Vermont Telecommunications Plan 2011: Broadband

Department of
Public Service

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EXECUTIVE SUMMARY

The Department views the successful roadmap to Vermont's enhanced telecommunications future as being comprised of two fundamental elements: first, the desired **outcomes**, and second, **strategies** necessary to achieve these outcomes. The Vermont Telecommunications Plan 2011: Broadband addresses these elements as follows:

OUTCOMES

Vermont can and should pursue a path to achieve the following outcomes by year end 2013:

1. Universal availability of mass-market broadband
2. Universal availability of mobile service along roadways and near universal availability statewide
3. Universal first responder communications
4. Fiber broadband connectivity to all anchor institutions and large businesses
5. Universal adoption and use of broadband at home and work
6. Speeds and pricing for residential broadband on par with national urban areas
7. All customer locations support smart electric meters

While these outcomes are achievable, there are overarching economic challenges to the business case for sustainable broadband infrastructure in Vermont, and strategies are necessary to overcome these challenges. On the demand side, sparse population and slow adoption in newly served areas provide lower incentive for private investment. On the supply side, Vermont's topography and the high costs of backhaul and tower construction are impediments to service deployment. The table below shows the strategies Vermont is employing to address these challenges, and the major funding sources to support these strategies.

STRATEGIES

The following strategies describe how a statewide expansion of the fiber core deep into communities, combined with a statewide wireless 4G umbrella will be harnessed to simultaneously meet and grow demand for broadband:

1. Leverage electric utility telecommunications infrastructure planned to lower cost of backhaul and increase geographic availability of broadband
2. Aggregate institutional demand and organize connections to institutions, broadband providers and cell sites
3. Subsidize construction of key telecom infrastructure if it is not economically available from existing providers

4. Continue expeditious permitting policies to improve affordability and availability of broadband deployment
5. Accelerate adoption through digital literacy programs and expansion of electronic delivery of services

These strategies will address important obstacles to the achievement of our objectives. Expanded and improved fiber networks deep into communities will deliver affordable high capacity backhaul that encourages statewide broadband deployment and use by institutional, mobile and home users. The plan maximizes resource-sharing between electric utility, public safety and broadband infrastructure which focus revenue streams and capital on a single set of physical resources. High bandwidth institutional use, in combination with statewide training and adoption incentives, builds broadband use throughout all sectors of Vermont and strengthens the long-term business case for providers throughout Vermont.

CONNECTVT

In January 2011, Governor Peter Shumlin launched a specific initiative to achieve statewide connectivity called ConnectVT. Telecommunications infrastructure and services will support the State's economic viability with enhanced technological competitiveness, and greater efficiency and effectiveness in the delivery of services including education, healthcare and energy. When Connect VT is successful, we will have invested wisely and carefully to achieve universal availability of broadband connectivity and mobile service throughout the state by year end 2013.

We will also work to Make Vermont the leading state in the nation for deployment and utilization of a wireless canopy and fiber infrastructure. Vermont telecommunications and technological infrastructure will support our goal to be:

- the vanguard of innovative, cost effective administration and delivery of health care
- the model of forward-looking, life-long education for every Vermonter
- the most energy-efficient state in the nation
- the state where business and agricultural sectors locate, expand, and thrive in a global marketplace for goods and services

It is not only the speed of connectivity; it is the quality of our telecommunications services that will be a differentiating factor for Vermont on a global landscape

DEFINITIONS

ConnectVT has adopted the following definitions:

Unserved target community: a census block where at least 10% of the premises do not have broadband at speeds of 768/200 kbps or greater available

Underserved target community: a census block where at least 50% of the premises do not have broadband at speeds of 5 mbps or greater available.

Community anchor institution: a school, library, government building, transportation center or health center that does not have broadband at 100mbps or greater available.

Cellular target corridor: a major or secondary roadway where cellular service is not available or is interrupted.

OUTCOMES

An increasingly mobile and communicative society and economy requires deployment of wired and wireless communications tools to meet its needs. Since the prior Vermont Telecommunications Plan, the State has seen tremendous development in communications infrastructure and services, but the need for this development is ongoing. Through continuing private and public investments Vermont can build broadband infrastructure that meets changing communications demands. This plan describes strategies and funding sources to bring the benefits of advances in telecommunications technology and services to serve the needs of electric utilities, public safety, state government, businesses and the general public. This plan emphasizes widely available infrastructure and initiatives that catalyze the widespread use of that infrastructure by all parts of society. Vermont can and should pursue a path to achieve the seven outcomes described in this plan by year end 2013.

When these outcomes are achieved, Vermont will have integrated broadband infrastructure and usage deeply into everyday use. Institutional users, large businesses, and "last mile" providers of broadband to local homes and businesses will have available and routinely subscribe to "big pipe" services that provide ample bandwidth for present and foreseeable future applications. Schools will have access to affordable gigabit connectivity and rural healthcare providers will be able to increase the diversity of services provided through ubiquitous mobile coverage and expanded broadband availability and adoption. Travel and tourism benefit from expanded mobile coverage for their customers and Vermonters will have more choices for communications providers at home. State government will transform the delivery of services to capitalize on the availability and statewide adoption of broadband in the home. Urgency created through the expansion of applications and statewide demand stimulation programs will foster widespread use of broadband. Mitigation of costs to deploy service will promote the business model for mobile companies to expand their networks. Last but not least, service providers have the opportunity to participate and to prosper by expanding the availability and capability of their services.

UNIVERSAL AVAILABILITY OF MASS-MARKET BROADBAND

To date broadband service is widely available throughout Vermont, but in order to achieve all outcomes described in this document, broadband service must be available and affordable to all Vermont businesses and households. An April 2010 survey report indicates that 18% of Vermont businesses report that they do not have broadband and half of those businesses report that they don't have it because it is not available at their location. Among residential internet users who do not have broadband access at home, 53 percent report that they don't have broadband because it isn't available to them where they live[1]. Mass market service means broadband service offerings that are priced for and available to homes and even the smallest business. Universal broadband availability is a foundation for other outcomes we seek to achieve, notably the widespread use of broadband

1 Vermont Department of Public Service 2010 Telecommunications Survey Report

UNIVERSAL AVAILABILITY OF MOBILE SERVICE ALONG ROADWAYS AND NEAR UNIVERSAL AVAILABILITY STATE-WIDE

In addition to high speed, access to mobile services is another hallmark of a modern telecommunications network. Mobile networks allow users to carry their communication with them from their homes and offices when they travel around the state. As many voice users continue to abandon landlines, we anticipate that broadband users will migrate between their mobile and land-based broadband services. In some locations mobile broadband is and will be the primary service for some individuals. All new mobile deployments are very likely to be at least third generation (3G), but the state should strongly advocate for 4G networks. Because the mobile industry is lightly regulated, the types of technologies deployed remain largely up to the vendors. Insofar as the State supports tower construction and affordable fiber connectivity, it will be empowered to identify new locations for service and to work with vendors to achieve agreeable terms.

