber optic network deployment and fiber leasing or broadband service provisioning –directly or indirectly with a partner – should seek grant funding at such time as the VTel and VTel Wireless loan agreement with RUS is retired on 9/20/2025 or earlier.

5) In the interim period, Electric DUs should monitor federal and state grant opportunities from other funding agencies than RUS (See Appendix IX for federal funding sources) to provide smart grid and resilient networks or broadband networks, either directly or in partnership with other service providers and/or Communications Union Districts.

6) Electric DUs should monitor news and state legislation regarding funding sources for communications union districts. If CUDs have available funding for fiber-optic network

deployment, Electric DUs may enter into a construction, maintenance and fiber-sharing agreement with a CUD that provides for electric DU pole make ready and construction of the network on DU poles, and maintenance and repair of the fiber. The parties would enter into long-term indefeasible right of use agreements (capital leases) with renewal options for ownership of strands within the fiber sheath. The CUDs would pay a nonrecurring cost for a share of the make ready costs and construction by the DU, and a recurring fee for a share of network maintenance and repair (pro rata with the number of strands owned by the CUD).

The DU would have access to strands of fiber for smart grid purposes, and for interconnection with other DUs, where feasible, to form an upstream middle mile backhaul network that could provide for wholesale Internet service for the DU by each party.

The CUD would own strands of fiber for broadband purposes, and it may be able to obtain access to backhaul over the DU network if feasible.

Important Tax Considerations for Cooperative Organizations

Cooperatives organized under Internal Revenue Service code section 501(c)(12) are subject to special income rules with respect to unrelated business income and tax-exempt status, as shown below. A cooperative should seek legal and accounting guidance before forming a new venture unrelated to the organization's mission.

IRC 7.25.12.8 (08-09-2006): The 85-Percent Member Income Test

1. A cooperative exempt under IRC 501(c)(12) must receive 85 percent or more of its income from members. The 85-percent member income test requires that the income be
    - derived from members and
    - used to pay for services listed in IRC 501(c)(12)
      Rev. Rul. 2002-55, 2002-2 C.B. 529; see Rev. Rul. 2002-54, supra, Treas. Reg. 1.501(c)(12)-1(a), and Credit Rural Electric Cooperative Corp. v. Commissioner, supra.
2. The 85-percent member income test is computed each tax year. If in any year the member income falls below 85 percent of the total income received that year, the organization is no longer exempt under IRC 501(c)(12) for that tax year and must file a corporate tax return. Rev. Rul. 65-99, 1965-1 C.B. 242.
3. When an organization uses the accrual method of accounting, it will use the same method to compute the 85-percent member income test. Rev. Rul. 68-18, 1968-1 C.B. 271.

4. Electric cooperatives do not have to subtract the cost of goods sold from gross sales to calculate the 85-percent member income test.

Unrelated Business Income

Even though a cooperative is recognized as tax exempt, it may still be liable for tax on its unrelated business income. Unrelated business income is income from a trade or business, regularly carried on, that is not substantially related to the charitable, educational, or other purpose that is the basis of the organization's exemption. An exempt organization that has $1,000 or more of gross income from an unrelated business must file a Form 990-T in addition to filing Form 990 annual information return. Internal Revenue Service Publication 598 provides detailed information on unrelated business taxable income.

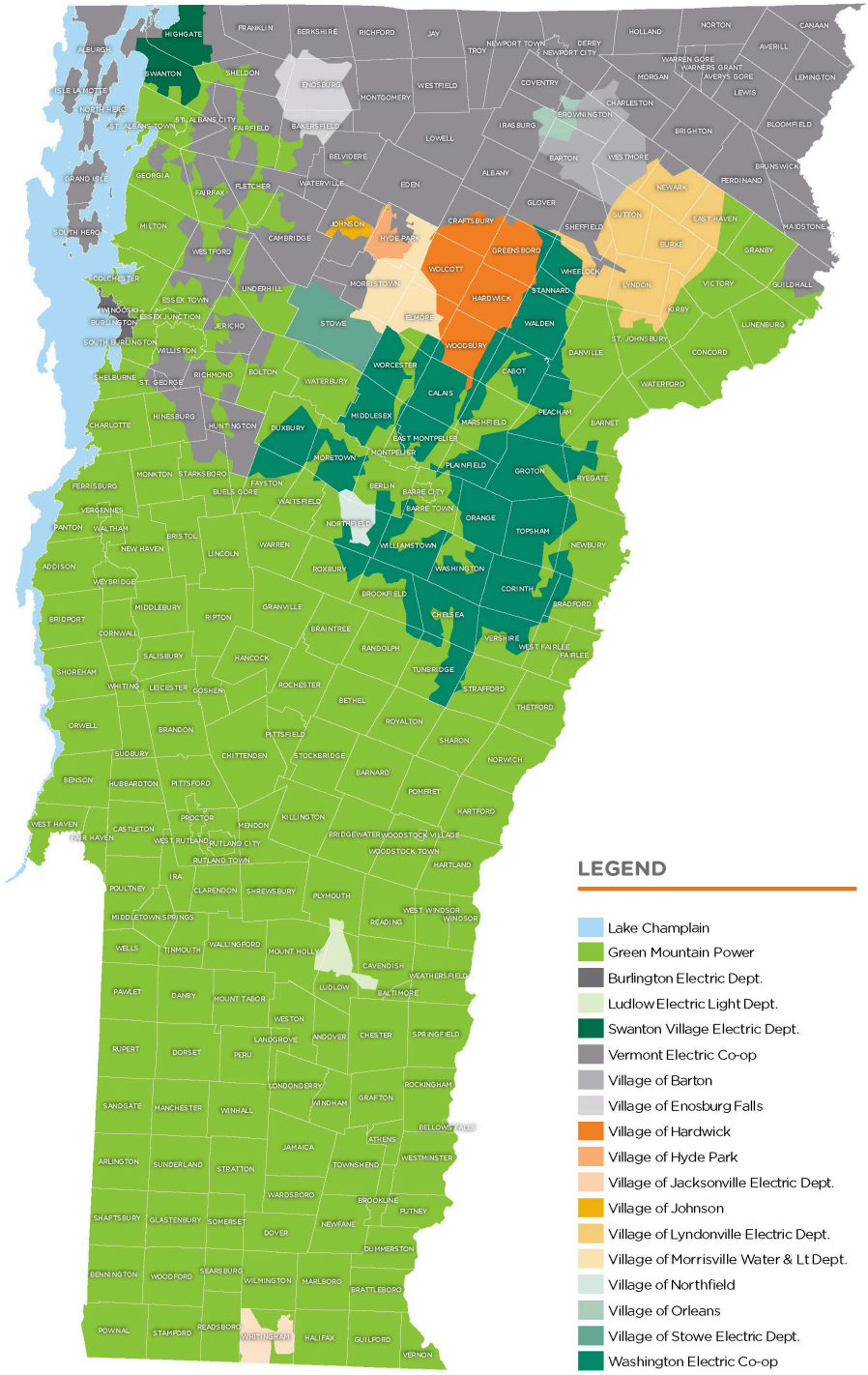
Accounting Treatment For Grants – Revenue Recognition

In general, grants that impose conditions and restrictions on a grantee's use of funds and reimburse eligible expenditures are recognized as revenue when reimbursements are received. For grants that allow advances of funds, advances are recognized as revenue when the grantee completes the work associated with the advance as required by the grantor.

The Financial Accounting Standards Board issued new guidance in 2018 with respect to revenue recognition of grants. See FASB document 2018-08, June 2018, Not-for-Profit Entities (Topic 958) clarifying the scope and accounting treatment of contributions made and received.

If a grant does not contribute significantly to an organization's mission, which is the basis for its tax exemption, then all or part of the grant could be considered unrelated business income. Nonprofit cooperatives may create separate for-profit subsidiaries to segregate revenues and expenditures not related to the mission of the organization.

Appendix I: DPS Electric Service Territory Map



Appendix II: Comments of Consolidated Communications regarding Feasibility of electric companies offering broadband in Vermont

From: Austin, Jeffrey <Jeffrey.Austin@consolidated.com>
Sent: Wednesday, November 13, 2019 12:05 PM
To: Chase, Corey; Wheeler, Scott
Cc: Purvis, Clay
Subject: RE: Feasibility study

Hi Corey and Scott,

Following up onour conversation regarding my thoughts on electric companies getting into the broadband business.

Please let me know if you have questions or want to discuss.
Thanks,
Jeff

- **Perception that the "industry" hasn't done their job**
  - Currently 6% of Vermont addresses don't qualify for 4 Mbps/1 Mbps (this equates to 10 Mbps/1 Mbps for CCI), which are the most expensive to serve, and ~20% don't qualify for 25 Mbps/3 Mbps. This statement in no way belittles the potential negative impact on the 6%, it's only meant to illustrate that 94% can receive at least 4 Mbps/1 Mbps and that hundreds of millions of dollars have been invested in VT broadband to get us to this point and this investment should not be broadly discarded. The remaining 6% will need laser focus, time and money.
  - Will ELCO's that build broadband be laser focused on only these 6% or 20% or just overbuild the hundreds of millions of dollars of investment by communications companies, increasing competition and potentially driving some companies out of business, leaving millions of dollars of stranded/abandon assets on our poles and less competition.
  - Regarding economic development, have we seen that FTTP actually drives economic development for the majority of Vermonters? We know there are work-at-home

opportunities, entrepreneurs, innovators, etc that could benefit but the majority of internet traffic is streaming video, gaming, email and browsing mainly for entertainment purposes, would this help the majority of Vermonters or just a few?

- **Expertise and industry knowledge**
  - Stand up a 24x7x365 Internet technical assistance organization including a management structure, trained technical assistance technicians with the ability to troubleshoot and test a customer's service, discuss IOT applications and usage including number and type of devices connected to the internet along with integration capabilities to enter a trouble ticket for technician dispatch.
  - A highly trained outside technician workforce with internal groups to help support troubleshooting, facility assignments and issues, etc. Will these technicians be contractors or full time technicians or ELCO technicians that also work in the ELCO space?
  - Battery back-up requirements
  - If VoIP provider, responsible for providing 911 connectivity
  - Network Architecture, Data Network Planning Groups and included but not limited to expertise in all of the following areas; equipment, vendors, robocalling, net neutrality and open internet, Title I and Title II, FCC, distributed denial of service (DDOS) attacks, network management and policies, peering, BGP routing, privacy, network monitoring and security, managed services, cloud services, network redundancy and resiliency, email settings and management, wireless standards 802.11b/g/n/ac…., internet acceptable use policies, billing and collections, professional installations, data storages services, virus, malware and spyware services, domain registration, home networking, modems, routing, outage reporting requirements, battery back-up requirements

- **Installing fiber on poles**
  - Pole attachments – will the ELCO's place fiber in the electric space or in the telecom space?
  - ELCO's are already assigned space on a pole depending on the pole's height, the equipment they need on the pole for electric service and the distance needed between the electric neutral and the highest communication space. This is called the "Safety Zone" and is 40"
    - Do they anticipate a free attachment in the communications space?
    - Do they need to set up a subsidiary for their internet company and that company pays the ELCO for the related attachment fees?
    - How does make-ready costs between their internet company and electric company get split?

- **Service Beyond the Demarcation Point**
  - Typical ELCO companies deliver service to the main breaker box and then have the customer contract an electrician to distribute the service within the house. ELCOs don't typically work beyond the DEMARC and that work is very prevalent with broadband installations.
  - Electric customers know that if they need electric work done in their home, they need

to call and pay for an electrician to do this skilled work.
  - Residential internet customers believe their ISP is responsible for all aspects of their internet experience, including wifi (a service of the modem), slower older electronic devices and multiple devices in their homes and will rarely call an IT company to assist with their in-home networks.
  - Multi-tenant business and residential buildings create additional challenges beyond the demarcation point that the ELCO's have not had experience with.
- **Phone/Internet/Video???**
  - Will the ELCO's provide phone/internet and video services, a "triple play" which many customers are looking for?
- **VT PUC/DPS Oversight/Regulation**
  - If ELCO's will be providing VoIP phone service, will be no VT Regulatory service quality metrics or if there are regulations, are they fully prepared for them?
- **Is there a business model?**
  - Will they only be providing these services where customers can't get 25 Mbps/3 Mbps? If so, that is only ~22% of the state in relatively small pockets in almost every town in VT.
  - Is there a business model that supports only providing internet service to the most expensive addresses in VT?
  - If ELCO's provide service to locations outside of the ~22% that don't qualify today for 25 Mbps/3 Mbps, who is going to pay for this?
  - ~78% of addresses in Vermont already have access to a wireline provider, is the plan to overbuild the entire 78%?
  - If there are going to be at least 3 internet providers to 78% of addresses in our very rural state, will there be enough revenue to keep all of these companies in business or will some companies decide to stop serving overbuilt areas? If so, is this ok for Vermont?
  - Costs related to building fiber to every pole is only part of the solution, there will be large additional costs for ELCO's to build a backbone internet network along with costs for fiber drops and ONT's to customers. In our experience, the costs for the fiber drops and ONT's to every address is almost equal to the cost to build fiber to every pole.
- **We are a little similar but a lot different**
  - We both exist in the outside plant environments and provide essential services
  - ELCO's usually have some IT staff on hand to manage their internal data and monitoring networks which is much different than managing a customer facing internet product.
  - The electric grid is massive, complex, dangerous and essential for our safety and economy
  - The internet network is massive, complex, exists in the Outside Plant environment so is also dangerous, is used mostly for entertainment purposes but does contribute to the health and welfare of some users and to our economy.
  - One company trying to manage both of these important networks may not have the breadth and scope to do them both well, which is essential and could have negative effects on its electric and internet/phone users.

Appendix III: Comments of the New England Cable & Telecommunications Association regarding Feasibility of electric companies offering broadband in Vermont

New England Cable & Telecommunications Association, Inc.

Ten Forbes Road • Suite 440W • Braintree, MA 02184
TEL: 781.843.3418 • FAX: 781.849.6267

Clay Purvis
Director, Telecommunications and Connectivity Division
Department of Public Service
112 State Street, 3rd Floor
Montpelier VT 05620-2601

RE: Broadband Study

Dear Mr. Purvis,

As ordered by Act 79 enacted by the Vermont General Assembly in 2019, the Vermont Department of Public Service (DPS) must assess the feasibility of providing broadband service using electric utility infrastructure. To this end, the DPS has issued a survey to all Vermont electric utilities, including nonprofit rural electric membership cooperatives, municipal electric utilities, and investor-owned electric utilities, as well as associations formed to support their interests. By email to one of the New England Cable and Telecommunications Association's members on October 23, 2019, you requested input from Internet Service Providers. On behalf of its Vermont members, NECTA submits the following comments.

In the survey created by Magellan Advisers, the first two questions highlight the primary concern of NECTA's members.[1] They seek information on the potential advantages and disadvantages of serving the Utility's internal data needs with a fiber-optic communications network and expanding the Utility's fiber to provide broadband service. As a primary matter, the two purposes, serving internal data needs and providing broadband service, must be distinct from one another. The former should be considered a function of a regulated utility, the cost of which is incurred to provide service to its ratepayers and is recovered through its utility rates. The latter is a new business endeavor, separate and distinct from its obligation as a utility. As such, the benefits and risks associated with a utility providing broadband must be assessed independently of its function as an electric utility that must meet the needs of its captive ratepayers.

[1] Survey Question 1: What are the potential advantages of serving the Utility's internal data needs with a fiber-optic communications network and expanding the Utility's fiber to provide broadband service?
Survey Question 2: What are the potential disadvantages of serving the Utility's internal data needs with a fiber-optic cable communications network and expanding the Utility's fiber to provide broadband service?

Further, in assessing whether the public interest is served should an electric utility make improvements in the electric distribution grid to support the provision of broadband service (see Question 6), the impact on potential broadband consumers is but one consideration. There is no question that the public interest is served when there is access to and adoption of broadband services. Broadband service is a driver of economic development, and key to success in the digital age. However, the public interest is also served by policies that promote private investment, create a fair and level playing field and protect consumer interests more broadly. When a regulated utility engages in a nonregulated and competitive market, there is a potential for that regulated entity to engage in discriminatory or imprudent activities or otherwise support the nonregulated business by the rates charged to the captive electric customers. Therefore, in order to ensure the public interest is served in such situations, there must be regulations that govern the separation of regulated and unregulated businesses of the electric companies. Primary among these is a requirement that the electric utility established a separate affiliate to conduct its broadband business. Once the affiliate is established, an electric utility must have clear rules as to how it will transact with the affiliate and vice versa. Further, the VT Legislature must empower the Department to exercise significant regulatory oversight over electric utilities, and to enforce compliance with the law.

In Vermont, there is a long standing principle that subsidization of unregulated activities by regulated activities is not allowed. Indeed, §12 of Act 79 amended 30 VSA §3047 to prohibit subsidization and require cost allocation by electric cooperatives, underscoring that "electric revenues received from regulated activities of a cooperative shall not subsidize any nonelectric revenues of the cooperative". The same principle applies to regulated electric companies. *See* Petition of City of Burlington, d/b/a Burlington Telecom, for a certificate of public good to operate a cable television system in the City of Burlington, Vermont, Docket 7044, Order September 13, 2005 (where the VT PUC emphasized its commitment to competitive neutrality). If an electric company becomes a Broadband Service Provider, then it must register as such. Further, the electric company cannot favor itself with respect to access to poles and must impute the costs of pole rental to its broadband subsidiary. VT PUC Rules 3.706(E) and 3.707(A)(3). *Id.* at 35 holding that the City of Burlington must adhere to conditions needed to insure that Burlington Telecom ("BT") "constructs and operates its proposed cable system on a competitively neutral basis, without undue preferences and advantages arising out of the City's common ownership and operation of BT and BED, the owner (or joint owner) of poles and conduits used by BT". The principle protects not only the competitive market but also the electric utility's ratepayers and therefore ought to apply whether the electric utility overbuilds an existing broadband network or in an unserved area.

Importantly, in response to Survey Question 8, which asks if the utility foresees an impact on electric rates as an outcome of providing broadband service, the above regulatory principles must be adhered to and the utility's answer must be "no." Otherwise, electric ratepayers would either unjustly benefit or be harmed by the nonregulated business.

NECTA provides no specific response to the survey questions concerning pole attachments. However, we do highlight a few items. First, the electric utilities are in the best position to comment on the safety of attachments in the electric space and, in fact, have done so many times. Most recently, in connection with the One Touch Make-ready discussions, electric companies have commented in Rulemaking 3,708

regarding pole attachments and make ready, that work above the communications space must be completed by properly trained, credentialed and rated electrical line contractors. Electric companies seek to retain control and oversight of the work in the electric space. [11.5.19 GMP, VEC Comments] This could result in a competitive advantage over other broadband providers which must attach to the utility's poles. Moreover, any electric utility that engages in the broadband market should be required to calculate its pole attachment rates in accordance with Section 224 of the Telecommunications Act.