In order for users to experience mobile service as universally-available, there must be continuous coverage along those routes that connect Vermont communities to each other and to neighboring states and provinces. By the end of 2013, mobile service must be available along all key transportation links which include interstate highways, non-seasonal US and state highways. Described on a relative basis coverage will include roadway segments that are regionally representative of moderate traffic flow rates. For example, roadway segments in the Northeast Kingdom typically experience fewer trips per day than roadways in Chittenden County. Thus, mobile coverage will be available on those segments that are moderately travelled relative to the region.

In addition, service from these mobile networks must reach over 90% of homes and business statewide. Development of the tower and fiber optic infrastructure that carries mobile traffic back to mobile switching centers will often provide opportunities to develop the infrastructure that supports the State's other goals at the same time. Broadband availability, first responder communications, and smart grid technologies derive benefits from the availability of mobile service and its infrastructure.

UNIVERSAL FIRST RESPONDER COMMUNICATIONS

In the future, first responders with multiple local and state safety agencies at an emergency will communicate on a unified communications platform. While local agencies presently continue to use existing separate networks, access to a statewide communications network will improve responders' ability to coordinate.. This goal will be met through a two-phased approach.

The Vermont Communications Board (VCOMM) will use existing communications sites developed and used by municipal Public Safety entities, electrical utility companies, and the State of Vermont for the host new equipment to enable the network. Additionally, Public Safety will develop four new towers that will augment existing infrastructure. The network will be capable of meeting the two-way voice interoperability needs of all first responders. It will also be capable of offering co-location opportunities for ISPs and mobile service providers. Availability of this additional infrastructure reduces the capital costs

for these providers and improves the business case for expanding broadband and mobile service in Vermont. Revenue streams derived from leasing space on the four new structures can help support the maintenance of the structures.

The federal government has reserved a set of frequencies in the valuable 700 MHz block for the next generation of public safety wireless systems. It is the migration path for the future and it will require the Department of Public Safety to develop additional infrastructure to support this technology. When deployed, a 700 MHz network will offer enhanced features and reinforce interoperability solutions. This is a national initiative that is practitioner driven. Over the next few years Public Safety will continue to invest in legacy technology while ensuring that these investments can be leveraged into newer systems. New tower structures will be based on design criteria that fits the 700 MHz spectrum; as new infrastructure is built, it will be sized it for future needs.

The Public Safety community nationally is currently working on the criteria for a public safety grade 700 MHz wireless network. Once this information is available then system engineering can be conducted that will allow Vermont to specifically determine the structural needs of the network.

FIBER BROADBAND CONNECTIVITY TO ALL ANCHOR INSTITUTIONS AND LARGE BUSINESSES

Capacity on expanded fiber optic networks has the ability to connect institutional entities and other types of users in many areas of the state, especially in combination with existing fiber network infrastructure and/or new construction.

In the past, overarching economic challenges to the business case for sustainable broadband infrastructure in Vermont left many Vermont organizations with little or no choice of providers for enterprise level broadband and pricing was prohibitive. In fact, pricing models historically encouraged network managers to 'slim down' applications and network use in order to afford minimal bandwidth from providers that operated within a model of scarcity. However, in the near future, where large-capacity fiber connections are available and priced so as not to discourage additional use of that abundant capacity, there will be a qualitative difference in the kinds of applications developed. When users operate under an assumption of ubiquitous and unconstrained availability, this situation will lead to the implementation of new tools for home and work. Users will pay primarily for the availability of a high-capacity connection, but will have low incremental pricing barriers to extensive use of these connections once they are available. By the end of the decade, we envision an environment where similar types of services and pricing conditions are essentially universally available throughout the state. This will encourage all members of various classes of users (such as education, or libraries, or health care institutions) to subscribe to a similar high level of service, promoting the development of networks that connect different classes of users.

The availability of these types of fiber optic connection and "abundant" bandwidth over them will also support achievement of other outcomes in this plan. Mobile service along Vermont roads which requires transport service between radio locations that are remote and often served by only one or two T-1's will also benefit from affordable high capacity fiber connectivity that enables higher

data delivery speeds and seamless service. Similarly, local networks that supply broadband services to homes and small businesses rely on these high-capacity fiber networks to transport traffic from the local community to the wider world. Greater availability and lower cost will allow these providers to re-evaluate their price points and/or network augmentation plans. On the demand side, sustainable broadband adoption programs and most importantly, aggregation among classes of anchor institutions that include business locations with more than 50 employees, cell carriers, education, healthcare, government and libraries will support and be supported by the achievement of this outcome.

WIDESPREAD ADOPTION AND USE OF BROADBAND AT HOME AND WORK

Each time a new user is added to a communication network, all the existing users benefit by having one more possible connection. Networks are especially valuable when they are near ubiquitous because they can be counted on to reach everyone. Ubiquitous broadband is especially important for the State of Vermont. Once high speed internet access is as widespread as access to telephones, the State can begin to replace outmoded paper-based and even phone-based systems for communication with taxpayers, applicants, and clients. Near complete broadband adoption is necessary for the State to achieve its ambitious goals for e-health, e-education, the smart electric network, and e-government.

Whether via personal computer, netbook, or smart phone, all residents should have access to broadband by year-end 2013. Although not all will necessarily connect at targeted speeds, Vermont households will incorporate some level of broadband. All major Vermont institutions, including public schools, state government and health care provider networks will have integrated the use of broadband into the everyday delivery of services to the public that they serve by year-end 2013. Additionally, state and local program planning and budgeting offices incorporate assumptions around universal availability and widespread adoption of broadband when it can help them improve effectiveness and efficiency of programs and reduce the costs of service delivery. The development of relevant content from institutional, community and household users further creates urgency among consumers to adopt broadband as a tool essential to their lifestyle.

Increases in home, business, and institutional broadband use and widespread adoption improve the business case for availability of affordable service by lowering the per user cost of service.

SPEEDS AND PRICING FOR RESIDENTIAL BROADBAND ON PAR WITH NATIONAL URBAN AREAS

Since the advent of the Internet, policy makers have struggled with how to define it. One key attribute in describing the Internet is the speed at which service providers offer access. In this document, the Department seeks to address two important broadband Internet access speeds. First, in order to assess our success at ensuring that all Vermonter's have access to broadband, we should define what the term means now. Second, we should set goals as to what service ought to be available to most customers in the future.

Minimum Technical Objectives

The table below lists the Department's broadband benchmarks; these are explained more fully in the paragraphs that follow:

Broadband Benchmarks

• Description	Download	Upload	Who	When
- Immediate Goals				
Basic Broadband	> 0.768 Mbps	> 0.2 Mbps	All	2013
Quality Goal	> 10 Mbps	> 3 Mbps	Most	2013
- Long-term Goals				
Minimal Technical Objectives	> 4 Mbps	> 1 Mbps	All	2020
Quality Goal	> 100 Mbps	> 50 Mbps	Most	2020

The FCC was compelled by congress to encourage the deployment of "advanced telecommunications capabilities" (later also referred to as broadband) which it defined as "*high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology.*"[2] This definition has since been the foundation for formulating the technical capabilities that enable these uses.

For instance, in 1999, the FCC defined broadband "as having the capability of supporting, in both the provider-to-consumer (downstream) and the consumer-to-provider (upstream) directions, a speed (in technical terms, "bandwidth") in excess of 200 kilobits per second (kbps) in the last mile."[3] In 2008 the FCC provided further refinement to this definition and used the term "basic broadband tier 1" to refer the subset of services equal to or greater than 768 kbps but less than 1.5 mbps in the faster direction[4]. This definition is also found in the NTIA State Broadband Data and Development reporting requirements[5]. Importantly, this is also the definition of broadband found in the ARRA funded BTOP grants and loans,[6] and thus describes services these recipients are expected to provide.

Statistics that relate the percentage of Vermonters that have access to Broadband should be meaningful in the current context. On a practical level, most customers think of the Internet access services provided by Cable, DSL, and fixed wireless operators as being "broadband." While most customers may enjoy services that offer faster speeds, some Vermonters rely on DSL services that offer download speeds of less than 1 Mbps. It would be inconsistent to define as "unserved" areas that the federal government has targeted for broadband funding investments[7]. Additionally, while satellite Internet access services

2 Section 706 of 1996 Telecommunications Act
3 FCC 2/2/1999 order CC-09-146: http://www.fcc.gov/Bureaus/Common_Carrier/Orders/1999/fcc99005.wp
4 FCC 6/12/08 order WC-07-38: http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-08-89A1.pdf
5 NTIA SBDP NOFA http://www.ntia.doc.gov/frnotices/2009/FR_BroadbandMappingNOFA_090708.pdf
6 NTIA BTOP NOFA: http://www.ntia.doc.gov/frnotices/2010/FR_BTOPNOFA_100115.pdf
7 ARRA grant recipients are directed to provide broadband, defined as services meeting the 768/200 threshold.

offering similar data rates are near universally available, non-terrestrial services do not qualify under federal standards..

Therefore, for the purposes of generalized statistics, and to identify "unserved" areas of the state, the Department considers Basic Broadband to be non-satellite data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kbps downstream and at least 200 kbps upstream to end users, consistent with the sources noted above. The Department's primary goal is to ensure that all Vermont residents have access to this service by the end of 2013. The Department also recognizes the range of service offerings available in the marketplace, and therefore sets an additional goal of ensuring that most[8] residents have access to services with advertised speeds of 10 mbps downstream and 3 mbps upstream by the end of 2013.

The formulation of goals must balance the imperative of robust targets with the practicality of the possible. The FCC national broadband plan recognized the tension between these needs by setting ambitious long-term goals for most of the population while at the same time directing public subsidy at ensuring that all residents have access to services that are currently available to most people. Clearly our economy would benefit if all Vermonters had fiber connections supporting 1 Gbps, but economics suggest that this is not likely within this decade. While speeds offered by current generation DSL may eventually prove inadequate for some purposes, for instance the needs of high-intensity or business users, DSL is likely to remain an important part of the broadband landscape. In fact, we project that a healthy percentage of Vermonters will continue to rely on DSL for some time to come, despite its speed limitations.

In developing long-term goals, the Department is mindful of Vermont statute that directs it to "identify minimum technical service characteristics which ought to be available as part of broadband services commonly sold to residential and small business users throughout the state.", and directs the VTA to give priority to projects that meet these characteristics.[9] Areas that lack the availability of services meeting these long-term goals will be defined as "underserved" areas of the state.

Every household and business location in Vermont ought to have access to affordable broadband service with actual speeds of at least 4 Mbps download

Moore's Law and the FCC's Definitions

Moore's Law , first described in 1965, states that computer processor power grows at about 60% annually and a 1984 study by Nielsen suggests that a high-end user's connection speed grows by 50% per year, which history has proven accurate. Both predict the acceleration of Internetworking Communications Technology processing and network broadband consumption over the past 30 years.

In 1996 the FCC defined broadband speed as 200 mbps and above. In 2008 the FCC reclassified broadband as network bandwidth that supports a minimum of 768 Kbps. Services operating at speeds between 200 and 768 Kbps formerly considered "broadband" are now known as first generation data networks. The FCC has established tiers of service to facilitate the accurate collection of data from service providers. Those tiers are described below:

The commission required that filers determine the percentage of their broadband connections that are faster than 200 kbps in both directions and to categorize those connections into five "speed tiers" based on the information transfer rate in the connection's faster direction:

(1) greater than 200 kbps but less than 2.5 megabits per second (mbps);
(2) greater than or equal to 2.5 mbps but less than 10 mbps;
(3) greater than or equal to 10 mbps but less than 25 mbps;
(4) greater than or equal to 25 mbps but less than 100 mbps;
(5) greater than or equal to 100 mbps.

As a result of this more refined data collection, the Commission is now able to examine the deployment of broadband capable of providing service in excess of 200 kbps on the basis of speed tiers in this and subsequent reports.

8 For the purposes of this report, the Department believes that 70% of the residents of the state should have access to services meeting this definition in order to meet the goal of ensuring that "most" residents have such access.

9 30 V.S.A. §8077

and 1 Mbps upload by 2020[10]. Specifically, following the FCC order, "this benchmark seeks transmission service that actually enables an end user to download content from the Internet at 4 Mbps and to upload such content at 1 Mbps over the broadband provider's network."[11] Because the speed tiers on the NTIA and FCC reporting forms do not coincide with these data rates, maps reflecting the extent of services meeting this benchmark will be based on the closest tiers, which reflect 3 Mbps download and 768 kbps upload speeds[12]. As described in the FCC's National Broadband Plan, "This represents a speed comparable to what the typical broadband subscriber receives today, and what many consumers are likely to use in the future, given past growth rates."[13] The State should seek to support availability of these services at rates that are closely comparable with those paid by consumers in major metropolitan areas, not at premium prices.

Looking forward, the State should expect the need for capacity to at least double every two years. Therefore, the State should aspire to achieve the goal of ensuring that most Vermonters have services with actual download speeds of at least 100 Mbps download and 50 Mbps upload over the next decade.