In closing, any consideration by the Legislature to address the feasibility of the State's electric providers to provide broadband service must address the fundamental fairness in a competitive broadband market and protection from any likelihood of cross subsidization from rate regulated utility to an unregulated broadband entity, whether it be in terms of financing, marketing, or access to infrastructure. Should electric utilities launch competitive broadband service, the Legislature should create a fully transparent structure in order to avoid potential discrimination.

We appreciate the opportunity to provide input on this very important policy matter. If you have questions or need further information, please do not hesitate to contact me.

Sincerely,

Timothy O. Wilkerson
President
NECTA

Stowe Electric Department
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802-253-7215
www.stoweelectric.com

December 24, 2019

Clay Purvis, Director
Telecommunications and Connectivity Division
Department of Public Service
112 State Street
Montpelier, VT 05620-2701

Re: Request for Comments on Act 79 Proposed Feasibility Study of Electric Companies Offering Broadband in Vermont

Dear Mr. Purvis,

The Town of Stowe Electric Department ("Stowe" or "the Utility") submits the following comments in response to request for comments from the Department of Public Service ("the Department") on the *Feasibility Study of Electric Companies Offering Broadband in Vermont* developed as per Act 79. Stowe agrees with the Legislature that "broadband is essential for supporting economic and educational activities, strengthening health and public safety networks, and reinforcing freedom of expression and democratic, social, and civil engagement,"[1] and "The accessibility and quality of communications networks in Vermont, specifically broadband, is critical to our State's future."[2] As such, Stowe is supportive of efforts to expand Vermonters' access to broadband services throughout the state and is open to a discussion on whether our electric customers would be well served if their electric utility provided broadband service.

[1] Act No. 79, An act relating to broadband deployment throughout Vermont, Sec. 1(2).
[2] Act No. 79, Sec 1(3).

However, this is a question that would need considerable analysis. Stowe understands that the final Report could be used as a starting point to identify electric utilities that should conduct their own feasibility studies. But Stowe has concerns about the conclusions the Draft Report presents and whether the Utility would be right to use them as a basis to decide whether to pay for their own feasibility study. These concerns center on the lack of discussion as to the sensitivity of the conclusions of the financial analysis to even slight variances in the assumptions. Ultimately, the Draft Report paints a picture that is highly dependent upon assumptions that fail to take into account the real world conditions in Stowe's service territory. And if one were to assume that these numbers are reliable, the IRR is still very close to zero even with 75% grant funding. The Draft Report acknowledges that the lack of broadband service for any particular unserved and underserved area is due in part to the lack of a business case to provide the service, saying, "Additionally, it is likely that the cable operator would have already extended its plant to serve these addresses if it found a viable business opportunity to do so."[3] Stowe therefore questions the applicability of a generalized financial analysis if the individual ISPs in Stowe have already concluded the numbers do not support this type of expansion.

One concern that Stowe has is that the utility is consistently referred to throughout the report as the Village of Stowe Electric Department. The Town of Stowe and the Village of Stowe merged on July 1, 1996, and the Village of Stowe ceased to exist as a municipal corporation.[4] The Utility has been referred to as the Town of Stowe Electric Department since that time. This may seem like a simple etymological discussion, and it would be a simple fix within the report itself, but Stowe would assert that it is indicative of a larger problem, namely a lack of familiarity with the electric utilities and the particulars of the territories they serve, both crucial elements to this report.

[3] Draft Report, p68-69.
[4] 24 App. V.S.A. ch. 153, § 1501

For one, Stowe questions the data used to develop the broadband service map that represents its service territory.[5] Roughly 12 of the underserved 911 locations to the northwest are part of the lift operations for the Stowe Mountain Resort. Another is a shed building on the Haul Road well within the Trapp Family Lodge cross country ski trails. Another is a facility building on the Trapp Family Lodge property. Another is an old garage owned by the Town of Stowe which is used for storage purposes and is located on a road where many residences receive 10/1 service. In addition to these 15 facility buildings which are either located near the road and could receive service if needed, or are very far from existing telecommunications infrastructure and would only be able to receive wired broadband service at very high expense, there are also at least 3 residential data points that Stowe questions. One on the very northeastern border of Stowe's service territory is a 0.5 acre camp and the other two are located on roads where neighbors on either side of them are receiving 10/1 service. If Stowe's suspicions are all correct, then according to Table 1 that would reduce the total number of underserved addresses within our service territory from 26 to 8.[6] This also raises questions about the remaining served numbers in the table. To be clear, Stowe does not intend to diminish the frustrations of some of its electric customers who may want or need better quality broadband service or are currently without any provider who can meet that need. But the true scale of the issue for Stowe residents is a crucial item to consider when evaluating the appropriateness of the serving electric utility providing broadband access.

As Stowe highlighted in its survey responses, there are already several ISPs operating within its service territory. This includes Consolidated Communications, VTel, Stowe Cable, and Firstlight. At a recent public meeting at the Stowe town offices, a representative from Consolidated mentioned that the company had undertaken a fiber project in the Robinson Springs neighborhood that offers speeds of 100, 60, and 40 mbs down. But Consolidated saw a take rate well below the 45% that the report assumes despite offering speeds that far outpaced 25/3.[7] Despite this build-out, Figure 2 shows that most addresses in this neighborhood have

[5] Draft Report, p23.
[6] Draft Report, p58.
[7] Draft Report, p71.

access to at best 10/1 service. As Consolidated Communications highlighted in their comments dated November 13, 2019, "~78% of addresses in Vermont already have access to a wireline provider, is the plan to overbuild the entire 78%?"[8] The report does specify the percentage of addresses in town that have access to wireline providers, but Stowe assumes it is a high percentage considering that there are already 4 ISPs in its service territory. That number would only grow as officials from Stowe Cable have been actively expanding their fiber network.

Finally, Stowe has many concerns about the financial model developed by the DPS to evaluate the feasibility of each electric distribution utility providing broadband service either on its own or by partnering with existing providers. A full review of the pro forma model would be needed to verify the assumptions and that all of the costs of constructing, operating, and maintaining the system are properly accounted for. Review of the Draft Report is inherently incomplete without a chance to evaluate the detail behind this model. But through a simple high-level review of the assumptions, results, and sensitivity analyses, we have the following specific comments.

Revenue Assumptions

- As stated above, the number of underserved addresses needs verification.
- The assumed take rate of 45% appears optimistic and would need to be verified for our local area, especially when considering that our customers already receive service from a number of ISPs. The Take Rate Sensitivity Analysis in Table 7 also shows different results for a 45% take rate as compared to the pro forma results for a 20 Year IRR in Figure 21.[9]
- The pricing is also sensitive with respect to the local community and the pro forma model. At a price of less than $38.78 per month, the IRR turns negative.

[8] Draft Report, Appendix II, p78.
[9] Draft Report, Figure 7, p75.; Draft Report, Figure21: Financial Results, p73.

- A marginal decrease in any of the above revenues would mean that the pro forma no longer supports the business case and Stowe Electric will lose money and need to find ways to subsidize the business.

Operating Cost Assumptions

- The assumed operations funding for Stowe is presented at $71,100 which appears extremely low. Start-up costs alone would need to cover labor (i.e., 2-3 additional headcount at a minimum) with benefits, vehicles, equipment, tools, computers, software, office space, and setup of new entities with delineated accounting, billing, and time reporting systems. All employees would need training, from the line crews to customer service, in order to support a new broadband network. Stowe would roughly estimate that this cost is closer to $300,000 to $500,000.
- Therefore, operating costs of an estimated $300,000 to $500,000 would need to be included annually in the pro forma in order to cover the maintenance, improvement, and administration of the system would need to be included in the pro forma.
- It does not appear that escalation rates were addressed in the pro forma analysis. Costs need to be escalated over time to account for inflation. Labor and benefits should have an escalation higher than inflation due to the tight labor market and the ever increasing cost of benefits.
- Reserve requirement metrics for renewal and replacement are not provided in the analysis for validation. If the analysis uses a percentage of revenue or cost, we would need to know that reserves would be funded appropriately for system upgrades, replacements, and software updates. Given that the system operating and capital costs appear too low for initial implementation (see Capital section below), it appears that the reserves expense each year would also be too low to support on-going system upgrades and maintenance.

- A marginal increase in any of the above costs would mean that the pro forma no longer supports the business case and Stowe Electric will lose money and need to find ways to subsidize the business.

Capital Cost/Funding Risks

- The total system cost of $3.1 million appears extremely low. In Table 6, funding for broadband systems serving rural/urban communities outside of Vermont are used to compare take rates.[10] However, those examples are not used to compare capital costs. Funding needed for these communities to provide service ranges from $15 million to $32 million. In order to create a system to provide broadband service for 900+ customers, Stowe would need to stand up a fully operating broadband network from a central hub out to customers spread over a widespread system. It does not appear that $3.1 million would fully cover the cost of the new network from design through implementation when compared to the examples in Table 6.
- Regarding grant funding, the pro forma model assumes 75% of funding would come from grant resources. But Stowe questions how much federal funding would be available for our service territory. The Draft Report claims that most of Vermont is ineligible for Rural Utility Service Telecommunications Program grants because VTel built a system using funds from this Program.[11] Grant restrictions would also require that Stowe's new broadband network could only have very limited overlap with the existing ISPs that offer Stowe residents a minimum of 25/3.[12] Stowe Electric currently provides electric service to 4287 customers, so we can assume using the number of underserved in the Draft Report that at least 76% of our electric customers already have access to minimum speeds of 25/3, further limiting the available funding for a new broadband network that would need to reach all corners of our service territory.

[10] Draft Report, p68.
[11] Draft Report, p101.
[12] Draft Report, p99.

- A marginal increase in any of the above costs would mean that the pro forma no longer supports the business case and Stowe Electric will lost money and need to find ways to subsidize the business.

In sum, Stowe questions many of the assumptions that were used to develop the Draft Report. While we acknowledge that the financial analysis does seem to support that the Utility should develop broadband service, that conclusion is highly dependent upon generalized assumptions and doesn't seem to take into account the particulars of Stowe's service territory. Stowe would need to perform an analysis of the details in the financial model before it elected to pay for its own feasibility study. Stowe supports the State's efforts to expand broadband service availability to unserved and underserved locations and is open to working with the Department to identify if the Utility is the proper entity to achieve that end.

Thank you for the opportunity to provide our input on the Draft Report. If you have any questions or concerns, please do not hesitate to contact me.

Matthew DS Rutherford
Manager of Regulatory Compliance
Town of Stowe Electric Department

Appendix V: Washington Electric Cooperative response to Question 1 of the Magellan Advisors' survey

Question 1. *What are the potential advantages of serving the Utility's internal data needs with a fiber-optic communications network and expanding the Utility's fiber to provide broadband service?*
Please list advantages in order of importance to the organization, with number 1 having the most importance to the organization and number 10 having the least.

The answer to this question and many of the Department's questions could be better answered once utility specific feasibility study has been conducted. We believe there are many benefits and advantages of deploying infrastructure that will provide high speed internet service. WEC is actively seeking funds to carry out a feasibility study and detailed business plan. This work is paramount as we consider and attempt to move ahead with the concept of providing broadband. It is also critical and necessary to answer many of the questions noted in the Department's survey. WEC seeks and needs to produce a feasibility study to provide high speed internet service and to evaluate the cost/benefits of enhancing smart grid infrastructure for controlling loads, managing peak, and empowering members to reduce use of fossil fuels.
A feasibility study will consist of analysis to provide a business case assessment for highspeed internet infrastructure equipment deployment. The feasibility study will include an assessment and summary of the following items and additional areas of research may be added as well:

- existing infrastructure
- equipment needs
- capital costs
- financing
- buildout plan phases
- impacts to WEC's finances
- competitive market study
- breakeven take rates
- service fee to customer
- community demographics
- competitive service provider risk identification
- overlap with VTEL areas and associated risks
- business provider options including subsidiary structures and full service provider models
- pole attachment and easement requirements for WEC owned equipment and potential needs of other equipment

- make ready assumptions
- regulatory issues
- grant funding requirements
- partnership opportunities
- relevant successor technology

WEC will retain experienced consultants(s) hired through a Request-for-Proposal (RFP) bid process. The project may interact with other stakeholders, including the state's transmission utility VELCO, other utilities and municipalities, other internet providers including EC Fiber and CV Fiber municipal Communications Union Districts.

The feasibility study we propose to conduct as part of a grant as a preliminary step to the design and roll-out of smart grid infrastructure. It is also an essential step to expanding telecommunications infrastructure of rural Vermont. While this specific project will not yet result in new infrastructure, it is targeted to do so once a financially sustainable path forward is identified.

The project as proposed is expected to create jobs and improve the lives of low-income Vermonters if the plan yields positive results and we move ahead. This work is essential and a first step to bring new opportunities to low income Vermonters across WEC's 41 towns in the Counties of Washington, Orange, Caledonia and Orleans.

The feasibility study's primary focus is in defining the feasibility of deploying highspeed internet equipment in underserved Vermont towns. Enabling increased deployment of highspeed internet will improve basic telecommunication needs to areas already determined economically distressed and underserved with basic internet services for many low-income Vermonters.
Highspeed broadband will also provide a secondary means to improve the critical energy and telecommunications infrastructure of rural Vermont communities by facilitating peak load management and management of distributed generation resources such as solar powered systems. WEC is one of only three utilities in the state identified to be already100% renewable. In a feasibility study, WEC will define its specific need for and prospective benefit of improved communications and control of its electric infrastructure to facilitate operating renewable and alternative energy in a manner responsive to the guidelines of the state's comprehensive energy plan.

It is clear to WEC that greater two-way communications between the utilities, consumers, and distributed producers than exists now will be a requirement of the future grid, and is a basic public

need. The same network for managing the utility may also serve, with appropriate extension, to provide broadband telecommunication service to Washington Electric members at download and upload rates (100 Megabits per second download/100 Megabits per second upload) consistent with modern business and communications needs. The feasibility study's purpose is to assess the opportunity to make economically sustainable advances toward state goals.

Background and Project

The larger effort to provide greater access to high speed internet in currently under-served areas can have a profound impact in numerous sectors, as broadband usage is now considered to be a necessary complement of modern basic economic needs and an integral part of our societal and cultural way of modern life. Educators at all levels, for example, often require students to access and complete assignments over the internet. Software and IT professionals require high download and upload speeds to perform their work competitively. Rural enterprises of all backgrounds make increasing use of the internet to conduct their business from remote locations. Many of these examples are documented in the Vermont Comprehensive Economic Development Strategy, along with estimates of economic benefits that accrue with reliable internet access and the different scope of the workforce that rapid broadband connectivity enables.

The use of fiber optic connectivity in managing the utility's infrastructure also has economic benefits beyond just modernizing the grid. The National Rural Electric Cooperative Association (NRECA) overview report ("The Value of a Broadband Backbone for America's Electric Cooperatives: A Benefit Assessment Study) quantitatively documents the nominal savings to ratepayers that can result from broadband-enabled smart grid modernization. For a utility the size of Washington Electric, the report indicates the prospective annual savings range from $1 to 2 million dollars. That said, a business plan created for Washington Electric's specific situation must be performed in order to quantify its own potential savings, which is one purpose of the project.

The primary performance metric is the completion of a written study to evaluate the economic feasibility to install and manage a fiber optic network for smart grid applications and provision of broadband connectivity to members. The study will attempt to answer a fundamental question: Is it financially feasible for WEC to install and administer broadband internet services to residences and businesses in its service territory in a manner that is economically sustainable?
Is there sufficient economic benefit in installing broadband equipment that will be used to manage load and distributed generation?

Washington Electric seeks to supervise a study to address these questions, making use of previous efforts conducted by other electric cooperatives. We expect our study to answer several key questions in detail:

- Why does an investment in broadband make financial sense to the cooperative and its members?
- What investment level is appropriate? Are the optimal choices of technology being made?
- If WEC pursues broadband, what are the optimal choices for infrastructure ownership and operation? What partnerships should be considered?
- What legal and regulatory issues must be considered?

Work Plan

The proposed work is guided by the following vision. We wish to:

- Facilitate access by all or most of WEC's customers to reliable highspeed broadband internet and related service, e.g. internet phone. The target speed for broadband is 100 megabits/second download and 100 megabits/second upload (100/100), consistent with state initiatives.
- Update WEC's internal communications links to its substations, subsidiary equipment, and ultimately customers' meters to a fiber optic network for rapid monitoring and control.

Based on the experience of other co-op utilities that have undertaken the switch to fiber optic, it is essential to perform a feasibility study and to create a business plan prior to seeking financial backing to install fiber optic hardware. Apart from the obvious reason about the economic uncertainty of embarking on an expensive investment, a comprehensive plan will be needed when prospective grantors are asked by WEC for external funding. And a cursory look indicates that outside funding through grants or loans will be mandatory if the project is to succeed. The main task of this proposed work is to identify and hire a qualified consultant and other experienced advisors to perform a feasibility study and evaluate potential business plans that address the linked vision. Since the vision encompasses utility communication as well as broadband internet, the consultant should be familiar with co-ops that have previously undertaken upgrades to fiber optic.

The scope of work requested of the consultant includes:

- Mapping and needs assessment to identify the estimated number of customers by type and location

- Business and financial modeling to include detailed projections of revenue, expense, debt load, subscription rates, subscription take-rates, and build-out timelines, reflecting both capital and operating costs.
- Recommendations on various approaches for governance and ownership, with attention to how a partnership between WEC and CV Fiber could be structured to take advantage of their respective strengths and weaknesses
- Suggestions on funding sources for the infrastructure buildout
- Recommendations regarding the infrastructure approaches to be utilized
- Assessing the impact of a fiber initiative on opportunities within the service area for both economic development and improved efficiency of utility operation.

Regional Plan

This proposal complements ongoing regional efforts to provide better broadband service to central Vermont. While high speed broadband is available to many Vermonters, it is clear that a large number of rural residents and business locations lack reliable access in an era when access to broadband is considered to be a modern technological imperative. The recent bill before the state legislature demonstrates the need to provide more universal access to high speed telecom. It is generally recognized that commercial providers are not likely to broaden their service to more sparsely populated areas, and they are under no regulatory direction to do so. In response, a number of towns in central Vermont have created two public Communication Union Districts (CUD) as a means of providing broadband to town residents. EC Fiber was the first to be created in this area, and after several years, it is understood to be successful thus far. The CV Fiber CUD created last year includes 15 of the 41 towns in WEC's service territory, and seeks to provide broadband coverage. This project will maintain awareness of companion efforts by other non-profits to develop feasibility studies for installation of broadband in portions of WEC's service territory, and explore partnerships where appropriate.

State Planning

The goals of this project directly align with several major state plans focused on energy and economic development. The state's 2016 Comprehensive Energy Plan calls for substantial modernization of utilities' infrastructure to accommodate more effective management of demand and of distributed generation, in addition to offering the consumer greater choices on heating and transport that use less fossil fuels. This project responds to these needs by developing a plan for WEC'S communication infrastructure to include not only monitoring of substation and control

equipment, but also fiber to the customer's meter for control and monitoring of various smart grid applications e.g. EV charging, dynamic time-of-use pricing, demand management of appliances. WEC's ability to couple its existing 100% renewable supply portfolio with enhanced, consumer-centric load management techniques enabled by fiber-linked infrastructure will give a powerful boost to the state's energy goals.