Broadband Speeds and Pricing

On a national level, broadband speeds and pricing are the source of much confusion between consumers and telecom advocates. On the one hand, measuring connection speed is fraught with variables that are difficult for the end-user to identify such as the speed at which a wireless device connects to an access point, versus the speed at which data travels from one point on the internet to the next. On the other hand, pricing for various types of service may include equipment costs or the purchase of additional services. Price should also be described as relevant to the quality of service, i.e., speed, but is seldom described this way in national surveys. In Vermont, the average monthly price for broadband was $39.00 in 2009. However this figure does not include additional equipment and service requirement costs, nor does it include any description of the service speed available at that price.

Communications technologies with inherently high latency[14] characteristics are, for the purposes of this plan, not considered broadband. Latency affects delivery of real-time synchronous communications. Internet connectivity delivered via geosynchronous satellite connections and caching technologies do not offer the same services as true broadband services. High latency disrupts internet telephony applications as well as the use of virtual private networks and highly interactive applications.

Download Demand

A variety of factors figure into the determination of the minimum technical service objectives for broadband in Vermont. On the downstream side, the dramatic increase in bandwidth demand in the US has been driven by online video demand. As the selection of new online media grows and the price of portable memory storage drops, consumers download increasing quantities of entertainment onto computers, smartphones, tablets and, reading devices, and even thumb drives, for consumption at their leisure. As downloading entertainment in the time it takes to make a round trip to the local video store becomes a consumer's choice in much of the country, it should also be a choice for all Vermonters.

10 These standards are intended to be the minimum technical objectives required by 30 V.S.A. §8077.

11 FCC 7/20/20 order GN 09-137, para 5: http://www.fcc.gov/Daily_Releases/Daily_Business/2010/db0720/FCC-10-129A1.pdf

12 Idib para 20

13 FCC National Broadband Plan

14 Latency is the technical term for the delays in computer systems caused by both distance and processing. Distance creates latency because of simple physics. Messages travel at the speed of light and over long distances the delays are measurable. http://www.exchange-handbook.co.uk/index

While the variety and quantity of online entertainment media continues to grow, policy makers must keep in mind that bandwidth consumption is a two-way street on the internet. If the average online video watched is only 2.7 minutes, it is highly likely that many of the videos are user-generated and posted locally, which requires increasing availability of upload capacity. In order for rural Vermonters to participate in the internet, they must have access to appropriately balanced broadband service on par with their suburban counterparts.

As increasing types of devices connect and users find new means of connecting to one another, demand for upload speed increases. On the household consumer level, Flickr, Skype and Google's multitude of applications are examples of applications where users' content determines the value of the application. Increasingly, e-government, distance learning and healthcare providers offer services that require high levels of interactivity between end users and application distributors. Finally, access to adequate upstream capacity is essential because locally contributed content generates more of the elements that give the internet the custom fit that addresses Vermonters' family, community and work needs. In order to facilitate growth of Vermont's corner of the internet, Vermont has a definition of broadband that includes measures of upload capacity.

A month of Internet Video Use in 2008*

Notable findings from May 2008 include:

- 74 percent of the total U.S. Internet audience viewed online video.
- The average online video viewer watched 228 minutes of video.
- 82.2 million viewers watched 4.1 billion videos on YouTube.com (50.4 videos per viewer).
- 54.8 million viewers watched 703 million videos on MySpace.com (12.8 videos per viewer).
- 6.8 million viewers watched 88 million videos on Hulu.com (13.0 videos per viewer).
- The duration of the average online video was 2.7 minutes.

*ComScore Press release July 2008; http://www.comscore.com/release.asp?press=2324

The Role of Technical Objectives

Opportunities exist to promote enhancements consistent with these objectives across all broadband provider platforms. In telecommunications regulation in Vermont, network modernization should continue to be a central goal of any alternative regulation plan. Cable companies applying for and renewing franchises should be required to upgrade networks capable of offering services that meet Vermont's evolving standard. Additionally, wireless deployments for mobile and fixed services can take advantage of abundant affordable backhaul and are more easily and affordably upgradeable than their wired counterparts. Finally, as noted above, Vermont statutes direct the VTA to give priority to supporting those projects that meet these technical objectives.

Rapidly evolving compression technologies, online application design and use, infrastructure availability and pricing will all affect bandwidth consumption in the future. For this reason, the standard shall be reviewed no less than every three years, as directed by the legislature[15].

ALL CUSTOMER LOCATIONS SUPPORT SMART ELECTRIC METERS

The Vermont electric utilities obtained an ARRA grant to help defray the costs of improving their networks. This grant, like other ARRA grants directed at telecommunications projects, requires that the funds be encumbered within three years. Therefore, by the end of 2013, most Vermont electric utility customers will be connected to their utility through a "smart meter" that will

15 30 V.S.A. §202d(f)

help customers more efficiently control their electric use. In-Home Devices will be available that can be used to display electricity usage and price information in customer's homes. The electric utilities' networks supporting these smart meters will also enable the utilities to gather and present this information on their websites. In addition, ubiquitous broadband availability will help utilities and their customers communicate about electric use in real time. Furthermore, investments in smart grid technology mean most households will have access to the network that provides data service to support a smart meter – whether the property owner purchases broadband or not. This fact presents a tremendous opportunity for utility and telecommunications investments to be mutually reinforcing if they are coordinated over this three year grant window.

Smart grid is where electricity meets telecommunications. The "smart grid" is a term for a collection of technologies that promote greater reliability and efficiency of electric and other energy use by improving communication between electric utilities and the elements of the electric grid, including the customer and the devices that consume electricity. Consumers receive signals in real time related to how electricity prices dynamically fluctuate in wholesale electricity markets as electric load and generation supplies change, and they can automate the response of their electric devices in response to those signals. Electric utilities receive updates from smart devices deep in the grid that help them see, respond to, and even prevent outages and other reliability problems quickly, or even automatically. Furthermore, the improved ability of consumers to see and respond to low-cost off-peak power (and avoid the costly consumption of peak-use power) means that electric power powered by renewable and other non carbon-emitting sources can efficiently displace fossil fuel use in heating and transportation.

Adapting Institutional Network Management

IT managers throughout Vermont have managed networks, hardware and users since the 1980's, and all the while they have worked within a model of scarcity of affordable and accessible broadband. However, the power of the combined backbone networks and advocacy policies described in this document change that model and require a commensurate change in managerial mindset. Today, IT managers have to create new working environments and propagate them with an array of digital devices that enable broadband use throughout a geographically dispersed workforce and service constituency. The push to explore and expand connectivity through additional users and devices is in and of itself the key to improving the value of the network and the services on it. Organizational leaders will structure business plans based on a 24x7 inclusive workforce, global product demand and affordable work environments that accommodate family needs and create economic benefits. Additionally, leadership must reinforce through partnership and collaboration the notion that affordable broadband tools offer cost efficiency and social and global advantages over traditional means of transacting business.

STRATEGIES

In support of the seven outcomes, state agencies and partners in the private sector, non-profits, and local municipalities can employ five major strategies. In many cases work has already begun. Funding sources and strategies in most cases provide benefits toward the achievement of multiple outcomes.

LEVERAGE ELECTRIC UTILITY TELECOMMUNICATIONS INFRASTRUCTURE PLANNED TO LOWER COST OF BACK-HAUL AND INCREASE GEOGRAPHIC AVAILABILITY OF BROADBAND

Supported by a $69 million Smart Grid Investment Grant by the U.S. Department of Energy, the Vermont electric utilities will make substantial capital investments in smart grid infrastructure that leverage and are leveraged by investments in broadband infrastructure,. These utilities are building communications infrastructure to extend smart grid capabilities to most Vermont consumers by 2013. Leveraging these communications investments in coordination with federal stimulus dollars supports multiple outcomes.

By partnering with broadband service providers to deliver communications capability to these networks, electric utilities can seek more efficient use of their funds, and broadband service providers can gain a key channel for enabling, marketing, and encouraging use of their product. Investments in the communications systems supporting Smartgrid are an opportunity that can and should provide a double benefit whenever it can efficiently. There will be great temptation in the push to make investment in smart grid based narrowly on the opportunities and challenges supporting the electric grid. An even greater opportunity is possible if smart grid and broadband investment and adoption are seen as complementary issues.

In a separate, VELCO funded initiative, the utilities plan to install an extensive fiber network. The electric utilities' fiber network will be as extensive as the state's transmission and the sub-transmission network which it serves, which runs through most of Vermont's cities and towns. Should the electric utilities choose to offer commercial access to this network, it would greatly expand the geographic reach of current fiber networks and should improve the availability of mass market broadband and universal mobile service.

AGGREGATE INSTITUTIONAL DEMAND AND ORGANIZE CONNECTIONS TO INSTITUTIONS, BROADBAND PROVIDERS AND CELL SITES

Vermont's institutional users—schools, colleges, health care facilities, government offices and facilities, and libraries—can be both important beneficiaries of improvements to high-capacity fiber optic transport networks and anchors for efforts to improve these fiber optic networks, which transport local broadband and cellular traffic around the state and to the wider world. Aggregated institutional demand enables anchor community institutions to improve communications between partners, creates value for providers and promotes business for ISPs. In the first phase of an aggregation initiative, the VTA worked with organizations like the Departments of Education, Libraries, Public Safety, and

Information and Innovation, Vermont State Colleges, the University of Vermont, Vermont Law School, and the New England Telehealth Consortium to identify their network requirements. The second phase of this aggregation effort involves the identification and organization of network partners through RFP processes directed by the Secretary of Administration and state agencies to deliver gigabit service over fiber optic backbone networks to anchor institutions, broadband providers and cell towers. This process helps to identify how the needs of these users for abundant, low-cost bandwidth are best served. The needs of each class of institutional user will be met in at least one of three ways: 1) By connecting to existing available infrastructure 2) by extending fiber access from one or more of the existing telecommunications company or electric utility fiber optic networks 3) by developing new fiber network infrastructure that can be interconnected with existing networks.

Federal Policy and Mobile Services

Advocacy at the FCC of federal roaming regulation supports the case for rural carriers in Vermont. In order for carriers to serve their customers in non-rural markets, they must have roaming agreements with major carriers on reasonable terms. Without such agreements, carriers that serve small and rural markets can only provide service in rural areas by also bearing the heavy capital cost of over-building already served markets, when existing infrastructure is available but inaccessible. Another area for advocacy includes spectrum policy that requires rapid build-out of licensed spectrum and the release of unlicensed spectrum, particularly the white spaces that were the domain of television broadcasters.

Future such coordinated aggregation initiatives should focus on both the availability of gigabit fiber optic connections and on pricing that will encourage the type of abundant use described elsewhere in this plan. This aggregated demand effort is a proactive approach to meet the state's communications needs. The State should aspire to ensuring that all significant anchor institutions have access to gigabit fiber optic connections by 2013.

Each class of users will benefit from an abundance of available bandwidth through expansion of shared network applications and increased connectivity via new and existing backbone facilities. For example, schools within a supervisory union share online resources for teaching as well as administrative applications and tools for meeting federal funding requirements. In healthcare, administrative processes and patient data are shared between regional health organizations, community hospitals, and private practices. State government capitalizes on distributed e-government service models and shared access to the statewide network.

An aggregated customer base supports other outcomes of this plan by adding value for internet providers and supporting their efforts to meet customers' needs and expectations. Aggregation supports universal broadband availability because anchor tenants will share the cost to bring fiber further out into rural communities and homes and businesses along the way will benefit. On the mobile side, reducing the cost of abundant fiber backhaul and providing access to more locations in rural communities where anchor institutions take service translates into broader mobile coverage and improved service.

SUBSIDIZE CONSTRUCTION OF KEY TELECOM INFRASTRUCTURE IF IT IS NOT ECONOMICALLY AVAILABLE FROM EXISTING PROVIDERS

Where the private sector sees insufficient incentive to deploy expensive infrastructure with very long-term return-on-investment, there is a role for public sector financial support to ensure that all of Vermont's communities are connected to each other and to the wider world. In order to ensure that the state

has the infrastructure that will permit the outcomes sought in this plan, the State should take advantage of opportunities to make capital investments in key infrastructure. In Fiscal Year 2010 the State provided funding for the VTA in order to target three primary areas of broadband infrastructure: fiber optic transport, tower construction and last mile broadband infrastructure. This included $500,000 in capital and general fund appropriations for fiber optic transport network development across Vermont's six northern counties. $250,000 in capital funding supports cell tower infrastructure and $200,000 supports deployment of last mile broadband services to unserved towns.

Additionally, the VTA has available $40M in revenue bonding authority, which can be used to finance construction of towers and fiber optic transport facilities. For FY 2011 the Vermont General Assembly approved $4.5 million in additional capital investment to be divided between tower infrastructure and fiber transport. VCOMM received funding from the Department of Homeland Security and other federal sources which supports construction of towers that will provide co-location for cellular companies, wireless internet service providers (WISPs) and the Public Safety communications network.