This feasibility study project also aligns with the state's Comprehensive Economic Development Strategy (CEDS). In developing a plan to build out the rural infrastructure for both high speed telecom and smart grid, the project directly addresses the action areas of energy systems and telecommunications, and indirectly addresses the area of transportation by exploring the facilitation of EV use and charging. It will necessarily tackle the challenge of a low density of users. Fortunately, with WEC already serving portions of 41 towns in four counties, it has the experience to create and carry out integrated infrastructure planning and the necessary permitting processes in Vermont's rural landscape. Moreover, it wholly owns the utility poles on which fiber will be strung, which facilitates implementation to a great extent.

Planning for a modernized electric infrastructure will improve its resilience as well as promoting public and commercial innovation in smart grid applications. With greater access to the internet, particularly with higher upload speeds, software and advanced manufacturing businesses can be more productive, and students from elementary school through adult self-education can reliably participate in online assignment and opportunities for workforce development. These positive developments in the fiber optic network cannot take place without further financing, however, and this project to create a realistic implementation plan is necessary not only to evaluate its economic feasibility, but to make financing available from federal and other sources.
The feasibility study seeks to find a means to provide broadband service to under-served rural Vermonters for both their quality of life and employment opportunities in line with the Governor's strategic priorities of strengthening Vermont's Economy and assisting the most vulnerable Vermonters.

Project Financing
Total project costs for the study are $90,000.
The expected budget work is outlined as follows:

a. $10K consulting fees for technical management support
b. $60K for feasibility study and business plan
c. $20K for other data and supporting material

With proper planning of partnerships, WEC has an opportunity to create a broadband network that serves individuals who are traditionally left out by commercial providers.

Appendix VI: Engineer's Report of the Safety of MAW Communications Fiber Optic Installation

ENGINEER'S REPORT

of the

SAFETY OF MAW COMMUNICATIONS
FIBER OPTIC CABLE INSTALLATION

Prepared by:

Daryl L. Ebersole, P.E.

Jeffrey M. Kobilka, P.E.

January 7, 2018

A. INTRODUCTION

MAW Communications is a Pennsylvania public utility which provides telecommunication services for institutional and residential customers in Berks and Lancaster counties. MAW has installed Fiber Optic Cable in Lancaster City attached on utility poles owned by PPL Electric Utility. PPL has claimed the fiber optic cable installation by MAW represents an exigent public safety risk.

The purpose of our investigation was to determine if the fiber optic supply cables installed by MAW and identified by PPL as exigent public safety risks represent exigent public safety risk, a public safety risk, and/or a worker safety risk.

B. MATERIALS AVAILABLE FOR REVIEW

1. Inspection of FOSC Installations in Lancaster City, 01/03/2018
2. 20171221 List 1 of MAW Unauthorized Attachments including Exigent safety issues
3. Corning SST-Drop Data Sheet
4. Corning ROC Drop Data Sheet

C. ANALYSIS – MAW Fiber Optic Cable Materials - ADSS

The MAW fiber optic cable installation in Lancaster city utilizes two Corning fiber optic cables. The backbone cable is Corning SST-Drop. The drop cable is Corning ROC Drop. Both cables are All Dielectric Self Supporting (ADSS) fiber optic cables. Fiber optic cables by definition do not transmit electricity, instead they transmit light signals. An "All Dielectric" cable is not conductive and therefore is not a risk for conducting hazardous electricity from pole to pole or from pole to ground if the cable should break. The "Self-Supporting" designation allows the cable to be attached without a messenger. A messenger is a cable, often constructed of conductive metals, used to support another cable across a span between two attachment points.

In multiple locations within the National Electrical Safety Code (NESC), the recognized national standard for overhead communication and power lines, ADSS fiber optic cables are referred to as Rule 230F1b cables.

D. ANALYSIS – ADSS Clearance from Power in Supply Space

ADSS cable operates under different rules for clearance from supply cables than conductive

communication cables because it is dielectric (non-conductive) and does not require a messenger. The NESC recognizes that ADSS poses no risk of carrying voltage from pole to pole in Table 235-5 "Vertical Clearance between conductors at supports" FN10:

> *"No clearance is specified between fiber-optic supply cables (FOSC) meeting Rule 230F1b and supply cables and conductors. The FOSC may be attached to a supply conductor or cable at the pole or in the span, provided that the FOSC is positioned away from the supply conductor or cable to prevent abrasion damage."*

ADSS cable can be wrapped around electrical supply cables and be in accordance with the NESC as long as the connection is mechanically sound and does not cause abrasion.

The below picture is of a PPL installation in Berks county that utilizes ADSS fiber optic cable with minimal clearance to supply. This is acceptable per the NESC, provided workers utilize supply space work rules.

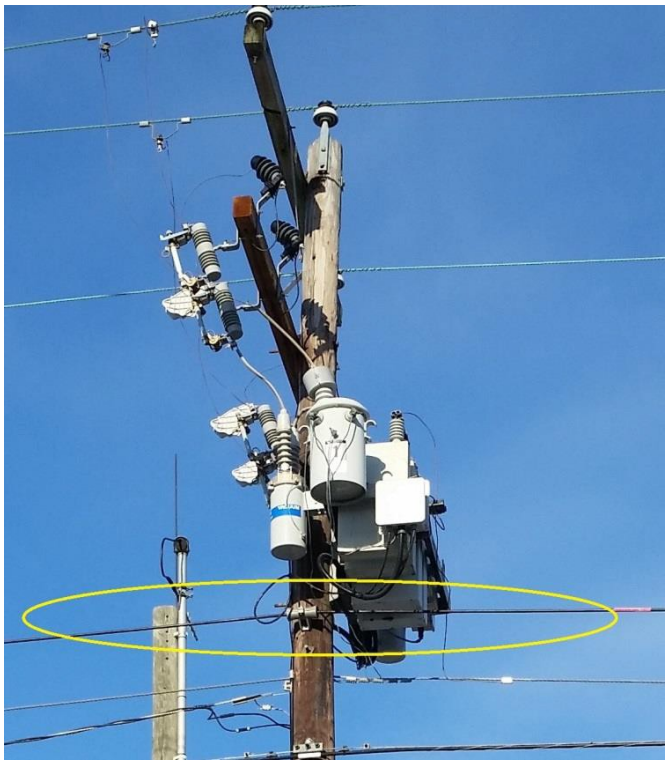


Figure 1 - PPL ADSS Fiber Optic Installation (outlined in yellow)

E. ANALYSIS – Exigent Public Safety Risk

PPL has claimed that the MAW fiber optic cable installation represents an Exigent Public Safety

Risk. The ways in which an overhead line can represent a public safety risk include:

- Low hanging conductors and conductive cables can pose a risk of electric shock
- Broken conductors and conductive cables can pose risk of electric shock

The above risks require the cable in question to be able to conduct electricity to present a risk to the public. The MAW installation is All Dielectric and does not conduct electricity and does not present either risk. If an energized cable should break (or otherwise fail) and come into contact with an MAW ADSS cable and the MAW ADSS cable should break or otherwise be in reach of the public there exists no electrical hazard from the MAW ADSS cable. Categorizing the MAW fiber optic system as an *exigent* public safety risk would indicate there is a pressing, urgent safety risk to the public. There is no basis for this claim, and none of the issues described by PPL present a risk to the public. The MAW Communication fiber optic system does not present a safety risk to the public.

F. ANALYSIS – Clearance from Ungrounded Luminaire Brackets

One of the issues presented in the PPL document titled "20171221 List 1 of MAW Unauthorized Attachments including Exigent safety issues" is insufficient clearance from an ungrounded luminaire bracket. The issue is listed multiple times and has a range of 6" to 36" from the ungrounded streetlight bracket. (Poles: 40670S26463, 40692S26440, 40701S26449, 40718S26466, 40743S26491, 40770S26512, 40819S26504, 40840S26501)

NESC Section 238 defines requirements for clearances between non energized metal supply equipment (such as brackets) and communications equipment or cables. The purpose of the clearances in this section is to create a "communication worker safety zone" between communication equipment/cables and the supply space. The need for this zone comes from the work rules for communications workers. Compared to supply space work rules, communication space work rules are less stringent and require different equipment. If a communications cable is to operate in the supply space then the telecom utility workers must follow supply space work rules, increasing requirements for insulated equipment and protective gear. This is defined in section 224A1:

> *Communication circuits located in the supply space shall be installed and maintained only by personnel authorized and qualified to work in the supply space in accordance with the applicable rules of Sections 42 and 44.*

Table 238-2—Vertical clearance of span wires and brackets from communication lines and equipment

(See also Rule 238C.)

	Carrying luminaires, traffic signals, or trolley conductors			
	Not effectively grounded		Effectively grounded	
	(mm)	(in)	(mm)	(in)
Above communication support arms	1000	40	500	20 ①
Below communication support arms	1000	40	600	24
Above messengers carrying communication cables	1000	40	100	4
Below messengers carrying communication cables	1000	40	100	4
From terminal box of communication cable	1000	40	100	4
From communication brackets, bridle wire rings, or drive hooks	1000	40	100	4

Figure 2 - NESC 2017 Table 238-2

Table 238-2 is understood by PPL to place the MAW installation in violation of the NESC. This is incorrect. Per the NESC if the MAW workers utilize supply space work practices there is no need for the communication worker safety zone. Analysis from the IEEE 2017 NESC Handbook agrees:

> *If communication workers are authorized to work in the supply space; use supply work rules and methods, insulated buckets, insulating tools and insulating personal protective gear; and otherwise meet Rule 224A, there is no requirement for a separate communication space and communication worker safety zone. [IEEE 2017 NESC Handbook Rule 238E page 429]*

MAW is not in violation of the NESC. For instances where their cables are within 40 inches of the lowest piece of supply space equipment, or there is an ungrounded luminaire in the communication worker safety zone, the NESC requires MAW Communications utilize supply space work rules and equipment.

The location of the MAW fiber optic cable does not present a safety risk to properly trained and equipped MAW workers, nor does it present a safety risk to employees of other telecommunication companies or PPL utility workers as the cable is not capable of carrying electrical hazard from pole to pole. However, the presence of not effectively grounded luminaires in the communication worker safety zone does present a risk to workers who are not utilizing supply space work

practices. As shown in Figure 3 there are other, non-ADSS telecom cables within 40” of the ungrounded luminaire bracket. For this reason and general good practice it is recommended that the luminaires be effectively grounded. With the luminaire effectively grounded, clearance requirements are reduced to 4”, and the requirement to follow supply space work rules is removed.

Figure 3 - Ungrounded Luminaire clearance to communication cables

G. ANALYSIS – Clearance from Neutral

The PPL issue list states that it is an exigent safety concern that the MAW ADSS fiber optic cable is “30” from Neutral” (Poles: 40764S26513, 40862S26497, 40760S26509). This is neither a safety concern nor a violation of NESC. This does not require supply space work rules. Footnote 5 of Table 235-5 “Vertical clearance between conductors at supports” requires 30” of space between neutrals and ADSS fiber optic cables.

May be reduced to 30 in for supply neutrals meeting rule 230E1, fiber optic supply cables on an effectively grounded messenger meeting Rule 230F1a, entirely dielectric fiber-optic cables meeting Rule 230F1b, … Bonding is not required for entirely dielectric cables meeting Rule 230F1b.[2]

H. ANALYSIS – Clearance from Drip Loops

The PPL issue list includes clearance from drip loops as an issue. There are two instances listed that have a clearance of 12" or more (Poles 40777S26511 and 40832S26503). These instances are not safety risks nor are they NESC violations. Per Section 238D:

> *If a drip loop of conductors entering a luminaire, a luminaire bracket, or a traffic signal bracket is above a communication cable, the lowest point of the loop shall not be less than 12 in above the highest communication cable.*[3]

Pole 40701S26449 is listed as having 3" of clearance from the Street Light Drip loop to the fiber optic cable. Per the NESC this drip loop should have a "suitable nonmetallic cover"[4].

[2] 2017 NESC Table 235-5 "Vertical clearance between conductors at supports" footnote 5
[3] 2017 NESC Rule 238D
[4] 2017 NESC Rule 238D Exception

I. FINDINGS

Within the bounds of reasonable engineering certainty, and subject to change if additional information becomes available, it is our professional opinion that:

5. The fiber optic network installed and maintained by MAW Communications and identified by PPL as exigent safety risks are not public safety risks.
6. The fiber optic network installed and maintained by MAW Communications and identified by PPL as exigent safety risks are not utility worker safety risks.
7. For instances where the clearance required by the communication worker safety zone (40" from supply space) is not possible, telecommunication workers should follow supply space work rules, methods, and utilize insulated equipment.
8. Ungrounded luminaires that are in the communication worker safety zone should be grounded to reduce the worker safety risk for all telecommunication workers who are not following supply space work rules.
9. Recommend installation of non-metallic cover on Pole 40701S26449 streetlight drip wire.

Daryl Ebersole, P.E.

Jeffrey Kobilka, P.E.

Appendix VII: Bill Texts for recent state enactments clarifying use of rights-of-way and easements for broadband

STATE LAWS ALLOWING USE OF COOPERATIVE ELECTRIC EASEMENTS FOR BROADBAND

1. Introduction

Electric cooperatives should carefully review their state laws and easements whenever adding anything beyond electric poles and wires or using existing facilities for non-electric purposes.

Four main questions arise for Vermont electric cooperatives considering provision of broadband service:

1. Does the electric cooperative have the legal authority under its enabling act to directly engage in the broadband business?
2. Does the electric cooperative have the legal authority under Vermont's electric cooperative act to own a separate entity, such as a subsidiary, that is engaged in the broadband business?
3. Does the electric cooperative have the ability to provide broadband to businesses and individuals that are not members of the cooperative?
4. Does the electric cooperative have the legal authority to run fiber-optic cable, lease unused fiber, or allow other providers to attach fiber or wireless equipment to their poles or bury fiber underground to provide broadband service?

This section provides specific examples of state laws allowing the use of cooperative electric easements and facilities to provide for broadband service. It includes current laws from seven states that impose specific regulations on cooperatives, including Alabama, Colorado, Georgia, Maryland, North Carolina, Indiana and Tennessee.

2. Alabama

HB 400, Broadband Using Electric Easement Accessibility Act, enacted May 23, 2019, codifies existing law that electric cooperatives have the ability to offer broadband service and that their easements are valid for that use.

HB 400 Summary:

Relating to broadband services:

1) To authorize the placement, construction, installation, operation, and use of broadband and other advanced communication capabilities and related facilities within electric easements by electric providers;
2) To authorize electric providers to engage in, and to permit electric providers to authorize others to engage in, providing broadband services through advanced communications capabilities within electric easements;
3) To grant the right to electric providers to condemn easements and rights-of-way for advanced communications capabilities; and
4) To permit consents through service agreements, licenses, leases, and membership agreements to place, construct, install, operate, and use advance communication capabilities within an electric easement.

HB 400 Text:

This chapter shall be known and may be cited as the Broadband Using Electric Easements Accessibility Act.

§37-16-2.

(a) The Legislature finds and declares the following:

(1) More advanced communication capabilities, broadband facilities, and services are needed in many rural and underserved areas of the state.

(2) Electric providers in those rural and underserved areas are capable of providing infrastructure for such advanced communications capabilities and providing, directly or indirectly, broadband facilities or services.

(3) The investment in and development of advanced communications capabilities for providing broadband facilities and services are necessary to better serve the public in those rural and underserved areas.

(4) The continued lack of advanced communication capabilities, broadband facilities, and services in rural and underserved areas deprives citizens residing in these areas from access to opportunities such that the state needs to take action to correct and eliminate these discrepancies.

(5) It is the public policy of this state to encourage and facilitate the development and investment in advanced communications capabilities and broadband facilities and services in those rural and underserved areas in the state, as this development is vital and necessary to induce, create, and

promote industrial and economic development in those rural and underserved areas of the state and to create job opportunities, enhance health care, and enhance educational advancement in those areas.

(6) It is the public policy of the state to promote the authorization of advanced communications capabilities to be installed by electric providers within existing easements and other rights-of-way.

(7) It is the intent of this chapter to authorize electric providers to engage in arrangements, contracts, and other collaborative activities with public or private persons to facilitate the investment in or development of advanced communications capabilities and broadband services and broadband systems in this state.

(8) The limited grant of authorization to electric providers in this chapter is reasonably related to the proposed legislative objective of providing advanced communications capabilities, broadband facilities, and services in rural, underserved, and unserved areas.

(b) Except as provided in subsection (a), nothing contained in this chapter is intended to exempt, except, or exclude providers that engage in the provision of broadband facilities or services through advanced communications capabilities from complying with any provisions of federal law which may at any time apply to the electric providers or their broadband facilities or services.

§37-16-3. As used in this chapter, the following terms shall have the following meanings:

(1) ADVANCED COMMUNICATIONS CAPABILITIES. The communications capabilities defined from time to time as advanced telecommunications capabilities by the Federal Communications Commission (FCC) through regulations, statutes, or other written guidance or orders. The term also includes broadband systems and broadband services.

(2) BROADBAND AFFILIATE. A person that is at least 10 percent owned by an electric provider, controlled by way of14ownership interests therein, directly or indirectly, by the electric provider, or under common control with the electric provider, and which is formed to provide, among other services, utility support services or nonutility support services.

(3) BROADBAND OPERATOR. A person that owns or operates a broadband system within an electric easement, including the electric provider if the electric provider is operating the broadband system and including a person that provides broadband services on a wholesale basis to another broadband operator or broadband service provider.

(4) BROADBAND SERVICE PROVIDER. A person that provides broadband services on a retail basis to end-use customers.

(5) BROADBAND SERVICES. The provision of connectivity to a high-speed, high-capacity transmission medium or to a technology supporting, in the provider-to-consumer (downstream) direction, a speed, in technical terms ("bandwidth"), with minimum download speeds of 25 megabits per second and minimum upload speeds of 10 megabits per second for either of the following:

a. To provide access to the Internet.

b. To provide computer processing, information sharing, information storage, information content, or protocol conversion, including any service application or information service over the electric delivery system of an electric provider, and includes any advanced communications capabilities that enable users to originate, send, and receive high-quality voice, data, graphics, video programming, and video communications using any technology including a broadband system.

(6) BROADBAND SYSTEM. Any of the following that may be used to facilitate, directly or indirectly, the provision or transmission of broadband services, whether utility support services or nonutility support services, or both: Materials; wires; cables, including fiber optic and copper cables, whether such cables are dark or lit, and whether such cable are in use or dormant; conduits; antennas; equipment; fixtures; switching multiplexers; poles; routers; switches; servers; appurtenances; facilities; and ancillary or auxiliary equipment.

(7) COMMISSION. The Alabama Public Service Commission.