In 2009 five Vermont ISPs submitted applications for federal stimulus funding to the U.S. Departments of Agriculture and Commerce in support of projects expanding mass-market broadband services. If all five applications had been granted, combined with obligations to build out by Comcast and FairPoint, all but a handful of Vermont communities would be at or very near 100% broadband availability. However, it appears that most, if not all, of these applications were not granted in the first round. Last mile Round 2 ARRA applications to cover these communities were submitted directly by providers. The major focus of the second round of the ARRA Broadband Technologies Opportunity Program (BTOP) funding program was Comprehensive Community Infrastructure projects, This included support for middle mile broadband infrastructure and connections to community anchor institutions.

In July 2010, the VTA and Vermont Telephone Co., Inc., (VTel), were each awarded Federal Stimulus grants from the Broadband Technology Opportunity Program (BTOP), a program of the U.S. Department of Commerce. Consistent with the objectives of the federal program the projects are designed to provide high-capacity connections to specific "community anchor institutions" such as K-12 schools, health care providers, libraries, colleges, state government offices, and public safety communications networks.

As part of the published objectives of BTOP, the proposed networks are not designed to deliver broadband service directly to the doors of Vermont households. Rather "last-mile" broadband providers are potential users of this network; the high capacity of this network will offer services to transport communications traffic between last-mile broadband and cellular facilities in local communities and the regional, national, and international networks to which they seek to connect.

Vermont FiberConnect will construct an approximately 770 mile fiber optic communications network over the next 36 months through Rutland, Bennington, Windham, Windsor, Orange, Washington, and Caledonia counties. This project is a public-private partnership between the VTA, Sovernet Communications,

, Vermont Department of Information and Innovation, and the New England Telehealth Consortium. These entities represent over 340 locations which this network seeks to connect. The network will be built, owned, and operated by Sovernet Communications. The VTA will administer the grant, provide oversight of the sub-grant to Sovernet and act as liaison to the Department of Commerce.

The VTel project, Vermont Broadband Enhanced Learning Link, will expand VTel's approximately 1,000 mile fiber network, to deliver access to anchor institutions throughout VT, parts of NH and NY.

Expansion of affordable service over fiber backbone networks in Vermont's most rural areas reduces network bottlenecks and provides access to low cost backhaul services, in turn improving the long-term business case for cell carriers and ISPs. The combined VCOMM, cell tower and fiber infrastructure projects create mutually beneficial revenue streams over shared facilities and are further supported through expedited permitting processes established in Act 79.

Backroads Broadband

In 2010, the Vermont legislature in Act 78 of the 2010 legislative session assigned $2,850,000 to the VTA, for the purpose of making broadband services available to at least 10,000 households or businesses in locations in Vermont where such services are not currently available. The 2010 legislature also appropriated the sum of $4,500,000 in Act 161 (the FY 2011 capital bill) to the VTA to be used by the VTA to the extent possible to leverage drawdown of American Recovery and Reinvestment Act (ARRA) funds and to build infrastructure that can be used as a revenue stream to enable use of up to $40,000,000 in moral obligation bonding allocated to the VTA. The capital appropriation was intended to be used in addition to funds appropriated to the Backroads Broadband Program through Act 78 for the VTA to construct infrastructure (towers and fiber optic cable) to meet the cellular and broadband needs of unserved Vermonters.

On March 15, 2011, the VTA issued a funding decision to allocate these funds as follows:

- The Board will fund FairPoint's proposal to provide wire line DSL service to all the remaining unserved locations in the Jeffersonville Target Co munity. The $779,040 in funding would consist of $36,424 of recaptured funds from earlier grants and $742,616 from the Backroads Broadband appropriation.
- The Board will allocate to the VTel Wireless network extension proposal $2,065,000 for radio and related equipment on at least 6 VTA-selected locations serving Target Communities not within the RUS-funded VTel service area. This funding would consist of $100,000 recaptured funds from earlier grants and $1,965,000 from the Backroads Broadband appropriation. The Board will also allocate Capital Bill funding to the development of at least 6 VTA-owned towers to support these service locations and to lease to VTel as an anchor tenant on a structure available for use by multiple service providers. The VTA will work with VTel to finalize selected locations based on the number

of unserved locations in remaining Target Communities, the anticipated coverage to be provided by the RUS-funded VTel tower infrastructure and the ability to reach additional locations not covered by that infrastructure, the ability to obtain an additional benefit in the form of expanded cellular coverage from new tower locations, and the geographic distribution of the resulting new coverage areas, with a special focus on southern Vermont, which contains the largest number of remaining Target Communities. VTA will select the Target Communities to serve but a final selection has not been completed. The Target Communities of Pittsfield, Pittsfield Micro, Stratton, Stratton North, Wilmington, Putney, and Newfane are being considered

Adopting e-government

The shift in service process and delivery creates urgency for household adoption that will also require support from sustainable adoption and training programs offered in communities. Vulnerable and late adopter populations benefit from Vermont based research funded through ARRA. Training programs for those populations will be based on the results of the statewide telecommunications survey included in this plan and a report on vulnerable communities to be published in 2010.

The VTA also supported a number of smaller projects with prior year grant funds that are either in process, nearing completion, or completed. The largest of these is a $240,000 expansion of the Cloud Alliance wireless broadband network in Hardwick, Woodbury, and Wolcott. Others include support for a fiber-to-the-premises (FTTP) network in Fairlee by Topsham Telephone, a wireless broadband network in several Northeast Kingdom towns developed by Northern Communities Investment Corporation (NCIC) and an expansion of wireless broadband networks in Fletcher, Canaan, Elmore, Ripton, and Stamford.

CONTINUE EXPEDITIOUS PERMITTING POLICIES TO IMPROVE AFFORDABILITY AND AVAILABILITY OF BROADBAND DEPLOYMENT

State regulations that encourage access to existing infrastructure and expedite the permitting process for network expansion create efficiencies and improve affordability that improve the business atmosphere in Vermont. In order to promote the deployment of necessary wireless infrastructure while encouraging development that minimizes impact on Vermont's landscape, the Legislature, through Act 79 and subsequent amendments, established new permitting processes. The Public Service Board is now empowered to further the State's interest in ubiquitous mobile communications and broadband service. Section 248(n) of V.S.A. Title 30 gives the Board the authority to expedite the permitting process for wireless installation on electric transmission and generation structures. Additionally, Section 248a provides a means for PSB review of proposals for installation of wireless facilities on new and existing structures with defined deadlines for rendering a decision.

Effective July 1, 2011, no new applications for certificates of public good under 30 V.S.A. § 248a may be considered by the Public Service Board. In October 2010, the Department convened an informal workshop regarding improvements to and the extension of 248a. In the 2011 legislative session, an extension of the statute with further refinements based on the Department's review will be sought.