(8) ELECTRIC DELIVERY SYSTEM. Any product, fixture, equipment, or technology, or part thereof, necessary or useful in supporting the generation, transmission, transformation, or distribution or delivery of electricity, including, but not limited to, generators, electric transmission facilities and lines, distribution facilities and lines, wires, cables, fiber optic cables, poles, transformers, antennas, anchors, guys, grounding systems, communications systems, insulators, conduits, and any other related or ancillary facilities or materials used by an electric provider to generate, transmit,1transform, deliver, or distribute electric energy, as such lines and facilities may exist from time to time and whether such lines or facilities are aboveground or underground.

(9) ELECTRIC EASEMENT. Any recorded or unrecorded easement or right-of-way in favor of an electric provider that permits the siting and use of an electric delivery system on, over, under, or across the land of a property owner, regardless of whether the easement or right-of-way is for the exclusive benefit of the electric provider or for use in connection with the provision of other

services, and regardless of whether the electric provider provides the other services. Electric easements include, but are not limited to, easements obtained under a law of this state, or by any of the following methods: Negotiation, condemnation, prescription, or grant, including, but not limited to, a grant pursuant to a bylaw provision, service agreement, or membership agreement, rate schedule, tariff, rule, regulation, practice, act, requirement, or privilege.

(10) ELECTRIC PROVIDER. A utility, as defined under paragraph a. of subdivision (7) of Section 37-4-1; or a cooperative nonprofit, membership organization formed, incorporated, or reincorporated under Chapter 6 of Title 37, that produces, generates, transmits, delivers, distributes, or furnishes electricity; or any board, authority, or public corporation incorporated or organized under Article 9, Article 15, or Article 16 of Chapter 50 of Title 11, for the operation of an electric distribution system; or a municipal corporation that operates an electric distribution system.

(11) NONUTILITY SUPPORT SERVICES. Broadband services and related services that support services, uses, or purposes other than utility support services.

(12) PERSON. An individual, trust, estate, corporation, partnership, limited partnership, limited liability partnership, or limited liability company having a separate legal existence under state law.

(13) UTILITY SUPPORT SERVICES. Broadband services and related services, uses, or purposes that support the operational performance and service reliability of the electric delivery system of an electric provider, including, but not limited to, all of the following:

a. Automated meter reading
b. Real-time or other system monitoring.
c. Remote service control.
d. Outage detection and restoration.
e. Predictive maintenance and diagnostics.
f. Monitoring and enhancement of power quality, load control, voltage control, and flow.
g. Supervisory control and data acquisition.
h. Management and flow of electricity.
i. Internal communications.
j. Dispatch, start-up, ramping, shutdown, curtailment, scheduling, or control of electric generation, transmission, or distribution of resources or ancillary services relating thereto, including, but not limited to, generator imbalance, spinning and non-spinning reserves, and reserve sharing.
k. All other uses supporting the reliability, resilience, and security of the electric delivery system.

§37-16-4.

(a) To the extent not otherwise authorized by law, and in addition to all other purposes, powers, and authority currently granted to electric providers under the laws of this state, an electric provider may do all of the following:

(1) Own, operate, maintain, construct, install, and replace a broadband system on, over, under, or across the electric provider's electric easements, whether used for or supporting utility support services or used for or supporting nonutility support services, whether on a wholesale or retail basis.

(2) Allow a broadband affiliate or an unaffiliated person to own, lease, manage, construct, superintend, install, operate, maintain, and replace a broadband system on, over, under, or across the electric provider's electric easements, on such terms and conditions as specified by the electric provider, whether used for or supporting utility support services or used for or supporting wholesale or retail nonutility support services, including the power and authority to apportion the electric easement, to grant licenses, and to grant other usage or operational rights to other broadband operators for the broadband system located within the electric easements.

3. Colorado

SB19-107, enacted June 3, 2019, Broadband Infrastructure Installation, concerns electric utility easements, installation of broadband facilities in easements, broadband suppliers' provision of broadband using facilities, notice requirements and conditions.

SB19-107 Bill Summary:

The act authorizes an electric utility that has an electric easement on real property or a commercial broadband supplier designated by the electric utility to act on the electric utility's behalf, after having provided advanced notice to the owner of the real property and to any interest holder in the real property that has requested notice , to install, maintain, or own a broadband facility within the electric easement or to lease any excess capacity of such facility to a commercial broadband supplier. The broadband facility may be installed, maintained, or owned aboveground within the electric easement if the facility is attached to the electric utility's electric service infrastructure. An electric utility or a designated commercial broadband supplier may maintain or own an underground broadband facility within the electric easement only if the facility existed before notice was delivered to the property owner and to interest holders requesting notice pursuant to the act.

An electric utility may assign its rights under the act to install, maintain, own, or lease excess capacity of broadband facilities. The terms and conditions of a written electric easement,

including any notice requirements related to entering the real property on which the electric easement is located, apply; except that any terms and conditions that prohibit the electric utility from exercising the rights authorized under the act do not apply.

The act establishes a 2-year limitations period within which an interest holder may bring a claim against an electric utility or commercial broadband supplier with regard to the electric utility's or commercial broadband supplier's exercise of rights under the act; except that the statutory limitations period does not apply to claims based on physical damage to property, injury to natural persons, or breach of the terms and conditions of a written electric easement. Damages for claims subject to the statutory limitations period are limited to damages that existed at the time that the electric utility or commercial broadband supplier first exercised its rights under the act at issue and measured by the fair market value of the reduction in value of the interest holder's interest in the real property.

An electric utility or commercial broadband supplier exercising rights under the act:

- Cannot discriminate among commercial broadband suppliers, including with respect to leasing fees charged and pole access provided, in offering or granting rights to install or attach broadband facilities;
- Is required to charge just and reasonable pole attachment fees; and
- May only withhold authorization to a commercial broadband supplier to install, maintain, own, operate, or use broadband facilities on the electric utility's electric service infrastructure if there is insufficient capacity for the broadband facilities or for reasons of safety or reliability concerns or engineering considerations that weigh against granting an authorization.

An electric utility shall not directly provide retail commercial broadband service, but a broadband affiliate of the electric utility may do so if:

- A separate accounting system is maintained for the broadband affiliate;
- An independent certified public accountant performs a financial audit of the broadband affiliate within 2 years after it commences retail commercial broadband service and at least once every 2 years thereafter; and
- The electric utility does not cross-subsidize the broadband affiliate or the broadband affiliate's provision of commercial broadband service.

A commercial broadband supplier that is unaffiliated with an electric utility may request that the electric utility and a broadband affiliate of the electric utility, if they are exercising rights under the act, certify that the electric utility and the broadband affiliate are in compliance with the act.

The certification is admissible in court in any action that arises between the unaffiliated commercial broadband supplier and the electric utility or broadband affiliate.

SB 19-107 Text:

Section 1. In Colorado revised statutes, add part 6 to article 15 of title 40 as follows: part 6 electric utility easements 40-15-601.

Definitions. As used in this part 6, unless the context otherwise requires:

(1) "attached facility" means a broadband facility, as defined in section 38-5.5-102 (2), or a broadband network or any portion of a broadband network, in each case located substantially:

(a) aboveground and attached to an electric utility's electric service infrastructure; or

(b) underground in an electric easement and existing before the delivery of notice pursuant to section 40-15-602 (2).

(2) "broadband affiliate" means a commercial broadband supplier that is a separate legal entity from any electric utility but is controlled by, controls, or is under common control with an electric utility.

(3) "commercial broadband service" means "broadband service", as that term is defined in section 38-5.5-102 (1), or broadband internet service.

(4) (a) "commercial broadband supplier" means:

(i) a provider of broadband internet service or an existing broadband provider, as that term is defined in section 38-5.5-102 (3), or a person that intends to provide broadband internet service or broadband service; or

(ii) a person that directly or indirectly sells, leases, or otherwise transfers attached facilities or a right to install, operate, maintain, or use attached facilities for another person's provision of commercial broadband service or a person that intends to sell, lease, or otherwise transfer attached facilities or a right to install, operate, maintain, or use attached facilities.

(b) "commercial broadband supplier" does not include an electric utility

(5) "electric easement" means a recorded or unrecorded easement, right-of-way under section 38-4-103 or otherwise, or similar right in or to real property, including prescriptive rights, no matter

how acquired, held by an electric utility for the siting of electric service infrastructure or for the purpose of delivering electric service, regardless of whether:

(a) the easement or other right is exclusively for the provision of electric service or for use in connection with commercial broadband service, telecommunication service, or another purpose; or

(b) the electric utility or a commercial broadband supplier uses the easement or other right to provide commercial broadband service.

(6) "electric utility" means a cooperative electric association, as defined in section 40-9.5-102.

(7) "interest holder" means a property owner or other person with an interest in the real property upon which an electric easement is located.

(8) "memorandum" means a written instrument that includes, at a minimum, the name and address of the electric utility, the date on which the notice was mailed, and the information required to be included in a notice under section 40-15-602 (2)(b)(iii) and (2)(b)(iv).

(9) "notice" means a written letter substantially complying with the requirements set forth in section 40-15-602 (2)(b), which notice shall be deemed delivered on the date postmarked or otherwise time stamped.

(10) "person" has the meaning set forth in section 40-1-102 (10).

(11) "property owner" means a person with a recorded fee simple interest in real property upon which an electric easement is located.

(12) "request for notice" means a written instrument recorded by an interest holder in compliance with requirements set forth in section 40-15-602 (2)(c).

40-15-602. Electric easements - commercial broadband service - broadband affiliates - notice required.

(1) with regard to real property subject to an electric easement, if an electric utility, or any commercial broadband supplier designated by the electric utility to act on its behalf, complies with the notice and filing requirements set forth in subsection (2) of this section, the electric utility holding the electric easement may, subject to subsection (4) of this section and without the consent of an interest holder in the real property subject to the electric easement, take the following actions to the extent not already permitted by the electric easement:

(a) install, maintain, or own, or permit any commercial broadband supplier, including a broadband affiliate, to install, maintain, or own, an attached facility for operation by a commercial broadband supplier, including a broadband affiliate, in providing commercial broadband service; and

(b) lease or otherwise provide to a commercial broadband supplier, including a broadband affiliate, any excess capacity of attached facilities for purposes of providing commercial broadband service.

(2) (a) at least thirty days before first exercising its rights under one or both of subsection (1)(a) or (1)(b) of this section with respect to an electric easement or portion of an electric easement, an electric utility or its designated commercial broadband supplier must send notice to each property owner that holds an interest in the real property subject to the electric easement and any other interest holder that has recorded a request for notice and must record a memorandum in the office of the county clerk and recorder in each county in which the electric utility is exercising its rights under subsection (1) of this section.

An electric utility or its designated commercial broadband supplier may only commence exercising its rights under subsection (1) of this section upon delivery of sufficient notice.

(b) a letter providing notice pursuant to this subsection (2) must:

(i) be sent by certified mail from or on behalf of the electric utility to the property owner and any interest holder that has recorded a request for notice at each of the following, as applicable: (a) the last known address for the property owner based on the electric utility's records; (b) the address listed for the property owner in the records of the office of the county assessor; and (c) the address set forth in a request for notice;

(ii) include the name, address, telephone number, and named point of contact for the electric utility and, if delivered by a commercial broadband supplier designated by the electric utility, the name, address, telephone number, and named point of contact for the designated commercial broadband supplier;

(iii) include the property address; the recording number, if any, of the electric easement or recorded memorandum of the electric easement; a general description of any existing electric service infrastructure currently located in the electric easement; and the approximate location of the electric easement, which need not include a legal description, land title survey, plat, or other designation of the exact boundaries of the electric easement;

(iv) include: (a) a citation to this part 6; and (b) a copy of the language of subsection (1) of this section with an indication of whether the electric utility is exercising rights under one or both of subsection (1)(a) or (1)(b) of this section;

(v) give an estimated time for the start of installation or construction with regard to any new installation or construction that will occur in connection with the exercise of rights under subsection (1) of this section;

(vi) include a statement regarding the right and obligation of the electric utility, or its designated commercial broadband supplier, to record a memorandum; and

(vii) include a statement regarding the statute of limitations for the interest holder to file a claim with respect to the electric utility's exercise of rights.

(c) an interest holder that desires to obtain notice under this part 6 at a specific address may file in the office of the county clerk and recorder for the county in which the real property is situated a request for notice that identifies the interest holder's name and address, the instrument granting the interest holder's interest in the property, and the recording number of the instrument or a recorded memorandum of the instrument.

(3) upon exercise of the rights set forth in subsection (1) of this section, the rights run with the land and are assignable by the electric utility.

(4) the terms and conditions of a written electric easement apply to an electric utility's uses of the electric easement set forth in subsection (1) of this section, except those terms and conditions that would prohibit the electric utility's exercise of rights under subsection (1) of this section. A prohibition on aboveground electric service infrastructure contained within a written electric easement constitutes a prohibition on aboveground attached facilities. In connection with the exercise of rights under subsection (1) of this section, an electric utility or its designated commercial broadband supplier must comply with any notice requirements contained in a written electric easement held by the electric utility related to entering the real property subject to the electric easement or commencing any construction or installation on the real property.

(5) nothing in this part 6 requires an electric utility to comply with subsection (2) of this section in order to take any action or exercise any rights under an electric easement that is already permitted within the scope of the electric easement. Unless expressly prohibited by the terms of an electric easement, an electric easement will be deemed to allow an electric utility to install, maintain, or own, or permit a third party to install, maintain, or own for beneficial use by the electric utility, telecommunications facilities and equipment for use in connection with the electric utility's provision of electricity.

40-15-603. Statute of limitations - damages - limitations on damages.

(1) (a) no claim or cause of action against an electric utility or a commercial broadband supplier concerning the electric utility's or commercial broadband supplier's exercise of rights under this part 6 or any actions that the electric utility or commercial broadband supplier takes before the effective date of this section that, if taken after the effective date of this section, would be authorized under section 40-15-602 (1) may be brought by or on behalf of an interest holder more than two years after the latest of:

(i) the effective date of this section;

(ii) the date of delivery of notice pursuant to section 40-15-602 (2); or

(iii) the date of recording of a memorandum pursuant to section 40-15-602 (2).

(b) subsection (1)(a) of this section does not apply to a claim or cause of action based on:

(i) physical damage to property;

(ii) injury to natural persons; or

(iii) breach of the terms and conditions of a written electric easement as the terms and conditions apply in accordance with section 40-15-602 (4)

(c) nothing in this section extends the statutory limitation period applicable to a claim or revives an expired claim.

(2) a claim or cause of action to which subsection (1)(a) of this section applies shall not be brought by or on behalf of an interest holder against a commercial broadband supplier for actions that the commercial broadband supplier has taken under section 40-15-602 (2) on behalf of an electric utility. Nothing in this subsection (2) prohibits an electric utility and a commercial broadband supplier from contracting to allocate liability for actions taken under section 40-15-602 (2).

(3) if an interest holder brings a trespass claim, inverse condemnation claim, or any other claim or cause of action to which subsection (1)(a) of this section applies for an electric utility's or commercial broadband supplier's exercise of rights or performance of actions described in section 40-15-602 (1)(a) or (1)(b), the following applies to the claim or cause of action:

(a) the measure of damages for all claims or causes of action to which subsection (1)(a) of this section applies, taken together, is the fair market value of the reduction in value of the interest holder's interest in the real property, as contemplated by section 38-1-121 (1). In determining or providing the fair market value under this subsection (3)(a):

(i) the following shall not be used and are not admissible as evidence in any proceeding:

(a) profits, fees, or revenue derived from the attached facilities; or

(b) the rental value of the real property interest or the electric easement, including the rental value of any attached facilities or an assembled broadband corridor; and

(ii) consideration must be given to any increase in value to the real property interest resulting from the availability of commercial broadband service to the real property underlying the real property interest that arises from the installation of attached facilities.

(b) the interest holder must make reasonable accommodations for the electric utility or commercial broadband supplier to perform an appraisal or inspection of the real property within ninety days following any written request for an appraisal or inspection. If an interest holder fails to make such accommodations, the electric utility or commercial broadband supplier has no further liability to the interest holder. The electric utility or commercial broadband supplier shall promptly provide to the interest holder a copy of any appraisal performed pursuant to this subsection (3)(b).

(c) any damages for any claims or causes of action to which subsection (1)(a) of this section applies:

(i) are limited to those damages that existed at the time that the electric utility or commercial broadband supplier first exercised the rights or performed the actions; and (ii) shall not be deemed to continue, accrue, or accumulate.

(d) with regard to a claim or cause of action to which subsection (1)(a) of this section applies:

(i) except for an electric utility's or commercial broadband supplier's failure to comply with section 40-15-602 (2), negligence, or willful misconduct, or in accordance with the terms and conditions of a written electric easement as the terms and conditions apply in accordance with section 40-15-602 (4), an interest holder is not entitled to reimbursement from an electric utility or commercial broadband supplier for the cost of any appraisal, attorney fees, or award for special, consequential, indirect, or punitive damages.

(ii) for purposes of this subsection (3)(d), any action or failure to act by an electric utility or commercial broadband supplier in furtherance of the electric utility's or commercial broadband supplier's exercise of rights set forth in section 40-15-602 (1) shall not be deemed negligence or willful misconduct.

(4) by accepting a damage award for any claim or cause of action to which subsection (1)(a) of this section applies, an interest holder shall be deemed to have granted an increase in the scope of the electric easement, equal in duration to the term of the electric easement and subject to section 40-15-602 (4), to the extent of the interest holder's rights in the real property, for all of the uses of the real property and actions set forth in section 40-15-602 (1)

40-15-604. Electric utility obligations.

(1) an electric utility that exercises any rights under section 40-15-602 (1)(a) or (1)(b) for the provision of commercial broadband service shall:

(a) not discriminate among commercial broadband suppliers, including broadband affiliates, in offering or granting rights to install or attach any attached facilities; or

(b) charge fees that are nondiscriminatory among commercial broadband suppliers for a substantially similar lease or use of the capacity of attached facilities owned or controlled by the electric utility, but only to the extent an electric utility chooses, in its sole discretion, to offer the lease or use to a particular commercial broadband supplier.

(2) an electric utility that has a broadband affiliate and, if applicable, the broadband affiliate shall:

(a) charge just and reasonable attachment fees, including recurring fees, that are related to the costs associated with such attachments, such as a just and reasonable share of the carrying costs of the per pole investment, including ongoing maintenance of the pole based on the portion of the usable space on the pole occupied by the attachment;

(b) provide all commercial broadband suppliers access to all poles and similar support structures owned by the electric utility or broadband affiliate for the purpose of attaching equipment for the provision of commercial broadband service. Access provided in accordance with this subsection (2)(b) must be provided:

(i) on a just, reasonable, and nondiscriminatory basis; and

(ii) under terms and conditions that are no less favorable than the terms and conditions offered to broadband affiliates, including terms and conditions regarding application requirements, technical requirements, electric lineworker

health and safety requirements, administrative fees, timelines, and make-ready requirements; and

(c) charge fees that are nondiscriminatory among commercial broadband suppliers for a substantially similar lease or use of the capacity of attached facilities owned or controlled by the electric utility or broadband affiliate and that are equal to or less than the fees that the electric utility charges to its broadband affiliates, but only to the extent an electric utility or broadband affiliate chooses, in its sole discretion, to offer the lease or use to a particular commercial broadband supplier.

(3) subject to the requirements of subsection (1) of this section, nothing in this section requires an electric utility to offer or grant a right to access or use an electric easement or to use attached facilities or electric service infrastructure owned or controlled by the electric utility in a manner that would, in the electric utility's reasonable discretion, materially interfere with the electric utility's construction, maintenance, or use of any electric utility infrastructure for the provision of electric service.

(4) (a) an electric utility with a broadband affiliate shall not unreasonably withhold authorization or delay its decision whether to provide authorization to a commercial broadband supplier to install, maintain, own, operate, or use the commercial broadband supplier's attached facilities on electric service infrastructure owned or controlled by the electric utility. An electric utility may only withhold authorization pursuant to this subsection (4) if the reason for withholding authorization is that:

(i) there is insufficient capacity for the attached facilities; or

(ii) concerns of safety or reliability or generally applicable engineering purposes weigh against granting the authorization.

(b) an electric utility that withholds authorization pursuant to this subsection (4) shall promptly notify the commercial broadband supplier in writing of the reasons for withholding authorization.

(5) an electric utility shall not directly provide retail commercial broadband service but may cause or allow a broadband affiliate to offer retail commercial broadband service. As long as an electric utility maintains its exclusive right to provide electric service to customers within its exclusive service territory, both the electric utility that has a broadband affiliate and the broadband affiliate shall:

(a) maintain or cause to be maintained an accounting system for the broadband affiliate separate from the electric utility's accounting system, using generally accepted accounting principles or another reasonable and customary allocation method;

(b) cause a financial audit to be performed by an independent certified public accountant, within two years after commencement of commercial operation of retail commercial broadband service and at least once every two years thereafter, with respect to the broadband affiliate's provision of commercial broadband service, including an audit of the allocation of costs for property and services that are used in both the provision of commercial broadband service and the electric utility's provision of electric service; and

(c) (i) not cause or allow the electric utility to use its exclusive right to provide electric services within its exclusive territory to cross-subsidize the broadband affiliate or its provision of commercial broadband service, whether by: below fair market value pricing; payment of capital or operating costs properly charged to the broadband affiliate under applicable accounting rules; or use of any revenue from or subsidy for the provision of electric service to provide commercial broadband service below market value, except in connection with the electric utility's provision of electricity.

(ii) nothing in this subsection (5)(c) prohibits an electric utility from:

(a) entering into a transaction with a broadband affiliate on terms and conditions substantially similar to those that would be agreed to between two similarly situated parties in an arm's length commercial transaction;

(b) loaning funds to a broadband affiliate if the interest rate on the loan is no less than the electric utility's lowest cost of capital;

(c) exchanging services or materials for other services or materials of equivalent value;

(d) providing reduced-cost commercial broadband service to low-income retail customers; or

(e) conducting and funding due diligence, operational analysis, entity set-up, and associated noncapital expenditures relating to and prior to the establishment of a broadband affiliate.

(6) upon request of a commercial broadband supplier, an electric utility and any broadband affiliate subject to this section shall cause an officer of the electric utility and an officer of the broadband affiliate to certify that the electric utility and the broadband affiliate, respectively, are in compliance with this section. If a dispute arises between an electric utility or its broadband affiliate and an unaffiliated commercial broadband supplier:

(a) regarding matters addressed in this part 6, the parties to the dispute have standing to file a claim or cause of action in any court of competent jurisdiction in the state; and

(b) the following are discoverable and admissible as evidence in court regarding the electric utility's and its broadband affiliate's compliance with this section:

(i) any certification requested and produced pursuant to this subsection (6);

(ii) the terms and conditions applied to the electric utility's or broadband affiliate's offer to or grant of a right to the unaffiliated commercial broadband supplier to install, maintain, own, operate, or use attached facilities; and

(iii) any audit required to be performed pursuant to subsection (5) of this section.

(7) notwithstanding any provision of this part 6 to the contrary, an electric utility that is subject to regulation under 47 u.s.c. Sec. 224, as amended, and the FCC regulations promulgated pursuant to that federal law, is not subject to this section.

(8) nothing in this part 6:

(a) subjects an electric utility to regulation by the FCC;

(b) constitutes an exercise of, or an obligation or intention to exercise, the right of the state under 47 U.S.C. Sec. 224 (c) to regulate the rates, terms, and conditions for pole attachments, as defined in 47 U.S.C. Sec. 224 (a)(4); or (c) constitutes a certification, or an obligation or intention to certify, to the FCC under 47 U.S.C. Sec. 224. Section 2. In Colorado revised statutes, amend 38-4-103 as follows:

38-4-103. Electric power companies.

(1) any foreign or domestic corporation organized or chartered for the purpose, among other things, of conducting and maintaining electric power transmission lines for providing power or light by means of electricity for hire shall have has a right-of-way for the construction, operation, and maintenance of such electric power transmission lines through any patented or unpatented mine or mining claim or other land without the consent of the owner thereof of the patented or

unpatented mine or mining claim or other land, if such the right-of-way is necessary for the purposes proposed.

(2) an electric utility, as defined in section 40-15-601 (6), exercising its rights under subsection (1) of this section may, in accordance with part 6 of article 15 of title 40: (a) install or allow the installation of any attached facility, as that term is defined in section 40-15-601 (1); and (b) exercise any rights available to the electric utility under part 6 of article 15 of title 40 in connection with the installation. Section 3. In Colorado revised statutes, amend 38-5-103 as follows: 38-5-103. Power of companies to contract. (1) such electric light power, gas, or pipeline company, or such city, or town, or other local government shall have power to contract with any person or corporation, the owner of any lands or any franchise, easement, or interest therein over or under which the line of electric light wire power or pipeline is proposed to be laid or created for the right-of-way for the construction, maintenance, and operation of its electric light wires, pipes, poles, regulator stations, substations, or other property and for the erection, maintenance, occupation, and operation of offices at suitable distances for the public accommodation. (2) an electric utility, as defined in section 40-15-601 (6), exercising its rights under subsection (1) of this section may, in accordance with part 6 of article 15 of title 40, install or allow the installation of any attached facility for commercial broadband service, as those terms are defined in section 40-15-601 (1) and (3), respectively.

4. Georgia

SB 2 and SB 17, effective April 26, 2019 clarifies that electric and telephone cooperatives are able to provide broadband service. The change to SB 2 allows electric cooperatives to use their easements which have been used for electric service to extend the easements to also apply to equipment and lines needed to supply broadband service.

SB 2, entitled an Act to amend Title 46 of the Official Code of Georgia Annotated, relating to public utilities and public transportation, so as to specifically authorize **electric membership corporations and their affiliates** to provide broadband services; to provide for definitions; to authorize certain financing and partnerships for the provision of broadband services; to prohibit cross-subsidization between the provision of broadband services and an electric membership corporation's natural gas activities or electricity services activities; to provide for related matters; to provide for an effective date; to repeal conflicting laws; and for other purposes.

SB 2 Bill Summary:

To amend Chapter 3 of Title 46 of the Official Code of Georgia Annotated, relating to electrical service, so as:

- to allow electric membership corporations to engage in certain activities in order to facilitate the provision of broadband services;

- to specifically authorize electric membership corporations and their affiliates to provide broadband services;
- to provide for and revise definitions;
- to authorize certain financing and partnerships for the provision of broadband services;
- to prohibit cross-subsidization between the provision of broadband services and an electric membership corporation's natural gas activities or certain electricity services activities;
- to authorize the Public Service Commission to have jurisdiction over compliance with the cross-subsidization prohibitions and to provide for expedited adjudication of any complaints related thereto;
- to provide certain rights, powers, and benefits to broadband affiliates of electric membership corporations;
- to provide for applicability; to require certain rates, terms, and conditions for pole attachments between communications service providers and electric membership corporations and their broadband affiliates;
- to permit the use of electric easements for broadband services;
- to provide for legislative findings and declarations as to certain utility easements;
- to provide for related matters;
- to provide for an effective date;
- to repeal conflicting laws; and,
- for other purposes.

SB 2 Text:

BE IT ENACTED BY THE GENERAL ASSEMBLY OF GEORGIA: SECTION 1.18 Chapter 3 of Title 46 of the Official Code of Georgia Annotated, relating to electrical service, is amended by revising Code Section 46-3-171, relating to definitions relative to electric membership corporations and foreign electric cooperatives, as follows:

"46-3-171.22

As used in this article, the term:

(1) 'Address' means a complete mailing address, including, whenever practicable, street and number or building and floor.

(2) 'Articles of incorporation' means the original or restated articles of incorporation or articles of consolidation and all the amendments thereto, including articles of merger, and also includes what have been designated by the laws of this state prior to July 1, 1981, as charters.

(2.1) 'Broadband affiliate' means any person which directly or indirectly controls, is controlled by, or is under common control of one or more electric membership corporations and which is used to provide broadband services.

(2.2) 'Broadband facilities' means any facilities and equipment utilized to provide or support broadband services.

(2.3) 'Broadband services' means a wired or wireless service that consists of the capability to transmit data at a rate not less than 200 kilobits per second to and from end users and in combination with such service provides:

(A) Access to the internet;
(B) Computer processing, information storage, or protocol conversion; or
(C) Any application or information content to be provided over or through broadband. Such term shall include any broadband facilities and equipment associated with providing such a service.

(2.4) 'Communications service provider' means a provider of cable service as defined in 47 U.S.C. Section 522(6), telecommunications service as defined in 47 U.S.C. Section 153(53), or information service as defined in 47 U.S.C. Section 153(24), as each such term existed on January 1, 2019.

(2.5) 'Electric easement' means a right of way or an easement, whether acquired by eminent domain, prescription, or conveyance, that is used or may be used for transmitting, distributing, or providing electrical energy and services by utilizing aboveground or underground wires, cables, lines, or similar facilities.

(3) 'Electric membership corporation' or 'EMC' means an electric membership corporation organized under this article or any prior electric membership corporation law of this state, or a corporation which elected, in accordance with the provisions thereof, to be governed by Ga. L. 1937, p. 644, the 'Electric Membership Corporation Act.'

(4) 'Federal agency' includes the United States of America and any department, administration, commission, board, bureau, office, establishment, agency, authority, or instrumentality thereof.

(5) 'Foreign electric cooperative' means a cooperative, nonprofit membership corporation organized under laws other than the laws of this state for the same or similar purposes for which an electric membership corporation may be organized under this article.

(5.1) 'Gas activities' shall have the same meaning as provided for in Code Section 46-4-152.62

(5.2) 'Gas affiliate' shall have the same meaning as the term 'EMC gas affiliate' provided in Code Section 46-4-152.64

(6) 'Insolvent' means that an electric membership corporation is unable to pay its debts as they become due in the usual course of its business or that it has liabilities in excess of assets.

(7) 'Member' means a person who that has met the requirements and conditions of membership in an electric membership corporation which are set forth in this article and in the articles of incorporation and bylaws of an electric membership corporation.

(8) 'Person' includes any natural person; firm; association; electric membership corporation; foreign electric cooperative; corporation, either domestic or foreign; business or other trust; partnership; limited liability company; federal agency; state or political subdivision thereof; or body politic; or other entity recognized by law.

(8.1) 'Retail broadband services' means any broadband services other than those provided for:

(A) The internal use of an electric membership corporation;
(B) The internal use of another electric membership corporation;
(C) Resale by another electric membership corporation or other communications service providers; or
(D) Use as a component part of communications services that other communications service providers offer to their customers.

(9) 'Service' means any service or commodity which an electric membership corporation may provide under this article for which value is paid."

SECTION 2. Said chapter is further amended by revising Code Section 46-3-200, relating to purposes of electric membership corporations, as follows:

"46-3-200. An electric membership corporation may serve any one or more of the following purposes:

(1) Furnish To furnish electrical energy and service;

(2) Assist To assist its members in the efficient and economical use of energy;

(3) Engage To engage in research and to promote and develop energy conservation and sources and methods of conserving, producing, converting, and delivering energy; and
(4) Provide and operate broadband facilities and provide and use the broadband services described in subparagraphs (A) and (B) of paragraph (8.1) of Code Section 46-3-171;95
(5) Furnish on a nondiscriminatory basis the broadband services described in subparagraphs (C) and (D) of paragraph (8.1) of Code Section 46-3-171;
(6) Form, fund, support, and operate a broadband affiliate, directly or indirectly, contingent upon compliance with Code Sections 46-5-163 and 46-3-200.2; and
(7) Engage To engage in any lawful act or activity necessary or convenient to effect the foregoing purposes."

SECTION 3. Said chapter is further amended by adding new Code sections to read as follows: "

46-3-200.1.104. In order to assist a broadband affiliate in the planning, engineering, construction, extension, provision, operation, repair, and maintenance of broadband services, an electric membership corporation or its broadband affiliate shall be authorized to:

(1) Apply for, accept, repay, and utilize loans, grants, and other financing from any person; and
(2) Enter into contracts, agreements, partnerships, or other types of business relationships with any person.

46-3-200.2. (a) No electric membership corporation, broadband affiliate, or gas affiliate shall permit cross-subsidization between its electricity services activities, its broadband services activities, or its gas activities. To prevent cross-subsidization between broadband services activities and gas activities and between broadband services activities and electricity services activities, any electric membership corporation with a broadband affiliate that provides retail broadband services shall:

(1) Fully allocate all costs of electricity services activities and broadband services activities, including costs of any shared services, between electricity services activities and such broadband affiliate's broadband services activities, in accordance with:

(A) The provisions of this Code section; and
(B) The applicable uniform system of accounts and generally accepted accounting principles that are applicable to electric membership corporations under federal and state laws, rules, and regulations;

(2) Not charge any costs of electricity services activities or gas activities to the broadband services customers of the broadband affiliate;

(3) Not charge any costs of broadband services activities to the electricity services customers of such electric membership corporation or to the gas activities customers of its gas affiliate; and

(4) Not use below-market loans or below-market funding from programs that are not intended to support the deployment of broadband facilities or broadband services in order to support broadband facilities or to provide broadband services unless the electric membership corporation or its broadband affiliate imputes the difference between market rates and the below-market loans or below-market funding into the costs of its broadband facilities and broadband services. The provisions of this paragraph shall not apply to loans or funding from programs that are intended to support the deployment of broadband facilities or broadband services.

(b) An electric membership corporation that has a broadband affiliate that provides retail broadband services shall:

(1) Not condition the receipt of electricity services upon, nor provide more favorable terms for electricity services in exchange for, persons that receive broadband services from the electric membership corporation or its broadband affiliate;

(2) Have a duty to provide access to the poles, ducts, conduits, and easements of such electric membership corporation to all communications service providers on rates, terms, and conditions that are just, reasonable, and nondiscriminatory;

(3) Not provide its broadband affiliate or any communications service provider any information obtained from other communications service providers in the pole attachment request and approval process, including without limitation the requested locations for pole attachments, the locations of the customers to be served, or any identifying information regarding such customers;

(4) When such electric membership corporation is assisting a customer or potential customer seeking to initiate electricity services and there is any inquiry or discussion regarding the availability of retail broadband services, in the course of the same discussion or transaction in which such assistance is being provided, inform such customer or potential customer of other providers offering broadband services in such customer's area based on any service map of a provider of broadband services or similar resource maintained by any department of the state or federal government and inform such customer or potential customer that broadband services may be obtained from such

electric membership corporation's broadband affiliate or such other providers of broadband services. Such information shall be provided only with regard to other providers of broadband services that have notified the electric membership corporation's broadband affiliate, in writing and in a commercially reasonable manner, that such provider of broadband services is able and willing to provide broadband services to customers located within all or a portion of the electric membership corporation's designated electricity service territory; and

(5) Develop and maintain a cost allocation manual, to be approved by the commission, describing the electric membership corporation's methods of cost allocation and such other information and policies reasonably required to ensure compliance with this article. Such manual shall:

(A) Establish rules for the pricing of transactions between an electric membership corporation and its gas affiliates and broadband affiliates, as applicable, including the transfer of assets between such electric membership corporation and its gas affiliates and broadband affiliates;

(B) Require the electric membership corporation and its gas affiliates and broadband affiliates, as applicable, to maintain separate books of accounts and records which shall be subject to inspection to confirm compliance with this article and the cost allocation manual; and

(C) Require that all services that an electric membership corporation provides to its gas affiliates and broadband affiliates, as applicable, be provided at the same rates and on the same terms and conditions as any other similarly situated retail customer or communications service provider. Any such services provided to any communications service provider shall be on a strictly confidential basis, such that the electric membership corporation does not share information regarding any communications service provider with any other communications service provider, including a broadband affiliate.

(c) The commission shall have jurisdiction over each broadband affiliate and each electric membership corporation that has a broadband affiliate that provides retail broadband services to enforce compliance within the provisions of this Code section. The commission shall provide for an expedited adjudication of any complaint as to a failure to comply with this Code section and may engage an administrative law judge for purposes of such adjudication.

(d) Except as provided in subsection (e) of this Code section, this Code section shall only193apply to electric membership corporations with a broadband affiliate offering retail broadband services.

(e) As to an electric membership corporation that was offering retail broadband services on or before January 1, 2019, whether directly through the electric membership corporation or indirectly through a broadband affiliate, this Code section shall only apply to retail broadband services offered on or after January 1, 2021, and such electric membership corporation shall have until January 1, 2021, to develop and maintain the cost allocation manual required in paragraph (5) of subsection (b) of this Code section.

46-3-200.3. Broadband affiliates shall have all of the rights, powers, and benefits granted to other entities under the provisions of Title 14 and shall not be subject to any restrictions contained in this article, except that a broadband affiliate shall:

(1) Only serve the purposes of developing, providing, furnishing, or promoting broadband facilities and broadband services, or a combination of such purposes; and

(2) Be subject to the provisions of Code Section 46-3-200.2. 46-3-200.4.

(a) As used in this Code section, the term:

(1) 'Existing agreement' means a pole attachment agreement or joint use agreement in effect as of January 1, 2019.
(2) 'New agreement' means a pole attachment agreement or joint use agreement that was not in effect as of January 1, 2019.

(b) Except as required by the Tennessee Valley Authority for its distributors in this state, a communications service provider that has an existing agreement with an electric membership corporation shall have the right ¸through December 31, 2034, to attach to poles of the electric membership corporation and its broadband affiliate after the expiration of the original period of such existing contract:

(1) Upon terms and conditions that are no less favorable than those in such existing agreement; and

(2) At rates that shall not exceed the rates in such existing agreement, subject to annual rate adjustments based on the Handy-Whitman Index of Public Utility Construction Costs and based upon the Consumer Price Index in the event the Handy-Whitman Index of Public Utility Construction Costs is no longer available.