ACCELERATE ADOPTION THROUGH DIGITAL LITERACY PROGRAMS AND EXPANSION OF ELECTRONIC DELIVERY OF SERVICES

The greatest impediment to deployment of statewide broadband and mobile service has been the lack of a compelling business model in the less densely-populated and less traveled parts of the state. Low broadband adoption rates stifle ISPs' plans for expansion and delay modernization of the economy at commercial, state, and community levels. Similar to the state government's role in building infrastructure where the business case is challenging, the State must also develop its own approach to encouraging broadband adoption that improves the long-term plan for providers.

Digital Literacy

The State should encourage digital literacy programs to address long term growth of the customer base. The State should consider implementation of sustainable adoption programs, such as the Vermont Council on Rural Development (VCRD) ARRA-funded eVermont program which targets broadband use and sustainable adoption at the community level. By reaching the foundations of Vermont communities—schools, businesses, municipal government, libraries, health and social services groups—successful adoption programs can drive the use of broadband in parts of the state that are just receiving services and effectively jumpstart adoption rates. e-Vermont schools will engage faculty, administration and students to take advantage of 21st century teaching and learning methods online. Under this program, the Vermont Small Business Development Center and Vermont State Colleges will team up to develop course offerings in professional development and best online practices for joining the national economy. Late adopters access skills development courses at libraries, schools and employment training centers which support all community members' access to and use of online government services, healthcare and community activities.

The adoption of new services will follow from the efforts of young people, business leaders and organizations who seed contributor-based platforms with local content and new users will find relevant information through applications like Front Porch Forum, Twitter, and YouTube. Strategic stakeholders such as educators and e-government initiate their own efforts to drive innovation and efficiency which also increase demand. Finally the newly served communities will model use that will have viral effects in their neighboring towns driving the figures higher. As deployment of institutional service applications increases, usage increases and is an incentive for providers to expand and maintain universal broadband service to Vermonters.

Public Services

Through expansion of the electronic delivery of government, education and private sector services, Vermonters will have reason to purchase and use broadband services at home. Transformation in the delivery of public services that truly unlocks the possibilities of universal broadband infrastructure will require changes in behavior by both the institutions that use communications technology in the service of their mission and broadband service providers. Institutional users will need to recognize and understand the possibilities of that shift.

Exactly how they use broadband to change the way they do business is a subject for plans in education, state government, health care, and other areas of public service. Recent planning in these areas indicates some examples of the changes that will be needed.

Education

When schools employ virtual school and classroom models through the Vermont Distance Learning Initiative, administrators, educators and students strengthen and build value on the network at new levels. Increasing network use in this way improves the quality of education because it offers access to wider course selection and a more diverse student body. Schools or districts have the ability to choose the best programs to be offered regardless of the instructor's location. The E-rate consortium, established by Vermont's K-12 schools, will support statewide applications for E-rate funding rather than more costly applications submitted by individual schools with limited administrative resources. Other initiatives that will take advantage of broadband include a possible statewide student information system (SIS) for all K12 schools and distance learning programs. Costs will be reduced through consolidated administrative services. Finally, expanded broadband adoption and use in schools promotes increases in home adoption and use.

Healthcare

The creation of menus of tools for specific audiences – such as seniors, the disabled and rural healthcare providers – will ease the transition to digital record keeping and improve use of inter-provider networks. Collaboration between healthcare providers and communities of higher education supports adoption and meaningful use of Electronic Health Records (EHR) for consumers and organizations that require access to patient records.

FEDERAL INITIATIVES

Initiatives at the federal level interact with the strategies outlined in this document. The two most important are the national broadband plan and significant awards made under the ARRA recovery act.

NATIONAL BROADBAND PLAN

The 2011 Vermont Telecommunications Plan echoes many sections of the National Broadband Plan and with good reason. For years, Vermont has responded to the FCC's Requests for Comment and Notices of Inquiry on issues ranging from inter-carrier compensation to the National Broadband Plan. The Department of Public Service and providers work with Vermont's representatives in Washington to bring attention to the issues of competition and affordability that challenge the case for ubiquitous broadband deployment in Vermont. In addition, the leadership by Vermont members of the Public Service Board in the National Association of Regulatory Commissioners (NARUC) increases the state's ability to influence policy on pressing and complex issues like Lifeline and spectrum allocation.

In the years leading to the National Broadband Plan (NBP), Vermont demonstrated leadership through legislative, broadband mapping and demand aggregation efforts. In 2007, Vermont passed Act 79, a bellwether for state telecommunications legislation at the time, which today is a model consistent with the National Broadband Plan's recommendation. NBP takes Act 79 one step further, however. It recommends establishing a broadband capacity building entity to support sustainable adoption and use programs, along with outreach and coordination of broadband projects among state agencies. The National Broadband Plan is divided into three sections:

Part I - Innovation and Investment

The plan recommends strategies to improve utilization of existing utility infrastructure, including rights of way and pole attachments. Similar to the NBP, the Vermont Telecommunications Plan (VTP) supports the provision of broadband to all residences through public investment in privately owned infrastructure. Both plans recommend using existing infrastructure for multiple purposes. Similar to VTP, which describes the lack of a profitable business model as a key barrier to wider deployment of modern broadband service, NBP includes recommendations to improve affordability of deployment and permitting.

The national plan recommends pole attachment rules similar to those that are already in place in Vermont. Notably, the NPB discusses the policy implications of transitioning from a circuit switched network to Internet Protocol (IP) that the 2004 Vermont Telecommunications Plan identified. The 2011 VTP is focused on looking beyond that transition to ensure that Vermont's communications infrastructure – as well as its citizenry – are ready for the next wave of broadband applications.

Part II - Inclusion

The plan correlates with many strategies of the VTP, particularly those that address availability and adoption. The NBP references best practices in adoption and use from around the globe and compares goals adopted by other coun-

tries. The national standard is 4 mbps download speed and 1 mbps upload; the Vermont plan adopts this as well. By comparison, NBP pushes out that minimum standard to 2015. It is fair to say that the Vermont standard reflects the State's longstanding priority in obtaining ubiquitous broadband. Both plans recommend regular review of the minimum standard speeds

The National Broadband Plan recommends changes in the Universal Service Fund (USF) that will shift most of the Fund to support broadband rather than voice without increasing the overall size of the Fund. The state supports using federal and state universal service funds to improve broadband availability, while at the same time balancing support for the rural telephone companies that greatly benefit from the present system.

Part III – National Purposes

The plan describes in-depth how widespread broadband availability will affect healthcare, education, energy and the environment. The Vermont plan addresses these areas, and it cites broadband that supports smart electricity metering at all residences by 2013 as one of its seven outcomes. NBP goes beyond a discussion of smart metering to describe smart homes and transportation. Both plans describe the role of broadband infrastructure and wireless use in the implementation of public safety plans. This section also describes the role of broadband and social media in fostering civic engagement and more open and transparent government. Economic opportunity has long been a part of e-State discussions in Vermont and while not addressed in VTP, it is included in the National Plan.