(c) Except as required by the Tennessee Valley Authority for its distributors in this state, any new agreement between an electric membership corporation and a communications service provider shall provide for attachments to poles of the electric membership corporation and its broadband affiliate:

(1) Upon terms and conditions that are no less favorable than those in existing agreements; and

(2) At rates that shall not exceed the highest of those rates in any existing agreement, subject to annual rate adjustments based on the Handy-Whitman Index of Public Utility Construction Costs, and based upon the Consumer Price Index in the event the Handy-Whitman Index of Public Utility Construction Costs is no longer available.

(d) An electric membership corporation that terminates, without cause, an existing agreement or new agreement with a communications service provider shall not be permitted to form or utilize a broadband affiliate for a period of one year from the date of the termination of any such agreement, if the number of poles with attachments under such terminated agreement constitutes one-half or more of all electric membership corporations' poles containing an attachment by a communications service provider."

5. Maryland

SB 634, April 30, 2019, Electric Cooperatives - Powers - Conducting or Communications Facilities, underscores how electric cooperatives can use their easements to provide broadband.

SB 634 Bill Summary:
Authorizing an electric cooperative to construct, maintain, or operate or allow others to construct, maintain, or operate conducting or communications facilities for telecommunications and broadband Internet services along, on, under, or across various types of property; requiring an electric cooperative to give certain notice to certain property owners at least 60 days before constructing certain facilities in a certain electric easement or making capacity available for certain services in the electric easement; etc.

SB 634 Bill Text:
An act concerning electric cooperatives –powers –conducting or communications facilities for the purpose of authorizing an electric cooperative to construct, maintain, or operate or allow others to construct, maintain, or operate certain conducting or communications facilities along, on, under, or across certain property under certain circumstances; requiring an electric cooperative to allocate certain costs in a certain manner and for a certain purpose; requiring an electric cooperative to give certain notice to certain property owners at least a certain amount of time before constructing certain facilities in a certain electric easement or making capacity available for certain services in the electric easement; providing for the contents of a certain

notice; providing for the application of this act; defining a certain term; and generally relating to the powers of electric cooperatives, by repealing and reenacting, with amendments, article – corporations and associations Section 5–607 Annotated Code of Maryland (2014 replacement volume and 2018 supplement) by adding to article –corporations and associations section 5–641.1 Annotated Code of Maryland (2014 replacement volume and 2018 supplement)
Section 1.
Be it enacted by the general assembly of Maryland, that the laws of Maryland read as follows:
Article –Corporations and Associations 5–607.

(a) a cooperative has the power to:

(1) sue and be sued in its corporate name;
(2) have perpetual existence;
(3) adopt and alter a corporate seal;
(4) generate, manufacture, purchase, acquire, accumulate, and transmit electricity;
(5) distribute, sell, supply, and dispose of electricity to:
(i) its members;
(ii) governmental agencies and political subdivisions; and
(iii) other persons not exceeding 10% of the number of its members;
(6) assist persons to whom the cooperative supplies or will supply electricity in wiring their premises by:
(i) providing financing or other assistance; or
(ii) wiring or causing the premises to be wired;
(7) assist persons to whom the cooperative supplies or will supply electricity in acquiring and installing electrical and plumbing appliances, equipment, fixtures, and apparatus by:

(i) providing financing or other assistance;
(ii) wiring or causing the premises to be wired; or
(iii) purchasing, acquiring, leasing as lessor or lessee, selling, distributing, installing, and repairing electrical and plumbing appliances, equipment, fixtures, and apparatus;

(8) assist persons to whom the cooperative supplies or will supply electricity in constructing, equipping, maintaining, and operating electric cold storage or processing plants, by providing financing or other assistance;
(9) construct, purchase, lease as lessee, or otherwise acquire electric transmission and distribution lines or systems, electric generating plants, electric cold storage or processing plants, electric plants, and any other assets considered necessary, convenient, or appropriate to accomplish the purpose for which the cooperative is organized;

(10) equip, maintain, and operate electric transmission and distribution lines or systems, electric generating plants, electric cold storage or processing plants, electric plants, and any other assets considered necessary, convenient, or appropriate to accomplish the purpose for which the cooperative is organized;
(11) sell, assign, convey, lease as lessor, mortgage, pledge, or otherwise dispose of or encumber electric transmission and distribution lines or systems, electric generating plants, electric cold storage or processing plants, electric plants, and any other assets considered necessary, convenient, or appropriate to accomplish the purpose for which the cooperative is organized;
(12) construct, maintain, or operate or allow others to construct, maintain, or operate conducting or communications facilities that furnish telecommunications, broadband internet access, or related services, along, on, under, or across:

(i)real property, personal property, rights–of–way, and easements owned, held, or otherwise used by the cooperative; and

(ii) publicly owned lands, roadways, and public ways, with the prior consent of the governing body of the municipal corporation or county in which the facilities are proposed to be constructed and under any reasonable regulations and conditions imposed by the governing body of the municipal corporation or county;

(13) purchase, lease as lessee, or otherwise acquire, use and exercise, and sell, assign, convey, mortgage, pledge, or otherwise dispose of or encumber, franchises, rights, privileges, licenses, and easements;
(14) borrow money and otherwise contract indebtedness, issue notes, bonds, and other evidences of indebtedness, and secure the payment of those instruments by mortgage, pledge, or deed of trust, or any other encumbrance on any of its assets, revenues, or income;
(15) construct, maintain, and operate electric transmission and distribution lines along, on, under, and across publicly owned lands, roadways, and public ways, with the prior consent of the governing body of the municipal corporation or county in which the lines are proposed to be constructed and under any reasonable regulations and conditions required in the consent;
(16) exercise the power of condemnation in the manner provided by the law of this state for the exercise of that power by other corporations that construct or operate electric transmission and distribution lines or systems;
(17) become a member of or own stock in other cooperatives or corporations;
(18) conduct its business and exercise its powers in any state, territory, district, and possession of the united states and in any foreign country;
(19) adopt, amend, and repeal bylaws; and

(20) do any other act and exercise any other power that may be necessary, convenient, or appropriate to accomplish the purpose for which the cooperative is organized.

(b) a cooperative that furnishes electric cold storage or processing plant service is not considered to be distributing, selling, supplying, or disposing of electricity under subsection (a)(5)(iii) of this section solely on that account.

(c) to ensure that electric customers do not subsidize the cost of broadband services, an electric cooperative shall allocate properly all costs incurred under subsection (a)(12) of this section between electricity–related services and broadband services.

5–641.1.

(a) in this section, "electric easement" means an easement held by a cooperative for the siting of electric facilities, regardless of whether the easement is for the exclusive benefit of the cooperative or for use by other utility companies.

(b) this section applies only to a cooperative in the exercise of its authority under §5–607(a)(12) of this subtitle to construct, maintain, or operate conducting or communications facilities within an electric easement that does not expressly provide for the construction, maintenance, or operation of conducting or communications facilities within the easement.

(c) (1) except as provided in paragraph (3) of this subsection, a cooperative shall give notice to each owner of property subject to an electric easement at least 60 days before the cooperative:

(i) constructs conducting or communications facilities within the easement; or

(ii) makes capacity available for telecommunications, broadband internet access, or related services within the electric easement.

(2) the cooperative shall give the notice required under this subsection by:

(i) posting notice on the cooperative's website; and

(ii)including the notice with billing information such as a bill insert or bill message.

(3) the cooperative shall give the notice required under this section at the next following annual member meeting of the cooperative after the notice has been given under paragraph (2) of this subsection.

(4) the notice shall contain:

(i) a statement indicating the cooperative's intent to use the electric easement by:

1. constructing new conducting or communications facilities; or

2. making capacity available for telecommunications, broadband internet access, or related services through existing facilities; and

(ii) a written plan for making broadband internet service available within the cooperative's service territory.

Section 2. And be it further enacted, that this act shall be construed to apply retroactively and shall be applied to and interpreted to affect all real property, rights–of–way, and easements held by an electric cooperative on and after the effective date of this act.

Section 2.3.and be it further enacted, that this act shall take effect October 1, 2019.

6. North Carolina

Senate Bill 310, Electric Co-op Rural Broadband Services, Enacted May 30, 2019

An act removing restrictions prohibiting electric membership corporations and their subsidiaries from seeking federal grant funds to provide telecommunications and broadband services, authorizing such corporations and their wholly owned subsidiaries to use easements held by the corporations to supply telecommunications and broadband services, and providing for the manner in which claims related to the expanded use of easements by such corporations shall be resolved.

Bill Text:

Whereas, electric membership corporations were created for the purpose of extending electric service to rural communities in the State, and they have effectively achieved this necessary goal for many years; and

Whereas, telephone service is also a necessity for all North Carolinians and has been successfully extended throughout the State; and

Whereas, broadband service has emerged as a necessity for all rural communities in the State; and

Whereas, the General Assembly finds that electric membership corporations and their subsidiaries, where they so choose, are uniquely positioned to pursue federal broadband funds and to leverage their right-of-way corridors and existing broadband fiber networks to provide, individually or in partnership, broadband services which will enable more rural communities to connect to broadband services; and

Whereas, broadband infrastructure deployed by electric membership corporations and their subsidiaries can coexist with electric infrastructure in right-of-ways owned or held by electric membership corporations; and

Whereas, it has been recognized that in order for electric membership corporations to effectively pursue federal funds and leverage their unique position, the General Assembly must amend certain statutes regulating the operations and rights of electric membership corporations;

Now, therefore, The General Assembly of North Carolina enacts: SECTION 1.G.S.117-18.1 reads as rewritten:

"§ 117-18.1. Subsidiary business activities.

(a) Electric membership corporations may form, organize, acquire, hold, dispose of, and operate any interest up to and including full controlling interest in separate business entities that provide energy services and products, telecommunications services and products, water, and wastewater collection and treatment, so long as those other business entities meet all of the following conditions: the provisions of subdivisions (1) and (3) of subsection (a) of this section do not apply to the separate business activities of an electric membership corporation that forms, organizes, acquires, holds, disposes of, or operates any interest up to and including full controlling interest in a separate business entity that provides or supports high-speed broadband services to one or more households, businesses, or community anchor points.

For purposes of this subsection, the term "anchor points" includes schools, libraries, community colleges, community centers, and other similar places, and the term "high-speed broadband services" means Internet transmission speeds of a minimum of 25 megabits per second (Mbps) downstream and 3Mbps upstream."

SECTION 2. Article 3 of Chapter 117 of the General Statutes is amended by adding a new section to read as follows:

"§ 117-28.1. Electric membership corporations; easements.

(a) Any easement owned, held, or otherwise used by an electric membership corporation for the purpose stated in G.S.117-10 may also be used by the corporation, or its subsidiary, for the purpose of supplying telecommunications and broadband service.

(b) Notwithstanding G.S.1A-1, Rule 23, a class action may not be maintained against an electric membership corporation or its subsidiary in a suit in trespass or inverse condemnation based on a claim of expanded use of an easement. If, in a suit in trespass or inverse condemnation 1ased on a claim of expanded use of an easement, an individual property owner prevails over a corporation or its subsidiary, the trespass shall be deemed permanent and the actual damages awarded shall be the fair market value which, notwithstanding any other provision of law, shall always be greater than zero but shall not exceed the difference between the fair market value of the property owner's entire property immediately before the taking and the fair market value of the property owner's

property immediately after the taking. Evidence of revenues or profits derived or the rental value of an assembled communications corridor shall not be admissible in determining fair market value. A property owner's actual damages shall be fixed at the time of the initial trespass and shall not be deemed to continue, accumulate, or accrue. Upon payment of damages, the corporation or its subsidiary shall be granted a permanent easement for the trespass that was the subject of the claim."

SECTION 3. This act is effective when it becomes law and applies to all claims filed on or after that date

7. Indiana

SB 478, June 8, 2017, "**Facilitating Internet Broadband Rural Expansion (FIBRE) Act**. The law allows electric cooperatives with easements for electric lines to use the same easements for fiber infrastructure.

SB 478 Bill Summary:
Utility easements.

1. Establishes a framework for resolving disputes between electricity suppliers and property owners regarding the attachment or installation of communications infrastructure within an electric easement.
2. Provides that the procedures apply only to an electricity supplier that is a rural electric membership corporation.
3. Provides specified exemptions from the procedures.
4. Specifies that the bill's provisions provide the exclusive remedy to a property owner with respect to the attachment or installation of communications infrastructure on above ground electric facilities within an electric easement.
5. Specifies that the bill's provisions do not provide the exclusive remedy to a property owner if the terms of (1) the electric easement; or (2) any contractual or other agreement between the property owner and the electricity supplier; provide otherwise.
6. Requires an electricity supplier that: (1) installs new communications infrastructure; or (2) makes capacity available for communications service through existing communications infrastructure within an electric easement to provide written notice by first class mail to the owner of the affected property.
7. Sets forth the required contents of the notice, including a written plan for making broadband Internet service available within the electricity supplier's electric service territory.
8. Specifies that the failure of an electricity supplier to take any action described in, or related to, the plan does not create any liability with respect to the electricity supplier.

9. Requires an electricity supplier to include provisions in a communications service member agreement, customer agreement, or other similar agreement to notify property owners who subscribe to communications service from the electricity supplier that by signing the agreement, the property owner consents to the expansion of the electric easement to include the attachment or installation of communications infrastructure.
10. Provides that a property owner may bring a cause of action against an electricity supplier for damages for a decrease in value of the property owner's real property caused by the attachment or installation of communications infrastructure, not later than two years from the later of: (1) July 1, 2017; or (2) the date upon which the required notice is delivered to the property owner.
11. Provides that to prove damages for the decrease in value of the property owner's real property, the property owner shall provide the electricity supplier with an appraisal comparing the value of the property before and after the attachment or installation of communications infrastructure within the easement.
12. Provides that an appraisal obtained by a property owner to prove damages relating to the decrease in the value of the property owner's real property caused by the attachment or installation of communications infrastructure must take into account any increase in value to the property resulting from the availability of broadband Internet service provided through the communications infrastructure.
13. Provides that the acceptance by a property owner of an electricity supplier's payment for damages operates to modify the electric easement to allow for the installation, servicing, maintenance, and use of communications infrastructure within the easement.
14. Provides that when installing, inspecting, or maintaining communications infrastructure within an electric easement involving land on which a manufacturing facility is located, an electricity supplier shall make a reasonable, good faith effort to notify the property owner.
15. Requires an electricity supplier to comply with all applicable rules and standards included in the National Electric Safety Code most recently adopted by the state.
16. Requires an electricity supplier that uses the procedures set forth in the bill to: (1) form a separate legal entity; or (2) maintain a separate accounting system; with respect to the provision of broadband Internet service made available by the electricity supplier, alone or with one or more other legal entities, within all or part of the electricity supplier's electric service territory.
17. Provides that the entity providing broadband Internet service shall cause to be performed an annual audit of the entity's financial records concerning only the provision of broadband Internet service by the entity.
18. Urges the legislative council to assign to the interim study committee on energy, utilities, and telecommunications the topic of rental rates and other fees for the

attachment of communications service facilities on utility poles owned or controlled by electricity suppliers.

SB 478 Bill Text:

AN ACT to amend the Indiana Code concerning property. Be it enacted by the General Assembly of the State of Indiana:

SECTION 1.I C32-30-16 IS ADDED TO THE INDIANA CODE AS A NEW CHAPTER TO READ AS FOLLOWS [EFFECTIVE UPON PASSAGE]:

Chapter 16. Utility Easements

Sec.1.

(a) This chapter applies only to an electricity supplier (as defined in section 6 of this chapter).

(b) This chapter applies to an action by a property owner against an electricity supplier that: (1) installs; (2) permits the installation of; or (3) intends to install; communications infrastructure within an existing electric easement.

(c) This chapter does not apply to the following:

(1) A negotiation between an electricity supplier and a property owner for: (A) a new electric easement; or (B) the siting, installation, or attachment of any facilities or infrastructure other than communications infrastructure.

(2) An easement that by its terms expressly provides for the installation of communications infrastructure within the easement.

(3) Communications infrastructure that is within an electric easement and that is used only to support the transmission, transformation, or distribution of electricity to consumers.

(4) Any physical damage to property that occurs during the installation, maintenance, or servicing of communications infrastructure under this chapter.

(5) Property owned by a railroad company.

(6) The installation of new poles, towers, or other structures that are required for the exclusive support of communications infrastructure that is intended to provide communications service.

(7) The attachment or installation of communications infrastructure on underground or buried electric facilities within an electric easement

(d) This chapter supersedes any conflicting statute or administrative rule, or any conflicting ordinance, rule, or other policy of a local unit.

(e) Except as otherwise provided by the terms of the easement or by the terms of any contractual or other agreement between an electricity supplier and a property owner, this chapter provides the exclusive remedy to a property owner with respect to the attachment or installation of communications infrastructure on above ground electric facilities within an electric easement, regardless of whether the attachment or installation occurs before, contemporaneously with, or after:

(1) the granting of the easement; or
(2) the attachment or installation of electric facilities or of other communications infrastructure within the easement; without regard to the statutory or common law basis of the property owner's claim for damages or request for relief that would otherwise apply.

Sec.2. As used in this chapter, "communications infrastructure" includes all wires, cable, and other similar facilities used to provide communications service. The term includes fiber optic cable and any requisite or useful ancillary equipment that is in use or may be used to provide communications service.
Sec.3. As used in this chapter, "communications service" has the meaning set forth in IC8-1-32.5-3.
Sec. 4. As used in this chapter, "electric easement" means any recorded or unrecorded easement held by an electricity supplier for the siting of electric facilities, regardless of whether the easement is for the exclusive benefit of the electricity supplier

8. Tennessee

In April 2017, the Tennessee Broadband Accessibility Act was signed into law. The law allows electric co-ops in the state to provide, through a subsidiary, broadband and other similar services within their service territory.
In March 2018, **SB 1646** was enacted. The law clarifies that an electric co-op can use existing infrastructure for delivery of high-speed internet access. The law stated that "any easement owned, held, or otherwise used by the cooperative in pursuit of a primary purpose may be used for any secondary purpose."

SB 1646 Bill Text:
AN ACT to amend Tennessee Code Annotated, Title 65, relative to powers of a cooperative. BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF TENNESSEE
SECTION 1. Tennessee Code Annotated, Section 65-25-105(a)(11), is amended by deleting the subdivision and substituting instead:

(11) With respect to a primary purpose and the secondary purpose of supplying telecommunications and broadband internet access and related services, but without limiting the generality or particularity of subdivisions (a)(1)-(10), construct, maintain, and operate, and allow others, so long as such others are permitted by law to operate such systems within the cooperative's service area, to operate, electric, or other telecommunications or broadband internet access and related services transmission and distribution lines or other conducting or communications facilities along, upon, under, and across all of the following:

(A) Real property, personal property, rights of way and easements owned, held, or otherwise used by the cooperative. Any easement owned, held, or otherwise used by the cooperative in pursuit of a primary purpose may be used for any secondary purpose; and

(B) Public thoroughfares, including, but not limited to, all roads, highways, streets, alleys, bridges, and causeways and publicly owned lands if the applicable authorities having jurisdiction over the public thoroughfares and lands consent, but consent shall not be unreasonably withheld or conditioned for the purpose of enabling the authority to gain competitive advantage with respect to the rendition by the authority or any other entity of a service that the cooperative also has a right to render; and

SECTION 2. This act shall take effect upon becoming a law, the public welfare requiring it.

Appendix VIII: Comparison of Aerial versus Buried Fiber Costs

Assumptions

Does not include equipment or drop costs

Splitter cabinets sized at 288 count

Average size fiber priced at 96 count

Assumes all new aerial - strand & lashing in the communications space

Pricing includes soft surface restoration & maintenance of traffic

based on 250,00' of new build

Item	Labor	Price	Unit	Quantity	Subtotal	Notes
2	Budget for OSP design & permitting	1.25	Ft	250,000.00	$312,500.00	
8	Install New Splice Case & Prep Cable	250.00	each	250.00	$62,500.00	every 1000'
9	Ground Splice Case	150.00	each	250.00	$37,500.00	
10	Prep Cable in cabinet	250.00	each	16.00	$4,000.00	
11	Splice Fibers	20.00	each	4,000.00	$80,000.00	assumes 8 per nap multiplied by 3
12	Install splitter cabinet	2500.00	each	16.00	$40,000.00	assumes 250 connections per 288 cabinet
13	install concrete base	600.00	ech	16.00	$9,600.00	
13	Terminate Fibers	20.00	each	4,608.00	$92,160.00	
14	Test Network	2500.00	all	1.00	$2,500.00	
17	Install pole attachments	65.00	Each	1,388.89	$90,277.78	assumes 180' avg span lengths
18	Install Strand	1.10	Ft	250,000.00	$275,000.00	
19	Install snow shoes	100.00	Each	500.00	$50,000.00	
20	install aerial slack	1.50	Ft	25,000.00	$37,500.00	100' every 1000' of linear route
21	install / lash aerial cable	1.50	Ft	250,000.00	$375,000.00	
22	tree trimming	5.00	Ft	20,000.00	$100,000.00	
23	install pole risers	310.00	each	69.44	$21,527.78	assumes 5% of poles
24	install down guy & anchors	210.00	Each	208.33	$43,750.00	assumes 15% of poles
25	Make Ready budget	1000.00	pole	138.89	$138,888.89	assumes 10% of poles
		Labor Subtotal			$731,037.78	
		10% Contingency			$73,103.78	
		Labor Total			**$804,141.56**	

Item	Material	Price	Unit	Quantity	Subtotal	Notes
2	96 count fiber	1.05	feet	288,750.00	$303,187.50	includes 5% waste - average size cable
3	Splice Trays	45.00	each	250.00	$11,250.00	
4	Splice Cases	706.00	each	250.00	$176,500.00	
7	Ground Rods	25.00	each	250.00	$6,250.00	
11	pole attachment hardware	45.00	pole	1,388.89	$62,500.00	
12	6m Strand	0.10	ft	250,000.00	$25,000.00	
13	snow shoes	80.00	each	500.00	$40,000.00	
14	lashing wire	0.01	ft	250,000.00	$2,500.00	
15	u guard	125.00	pole	69.44	$8,680.56	
16	anchors	125.00	each	208.33	$26,041.67	
17	288 count splitter cabinet w tails - fully loaded	8200.00	each	16.00	$131,200.00	
18	cabinet pad	200.00	Each	16.00	$3,200.00	
19	1x32 splitters	800.00	Each	144.00	$115,200.00	
20		Material Subtotal			$911,509.72	
		10% Contingency			$91,150.97	
		Material Total			**$1,002,660.69**	
				Total FTTP	**$1,806,802.25**	7.23

Assumptions

Does not include equipment or drop costs

Splitter cabinets sized at 288 count

Average size fiber priced at 96 count

24" min depth

(2) 2" conduits & 24" min depth on Underground

hand holes every 700'

distribution splice / ped in every other handhole

no rock adder included

pricing includes soft surface restoration & Maintenance of traffic

based on 250,00' of new build

Item	Labor	Price	Unit	Quantity	Subtotal	Notes
1	Directional Bore (2) 2"	13.00	feet	250,000.00	$3,250,000.00	
2	Budget for OSP design & permitting	1.25	Ft	250,000.00	$312,500.00	
3	Install Muletape in New duct	0.25	feet	500,000.00	$125,000.00	

4	Install #12 Tracer wire	0.25	feet	250,000.00	$62,500.00	assumes no rock
5	Install Fiber Cable in Duct - Including All Slack	0.80	feet	267,857.14	$214,285.71	
6	Remove & Restore Concrete	18.00	sq. feet	250.00	$4,500.00	assume 1 sq. feet per 1000 feet of install
7	Install Handhole	300.00	each	357.14	$107,142.86	every 500'
8	Install New Splice Case & Prep Cable	250.00	each	178.57	$44,642.86	every 1400'
9	Ground Splice Case	150.00	each	178.57	$26,785.71	
10	Prep Cable in cabinet	250.00	each	16.00	$4,000.00	
11	Splice Fibers	20.00	each	1,428.57	$28,571.43	assumes 8 per nap multiplied by 2
12	Install splitter cabinet	2500.00	each	16.00	$40,000.00	assumes 288 cabinet - average # if cabinets is 16 Per area
13	install concrete base	600.00	ech	16.00	$9,600.00	
13	Terminate Fibers	20.00	each	4,608.00	$92,160.00	
14	Test Network	2500.00	all	1.00	$2,500.00	
15	Install Marker Post	35.00	each	267.86	$9,375.00	75% of handholes
16	Install Marker Post with Test Station	50.00	each	89.29	$4,464.29	25% of handholes
26					$0.00	
27					$0.00	
		Labor Subtotal			$4,338,027.86	
		10% Contingency			$433,802.79	
		Labor Total			**$4,771,830.64**	

Item	Material	Price	Unit	Quantity	Subtotal	Notes
1	Mule tape	0.05	feet	500,000.00	$25,000.00	
2	96 count fiber	1.05	feet	281,250.00	$295,312.50	includes 5% waste - average size cable
3	Splice Trays	45.00	each	178.57	$8,035.71	

4	Splice Cases	706.00	each	178.57	$126,071.43	
5	Handholes	650.00	each	357.14	$232,142.86	
6	#12 Tracer Wire	0.35	feet	250,000.00	$87,500.00	
7	Ground Rods	25.00	each	178.57	$4,464.29	
8	Marker Post	45.00	each	267.86	$12,053.57	
9	Marker Post with Test Station	65.00	each	89.29	$5,803.57	
10	2" Pipe	1.00	feet	500,000.00	$500,000.00	
17	288 count splitter cabinet w tails - fully loaded	8200.00	each	16.00	$131,200.00	
18	cabinet pad	200.00	Each	16.00	$3,200.00	
19	1x32 splitters	800.00	Each	144.00	$115,200.00	
20		Material Subtotal			$1,545,983.93	
		10% Contingency			$154,598.39	
		Material Total			**$1,700,582.32**	
		Total Estimate			**$6,472,412.96**	25.89

Appendix IX: Funding Sources and Guidance

Federal Funding Sources

Rural Utilities Service

The Rural Utilities Service ("RUS") of the U.S. Department of Agriculture Office of Rural Development provides infrastructure loans and grants to rural telecommunications, electricity, water and wastewater utilities.

RUS is the lead federal agency providing grants, federal cost of money loans and loan guarantees for broadband infrastructure in unserved rural areas of the U.S. and its territories.
The definition of "unserved" is of primary importance in determining eligibility for RUS broadband infrastructure funding, as well as eligibility for subsidy funding from the Federal Communications Commission for provisioning broadband service in high-cost areas.

Over time, RUS has increased its baseline Internet service speed and latency requirements for broadband class service to keep up with growing consumer demand for high-speed Internet connectivity to support high bandwidth applications such as high definition and 4K ultra video, as well as an increasing number of household devices concurrently connected to the Internet. RUS baseline speeds for broadband service differ by funding opportunity; therefore, certainty is essential with respect to existing broadband coverage in an area proposed to be served with RUS funding.

The Vermont Department of Public Service is far ahead of other states in identifying areas unserved with broadband. Vermont DPS data sets include location-specific broadband coverage data that is up to date for residential and commercial premises, as well as existing cable networks and electric substations with fiber. The degree of granularity of Vermont DPS maps clearly identifies unserved areas, as well as areas of highest need.

Vermont DPS data and maps are a boon for communities, communications union districts, telephone, cable and Internet Service Providers wishing to expand broadband services into unserved areas with $3 million up to $50 million or more of federal RUS funding for broadband and smart grid infrastructure deployment

Within RUS, the *Telecommunications Program* has historically administered funding for telephone and broadband communications infrastructure.

The RUS *Electric Program* has administered funding for electric system improvements and expansion. In more recent years, the Electric Program has provided loan funding for broadband communications infrastructure for Smart Grid communications. While the Electric Program

requires that the primary purpose of loans for Smart Grid network deployment is improvement of electric system operations, reliability or security, it does not prevent the use of fibers in the Smart Grid network for dark fiber or lightwave leasing, or for wholesale and/or retail broadband service provisioning by the electric utility, if permitted by state law.

Key differences between the Telecommunications and Electric Programs relate to authorized funding, types of funding opportunities, eligible uses of funds, award limits, and restrictions on overlap with serving areas of other Internet Service Providers and RUS borrowers.

- Authorized Funding in FY 2019 and Types of Funding Opportunities
  - Telecommunications Program: $734.2 million authorized tor broadband infrastructure loans in FY 2019, and $480 million for broadband infrastructure grants.
  - Electric Program: $5.5 billion authorized for loans and loan guarantees

- Eligible Uses FY 2019
  - Telecommunications Program: Broadband infrastructure for rural areas unserved with broadband at a minimum speed of 10/1 Mbps or 25/3 Mbps depending upon funding opportunity (see Section "Federal Funding Opportunities: RUS Telecommunications Program")
  - Electric Program: Primary use must be for expansion or improvement of the electric system including Smart Grid communications networks. Fibers in Smart Grid communications networks may also be used to offer dark fiber and lightwave leasing, wholesale and/or retail broadband services

- Award Limits:
  - Telecommunications Program: Grants from $100,000 to $25 million; Loans from $100,000 to $25 million.
  - Electric Program: No stated limit on Loan size (up to authorized funding to Program.

- Restrictions on Overlap with Other Serving Areas:
  - Telecommunications Program:
    - No overlap or very limited overlap allowed with serving areas of Internet Service Providers offering at least the minimum service speed required by RUS funding opportunity.
    - Strict restriction on overlap with serving areas of existing RUS borrowers offering broadband service. (Existing RUS borrowers may apply for

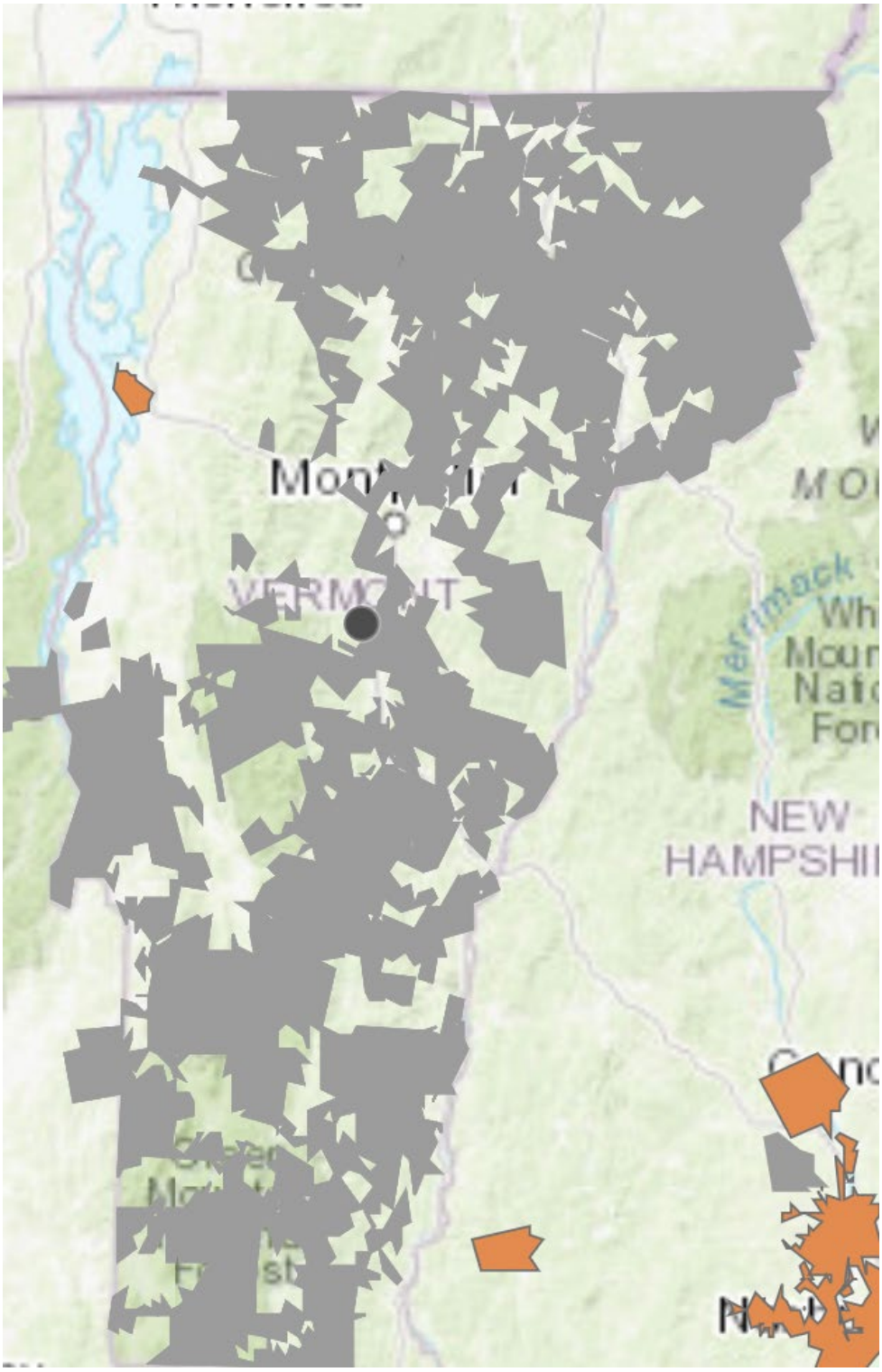
additional funding to increase service speed to a minimum of 25/3Mbps if RUS financial requirements can be met.)

- Electric Program:
  - No restriction on overlap with serving areas of broadband service providers not funded by RUS.
  - If electric utility plans to offer broadband service, RUS may elect to limit overlap with service areas of existing RUS borrowers offering broadband at the statutory speed (speed required by RUS at the time of grant or loan award) if competition would affect existing borrower's ability to repay RUS loan.

Serving Areas of Existing RUS Borrowers in Vermont

As shown in the RUS map below, Vermont Telephone Company ("VTel") is an existing RUS borrower whose serving area is purported to cover most of the State, as shown by the gray areas of the map of Vermont on the following page. An interactive online map can be found at the following link:
https://ruraldevelopment.maps.arcgis.com/apps/webappviewer/index.html?id=9715cdae301d4790b7aaf2382b2e9d76

Figure 24: RUS Map Vermont



Request to RUS Telecommunications Program to Consider Drive-test Results

The RUS Telecommunications Program is the grantor of the Broadband Initiatives Program ("BIP") loan and grant combination award to VTel and VTel Wireless; therefore, RUS considers most of Vermont to be ineligible for 2019 and 2020 RUS Telecommunications Program ReConnect grant and loan funding up to $50 million per award. (See next section for ReConnect Program rules.)

Electric Cooperatives seeking grant funding for deployment of Smart Grid communications networks may also find that RUS will restrict the use of fiber strands in the Smart Grid to provision broadband services in locations that overlap with the VTel and VTel wireless serving area funded by the BIP award.

Note that RUS eligibility rules allowed VTel and Vtel Wireless to apply for 2019 Reconnect loan and grant funding of $50 million in its serving area where 10/1 Mbps service is not available. In order to do so, the companies' financial ratios were required to meet RUS requirements. The companies did not apply for ReConnect funding, and no other service providers applied because the VTel and VTel Wireless BIP award serving area was ineligible for applications from other service providers.

VTel and VTel wireless are eligible to apply in the 2020 ReConnect funding opportunity that will open on January31 if its financial ratios meet the RUS test.

The enabling legislation for the ReConnect program contains a "non-duplication" provision. For purposes of this discussion this means that it must be demonstrated that an ISP (i.e., VTel Wireless) is not already providing service at the statutory speed before ReConnect funding can be authorized. DPS should share with RUS the results of the DPS 2019 drive-by speed test which showed that VTel Wireless service was not available in a percentage of all locations tested in the BIP funded service area, and request that RUS allow an RUS or other licensed engineer to verify service availability in the funded area, or accept the results of a nonbiased consumer survey to verify coverage availability and speed, or both. DPS should seek the opportunity to demonstrate that areas of the VTel Wireless BIP loan-funded service area have no service from VTel Wireless, so that an applicant could look for the clusters of unserved homes and apply for funding to serve those areas. It is obviously unfair to Vermonters to flag nearly 85% of the state as ineligible for ReConnect. The request should include that the RUS Administrator extend the deadline for ReConnect applications to allow for a consumer survey in Vermont and other areas that dispute broadband availability maps.

RUS Telecommunications Program Loans and Grants:

Loans

- Farm Bill Rural Broadband Access Loan Program:
  The Rural Broadband Access Loan Program was created by the U.S. Farm Bill, which must be reauthorized every five years. The Farm Bill was last reauthorized in December 2018.

  $29.9 million was available for this program in FY 2019, including carryover funding available from the previous fiscal year. The FY 2019 funding opportunity is now closed. FY 2020 funding in the same amount has not yet been approved pending passage of a federal budget. (RUS and other federal agencies are operating under a continuing budget resolution until December 21, 2019. If a budget or another continuing resolution is not passed by that time, federal agencies must operate under government shutdown rules.)

  In FY 2019, Rural Broadband Access Loans ranging from $100,000 to $25 million were made available for communities of 20,000 or less, where at least 15% of the proposed serving area was unserved. RUS restricted loan funding to areas with less than 3 incumbent service providers, and no part of the proposed serving area could overlap an area previously funded by RUS.

  RUS accepted applications on a rolling basis on a first-come, first served basis. Every 90 days RUS evaluated applications submitted and ranked them based on the percentage of unserved households that the applicant proposed to serve, prioritizing the highest ranked applications.
- Rural Electrification Act Telecommunications Loan Program
  The Telecommunications Loan Program is authorized by the Rural Electrification Act of 1936, as amended in 7 U.S.C. 901 et seq. In FY 2019 $690 million was available for communications infrastructure in rural areas and towns with a population of 5,000 or less, areas without telecommunications facilities, or areas where the applicant was the recognized telecommunications provider. If the applicant was an active borrower whose service area was considered rural at the time the initial Infrastructure loan for the system was made, then the application service area was considered to be rural even if the population exceeded 5,000 inhabitants. Funding priority was given to applications from carriers already providing telecommunications service in the serving area.

  In addition, a new pilot program known as ReConnect was authorized by the 2018 Consolidated Appropriations Bill, with $5.5 billion appropriated for FY 2019. The opportunity to seek funding under the FY 2019 appropriation is now closed; however, an additional $5 billion opportunity will open on January 31, 2020.

The 2018 Farm Bill reauthorization passed in December, 2018 also allows RUS to fund middle mile infrastructure for the first time, without regard to service provisioning to last mile end user premises; however, the rules for the new middle mile program are still in development by RUS and funding must be appropriated by Congress when the rules are finalized. While it is important to monitor availability of this new source of middle mile funding in the future, this section of the report contemplates only existing RUS programs for which funding has been appropriated – all of which require service provisioning to end user premises as an outcome.

RUS Telecommunications Program

For FY 2019. the Rural Broadband Access Loan and Loan Guarantee Program made federal cost of money loans available from $100,000 up to $25 million for broadband infrastructure in communities unserved with broadband Internet access. For this program in FY 2019, RUS defined broadband as having an Internet connection speed of 25 Mbps download and 3 Mbps upload over a wireline or fixed wireless system. A PFSA must not overlap with service areas of current RUS borrowers and grantees. Applications could be submitted on a rolling basis, but were evaluated and ranked every 90 days based on the percentage of unserved households in the proposed funded service area. Subject to available funding, eligible applications that proposed to serve a higher percentage of unserved households received funding offers before other eligible applications that proposed to serve a lower percentage of unserved households. In addition to the eligibility requirement that premises be unserved with 25/3 Mbps broadband Internet access, RUS restricted loan awards to areas not already served by an existing RUS Telecommunications Program borrower. The proposed funded service area could not overlap with service areas of current RUS borrowers and grantees, based on the premise that service providers must spread their fixed costs over sparsely populated and low-density communities that cannot sustain robust competition leading to decreased pricing.

US Department of Agriculture, Rural Utilities Service (RUS)/Rural Development

USDA – Rural Utilities Service – Community Connect Grant Program

The Community Connect program helps fund broadband deployment in rural communities where it is not yet economically viable for private-sector providers to deliver service. Eligible Applicants include nonprofit or for-profit organizations.

Eligible Areas:

- Funds must be used in rural areas that are not located within an urbanized area or a place that has a population of greater than 20,000 inhabitants.
- All the households in the applicant's proposed funded service area must have no access to existing broadband service at the Minimum Broadband Service speed of 10 Mbps / 1 Mbps (currently).
- Grantees must provide matching funds in cash that are equal to at least 15% of the requested grant amount.

Funding Availability:

- $50 million per fiscal year through 2023.
- Annual Application Window: Currently closed. Opportunities will be announced in the Federal Register
- Minimum Loan Amount: $100,000
- Maximum Loan Amount: $3 million
- Matching funds of at least 15% from non-federal sources are required and can be used for operating costs.

Application Scoring: Highly competitive, based primarily on need and outcomes, characteristics of the Proposed Funded Service Area, Local community involvement in project planning and implementation, Level of experience of the management team.

USDA - Rural Utilities Service - Rural eConnectivity Pilot Program (ReConnect)

ReConnect offers three types of funding options for broadband infrastructure to connect rural families, businesses, farms, ranches, schools, libraries, and public safety facilities to modern, high-speed internet. A rural area is eligible if it currently does not have sufficient access to broadband (currently at 10/1 Mbps but expected to be increased to 25/3 in next funding opportunity). The ReConnect grants, grant and loan combinations, and low-interest loans can be used to construct, improve, and acquire facilities that provide internet services to customers'

premises, with reliable technologies that are suitable for the type of rural community and the type of high-speed internet use.

- Eligible applicants may be organized as nonprofit or for-profit organizations.
- Funding window not currently open, but $550 million opportunity will be announced later this year or early next year.
- Grant awards capped at $25 million. Matching contribution required for 25% of project cost. 100% of serving area must be unserved with broadband at the statutory speed.
- Grant/loan awards capped at $25 million in grant funds, $25 million in direct federal cost of money loans. No match required. 90% of serving area must be unserved with broadband at the statutory speed.
- Loan awards capped at $50 million. No match required. Direct federal cost of money loans. 90% of serving area must be unserved with broadband at the statutory speed.
- Competitive awards based on scoring points. Rural unserved areas with greater numbers of farms, community support organizations and businesses will be ranked higher.

USDA - Rural Utilities Service Distance Learning Telemedicine (DLT) Grant Program

Targets rural communities of 20,000 or less to overcome the effects of remoteness and low population density. The Funding Window is currently closed for this year, but future opportunities will be announced in Federal Register. The grant awards are highly competitive, and FY 2019 Funding was $49 million. Eligible Uses for grant funds include:

- Broadband facilities that support distance learning or telemedicine
- Equipment, computer hardware network components, technical assistance.

Awards can range from $50,000 to $500,000. A minimum 15% match is required and cannot be from another federal source.

USDA – Rural Utilities Service - Future Funding Opportunity: Middle Mile Networks

The 2018 Farm Bill Reauthorization allows USDA RUS to provide grant/loan funding for middle mile infrastructure, only, for the first time. All other RUS programs require service provisioning to end user premises as part of the purpose of the award. The rules are currently under development by the RUS Telecommunications Program, and when completed, funding must still be appropriated. It could take 12-16 months before a funding opportunity is announced but should be a great benefit for rural areas where the middle mile is controlled by the incumbent carrier in a region.

USDA Rural Utilities Service - Electric Program Direct Federal Cost of Money Loans

Electric Program loans are noncompetitive and may be used to build Smart Grid systems for electric utilities that can also serve as broadband facilities but may not be solely used for broadband facilities. This program is a good fit for Vermont electric utilities **but may require a**

waiver for VTel serving area. The RUS Electric Program has a $5.0 billion annual loan budget for financing electrical infrastructure in rural areas, including Smart Grid networks. The Electric Program makes loans to borrowers for fully integrated "Smart Grid" purposes, including fiber-optic network infrastructure from electrical generation facilities directly to the meters of electric service customers. Smart Grid capabilities can improve reliability, promote energy efficiency, enhance grid security, advance safety, provide security, reduce pollution and restrain consumer electricity costs. It is the policy of RUS to promote smart grid deployment among all electric utilities serving rural consumers. It is also the policy of RUS to promote the deployment of broadband services in rural areas. The RUS Electric Program and the RUS Telecommunications Program will work together to find innovative ways to facilitate joint efforts between Electric Program and Telecommunications Program borrowers to provide Smart Grid and broadband capabilities in shared service areas.

In areas where the electric utility may also provide broadband service to electric customers, the RUS Electric Program and Telecommunications Program will work together to provide financing for eligible components for both purposes in one concurrent loan. In areas where the electric utility may not provide retail broadband service to electric customers, a public partnership with a nonprofit provider (e.g. cooperative) or a private sector provider should be considered.

Uses of Funds:

- All facilities receiving federal financing must be used for a public purpose.
- Funds may be used to finance:
  - Maintenance
  - Upgrades
  - Expansion
  - Replacement of distribution, sub-transmission and headquarters (service, warehouse) facilities
  - Energy efficiency
  - Renewable energy systems
  - Fiber-optic Smart Grid Fiber-to-the-Meter (FTTM) Communications Networks
  - Electric Program borrowers seek to enhance the use of fiber-optic networks for Smart Grid deployments to offer their customers additional services such as high-speed consumer broadband service.

Smart grid and broadband services are separate and distinct loan purposes, even though the network components both use fiber-optic facilities.

RUS will ensure that statutory boundaries between programs are respected, and unnecessary duplication of federal funding avoided, in cases where a converged fiber infrastructure can be used for multiple purposes.

While the Electric Program can fully fund Smart Grid infrastructure, it cannot solely finance the delivery of consumer broadband services. If an electric borrower (or applicant) were to seek Electric Program funding solely for the purpose of providing broadband services (with no Smart Grid elements); the application would be rejected by the Electric Program because the application seeks to use Electric Program funds to finance an ineligible purpose. In that case, the borrower would be referred to the Telecommunications Program for further consultation. Similarly, in cases where Electric Program borrowers seek to provide consumer broadband services in addition to Smart Grid capabilities, the borrower cannot use Electric Program funding for the enhancements to the Smart Grid infrastructure necessary only to deliver consumer broadband services. The borrower can self-fund, or use non-Electric Program financing, including RUS Telecommunications Program financing, for the enhancements necessary to provide consumer broadband services but not necessary for Smart Grid capabilities.

- Broadband network elements ineligible for Smart Grid funding include customer premise inside wiring, and gateways, routers and set-top boxes located inside the customer premise. **Elements of network infrastructure from generation facilities to electric customer meters are eligible expenditures.**
- Constraints on Electric Program Smart Grid funding may be necessary for fiber to the meter (premises) Smart Grid projects that propose broadband services in areas where there are existing RUS Telecommunications borrowers providing the services.

Electric Program and Telecommunications Program borrowers are strongly encouraged to collaborate and cooperate in efforts to deliver Smart Grid and high-speed broadband services to rural consumers within the territories served by both borrowers. Electric utilities not prohibited from providing consumer broadband service by state law or corporate charter may provide broadband services to electric customers over Smart Grid network infrastructure funded by the Electric Program. In states with laws restricting electric utilities from providing retail broadband services, a nonprofit (e.g. cooperative) or private-sector broadband provider partnership should be considered.

Entities eligible for this type of RUS funding include most retail distribution or power supply providers serving qualified rural areas:

- States, Territories, Local Governments and Government Agencies
- People's Utility Districts, Communications Union Districts, Public Service Districts
- Federally Recognized Indian Tribes
- Nonprofits, including cooperatives and limited dividend or mutual associations
- For-profit businesses (must be a corporation or limited liability company)
- Partnerships with other federal, state, local, private and non-profit entities are encouraged

To be eligible for this RUS funding borrowers must provide or propose to provide:

- The retail electric service needs of rural areas, or
- The power supply needs of distribution borrowers under the terms of power supply arrangements satisfactory to RUS.

Also, the area must be "rural" under RUS program guidelines and statutory requirements, which mandate consideration of several factors to determine whether an area qualifies as rural for the purposes of this program. A "Rural Determination" must be performed by RUS for a potential New Borrower or a Returning Borrower, as a first step.

- Identifies all areas within a service territory of a borrower or applicant that are rural in comparison to areas that are not rural (i.e., urban).
- Electric facilities to be financed must provide service to Rural Electrification Act Beneficiaries (person, business, or other entity located in a rural area).
- Rural Determination is not an issue for Existing Borrowers (exclusive of certain Acquisitions, Mergers and Consolidations).

There is no stated maximum loan amount, with $68+ million in loan disbursements reported in 2017.

Loan terms include:

- Repayment may not exceed the useful life of the facility being financed, with a maximum repayment schedule of 35 years. Power supply borrowers are also limited by the terms of their wholesale power contracts.
- Loan Guarantees and Treasury Rate Loans: interest rates are fixed at the time of each advance based on rates established daily by the United States Treasury plus 1/8 of 1%.
- **The 30-year fixed interest rate is based on the 30-year Treasury Constant Maturity Rate: 2.21% on Nov. 1, 2019. RUS will allow a 35-year maturity for low-population areas.**

- Borrowers must have legal authority to provide, construct, operate and maintain the proposed facilities or services.
- Loan Security: Unsubordinated Security Interest in assets of utility as a going concern. For public utilities owned by local governments, states, territories and public power districts, RUS will accept a pledge of revenues.

The Loan application process is paperwork intensive. Loan application preparation, review and approval by RUS can take from 12 months to 18 months for a new borrower.

Key Loan Application Documentation:

- Load Forecast
- Construction Work Plan (CWP)
- Environmental Assessment and Maps
- Report of Impacts on Historic Preservation
  - State Historic Preservation Office Notification and Clearance
  - Notifications to Tribes
- Long Range Financial Forecast (LRFF) (10-year Period)
- Useful Life Certification
- At least 90% of loan funds for facilities with useful life of 33 years or more
  - Schedule of Facilities and/or Useful Life Worksheet
- Reimbursement Schedule for Distribution Facilities
- Attorney Opinion Letter
- Board Resolution requesting Rural Electric Infrastructure Loan or Loan Guarantee

A complete list of required documentation can be found at 7 CFR §1710.501. Additional Information: https://www.rd.usda.gov/programs-services/all-programs/electric-programs

RUS Water & Waste Disposal Loan & Grant Program

The purpose of this program is to provide funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas. The program helps very small, financially distressed rural communities extend and improve water and waste treatment facilities that serve local households and businesses. Good practices can save tax dollars, improve the natural environment, and help manufacturers and businesses to locate or expand operations.

RUS Water and Wastewater disposal loans and grants may be leveraged to co-locate broadband conduits and/or fiber-optic cable during trenching. Approximately 80% of the cost of underground network deployment is in the trench. RUS Broadband programs may provide grants for materials and labor to co-locate the conduits/fiber during construction.

Eligible Applicants include:

- Most state and local governmental entities
- Private nonprofits
- Federally recognized tribes

Eligible Areas include rural areas and towns with populations of 10,000 or less and Tribal lands in rural areas.

Program funding types are:

- Long-term, low-interest loans
- If funds are available, a grant may be combined with a loan if necessary, to keep user costs reasonable.

Funds may be used to finance the acquisition, construction or improvement of:

- Drinking water sourcing, treatment, storage and distribution
- Sewer collection, transmission, treatment and disposal
- Solid waste collection, disposal and closure
- Storm water collection, transmission and disposal
- In some cases, funding may also be available for related activities such as:
  - Legal and engineering fees
  - Land acquisition, water and land rights, permits and equipment
  - Start-up operations and maintenance
  - Interest incurred during construction
  - Purchase of facilities to improve service or prevent loss of service
  - Other costs determined to be necessary for completion of the project

See 7 CFR Part 1780.7 and 1780.9 for a complete list of related activities.

Funding, Loan Term and Rate:

- Funding announced each year.
- 40-year payback period, based on the useful life of the facilities financed
- Fixed interest rates, based on the need for the project and the median household income of the area to be served

Note that other programs of USDA's Office of Rural Development, listed below, may cover associated costs of broadband infrastructure deployment for technical assistance, planning,

design engineering, equipment, facilities, inside wiring, and extension of broadband utilities to a site or sites:

Program		Millions
Community Facilities Direct Loan & Grant Program	$	2,830.0
Regional Commissions, including Northern Border Regional Commission	$	8.0
Distance Learning & Telemedicine Grants, including for Opioid Epidemic	$	47.0
Economic Impact Initiative Grants	$	5.8
Farm Labor Housing Direct Loans & Grants	$	37.5
Intermediary Relending Program	$	18.9
Rural Business Development Grants	$	35.0
Rural Economic Development Loan & Grant Program	$	56.9
Total Funding Authorized to Programs	**$**	**3,039.1**

Other Federal Sources

Department of Transportation - BUILD (F/k/a TIGER)

Funding provided under National Infrastructure Investments have supported capital projects for broadband infrastructure by allowing fiber-optic cable to be installed as part of funded road projects. $900 million appropriated for FY 2019, but funding window closed July 2019. May be a viable source for FY 2020.

Department of Treasury - Community Reinvestment Act (CRA)

CRA requires federal banking regulators to encourage financial institutions to help meet the credit needs of the communities in which they do business, including low- and moderate-income (LMI) neighborhoods. Local financial institutions may provide funding under CRA for deployment of community broadband facilities in these areas.

Department of Treasury - New Markets Tax Credit Program

The New Markets Tax Credit Program (NMTC Program) helps economically distressed communities attract private capital by providing investors with a Federal tax credit.

EDA - Public Works (PW) and Economic Adjustment Assistance (EAA)

EDA's PW and EAA programs provide economically distressed communities and regions with comprehensive and flexible resources to address a wide variety of economic development needs. EDA program investments help facilitate the transition of communities from being distressed to becoming competitive by developing key public infrastructure, such as technology-based facilities that utilize distance learning networks, smart rooms, and smart buildings; multi-tenant manufacturing and other facilities; business and industrial parks with fiber-optic cable; and telecommunications and development facilities.

- Maximum Award: $3 million
- Minimum Award: $100,000

There are no submission deadlines, and applications are accepted on an ongoing basis until the publication of a new Notice of Funding Opportunity.

NOTE: In 2019 preference points awarded to communities affected by loss of coal mining.

EDA Criteria for Selection:

- The project's demonstrated alignment with at least one of EDA's current investment priorities (as published on EDA's website at www.eda.gov).
- The project's potential to increase the capacity of the community or region to promote job creation and private investment in the regional economy.
- The likelihood that the project will achieve its projected outcomes.
- Ability of the applicant to successfully implement the proposed project, including the applicant's financial and management capacity and the applicant's capacity to secure the support of key public and private sector stakeholders.

Federal Communications Commission

The following programs provide for subsidies payable to for schools, libraries, and health care institutions for eligible broadband services, and to service providers willing to provide broadband service to eligible high cost rural and remote areas identified by the FCC. Subsidies pay for a portion of the service providers' customer charges or deployment costs for these areas.

FCC - E-Rate Program

The schools and libraries universal service support program, commonly known as the E-Rate program, helps schools and libraries to obtain affordable broadband.

FCC - High Cost Program

The federal universal service high-cost program (also known as the Connect America Fund) is designed to ensure that consumers in rural, insular, and high-cost areas have access to modern communications networks capable of providing voice and broadband service, both fixed and mobile, at rates that are reasonably comparable to those in urban areas.

FCC - Rural Health Care Program

The Rural Health Care (RHC) Program provides funding to eligible public or non-profit health care providers for broadband and telecommunications services necessary for the provision of health care.

FCC – Rural Digital Opportunity Fund

Reverse auction (lowest cost responsive bidder wins) will award up to $20 billion to support 25/3 Mbps service in rural unserved areas. Final rules have not yet been announced by FCC.

Department of Housing and Urban Development

HUD - Community Planning and Development - Community Development Block Grant (CDBG)

The Community Development Block Grant (CDBG) Program provides annual grants on a formula basis to states and local governments, to be used for economic and community development, principally for low- and moderate-income persons.

Northern Border Regional Commission (NBRC)

The NBRC is "a new Federal-State partnership for economic and community development within the most distressed counties of Maine, New Hampshire, Vermont, and New York."[108]

NBRC - Economic & Infrastructure Development Program

NBRC's 2019 EID Investment Program offers up to a $500,000 maximum award to eligible infrastructure projects, including broadband communications networks. Eligible applicants are nonprofits, governmental institutions and authorities, and Indian Tribes. Eligible Activities include: Engineering, Construction and bid/performance/payment bonds for construction.

[108] http://www.nbrc.gov/