Overall, the 2011 Vermont Telecommunications Plan focuses on the most pressing issues of broadband deployment, adoption and use in Vermont. As a rural state, the issues addressed in the Vermont Telecommunications Plan reflect the needs of small communities and small business and the tools necessary to increase deployment and adoption by year-end 2013. The national timeline is much longer and the goals are much broader. Many of the recommendations in the National Plan do not offer funding mechanisms, whereas the Vermont Plan is specific in that regard. In essence, the Vermont Plan capitalizes on many years of thoughtful telecommunications planning and the recent federal funding opportunities that support widespread deployment. On a national level over the past decade, broadband was slow to rise on the list of priorities. The National Broadband Plan reflects the "catch-up" effort to compete globally by examining the elements of regulation, competition, deployment and adoption that form the core of a successful national broadband commitment.

RECOVERY AWARDS IN VERMONT

NTIA Comprehensive Community Infrastructure (middle mile) projects

The Vermont Telecommunications Authority (VTA) was awarded $33.3M for the Vermont Fiber Link project, a public-private partnership between the VTA and Sovernet, that will focus on Vermont's key community anchor institutions. The project plans to build almost 800 miles of fiber broadband infrastructure and provide direct connections at speeds of up to 1 Gbps to as many as 340 institutions statewide.

The Vermont Telephone Company (Vtel) was awarded $12.2M for the VT Bell project, which will address bandwidth and transport capacity shortage in the state's existing middle mile infrastructure. VT Bell will expand VTEL's existing fiber network to deliver up to 10 Gbps broadband to more than 200 anchor institutions statewide.

RUS Broadband Initiatives Program

The Vermont Telephone Company (Vtel) was awarded $81.6M and an additional loan of $35M for its Wireless Open World (WOW) project, which will bring 4G LTE wireless broadband to virtually every unserved anchor institution, home, and business throughout Vermont, and parts of NY and NH. VTEL will also extend GigE over active fiber to customers throughout its existing service area in a fiber to the home portion of the project.

Waitsfield and Champlain Valley Telecom was awarded a grant for $3.9M and a loan for $1.7M to build a Rural Broadband Advancement Project, focused on delivering high speed Internet access to 740 premises in its rural Vermont service areas through the deployment of advanced Passive Optical Network fiber to the home technology.

NTIA Sustainable Broadband Adoption Program

The Vermont council on Rural Development (VCRD) was awarded $2.5M for its Community Broadband Project. This project will increase internet access and adoption in 24 small, mostly rural communities through a comprehensive effort of broadband training, access, awareness and planning. VCRD and its partners will train more than 1800 people and distribute approximately 1200 computers to 4th and 5th grade students in these communities.

NTIA State Broadband Data and Development Program

The Vermont Center for Geographic Information (VCGI), in partnership with the VTA and the Department, were awarded a three-year $3.5M grant from the NTIA to create a comprehensive inventory of broadband service availability. The program also creates a new position, the Director of Broadband Coordination and Outreach at the VTA. Through this grant the partners formed the Broadband Mapping Initiative, whose primary responsibility is the preparation and submission of information meeting the NTIA specifications. In addition, the team has developed a website that depicts broadband availability throughout the state.

RUS Satellite Awards

Hughes Network Systems was awarded a grant of $58M to offer satellite broadband service to rural residential and commercial customers where terrestrial broadband is not physically available or economically feasible. Approximately 41,000 Vermont households are eligible on a first-come first-serve basis, for this program which covers installation costs and caps usage fees at $50 per month for the first year.

Smartgrid award

The 21 Vermont electric distribution utilities were awarded $69M in matching funding to support smartgrid projects that will bring smart meters to most Vermont consumers. As described elsewhere, the Vermont utilities are endeavoring to cooperate with other ARRA recipients to meet certain communications requirements of the smart grid project. If successful, this effort will enable Vermont utilities and telecommunications providers to maximize the benefit of these awards. This award will also support other important electric utility projects such as distributed automation.

REPORTING

Notice of the implementation of state plans instills a sense of confidence among tax-payers and policy makers that goals are being accomplished or that changes are necessary. To that end, update reports on deployment of infrastructure as well as consumer trends are in place.

Primary responsibility for reporting progress on this plan will fall to the Secretary of Administration, who will report on key measures of changes in broadband and mobile services.

The VTA's Annual Report, produced under the direction of the Secretary of Administration, will detail the overall activities and accomplishments of the VTA during the calendar year. In this report, the VTA will identify key parameters that describe broadband service quality, and shall measure and report on these key parameters.

This edition of the Vermont Telecommunications Plan is highly Broadband centric. This reflects the emphasis placed on this important issue by the present administration as well as its predecessor, and nationally in the FCC's 2009 National Broadband Plan. Nevertheless, the Department acknowledges that several key components from 30 V.S.A. §202d are not thoroughly addressed in this plan, and therefore the Department plans to amend this plan in 2012.

In 2011 the Department should publish an update to sections of the Telecommunications Almanac that pertain to pricing, availability and subscription to broadband and mobile services incorporating the BMI data. The State Utility Facts should include a section that monitors deployment of smart meters.

CONCLUSION

Modern communications tools are the connective tissue that supports collaboration and cohesion among and between Vermont's business, healthcare, education, and government sectors. This plan supports the integration of multiple backbone networks into a unified statewide resource that enhances the power of the whole exponentially. Affordable ubiquitous access to all levels of communication, including fiber deep into rural communities, and a high-speed wireless umbrella enables Vermonters to create in-state quality jobs with low environmental impact. Networked employers and employees have access to workspaces that accommodate family needs and empower all to take advantage of online professional development tools and human services on a schedule that accommodates 21st century lifestyles. Digital tools connect businesses and individuals in remote areas to the jobs, services and products that strengthen the future of the state. When more Vermonters possess high level online skills and they adopt high speed services on any of a multitude of devices, they can participate in the knowledge economy of the 21st century.

Today, through initiatives undertaken by private utilities and through a shift in federal funding and green technology priorities, Vermont faces a rare convergence of opportunities to affect our outcomes over the next few years. Because state government and utilities were proactive in addressing radical changes in energy and communications needs long before announcements of ARRA funding, Vermont is well-positioned today to embark on collaborative projects in infrastructure development and service deployment that raise the bar for economic development, educational opportunities and government and healthcare service provision and delivery through digital inclusion.

The outcomes and strategies described in this plan provide the tools to support transformation of Vermont's economy through better communication. Vermont is small enough to undertake significant changes in how we go about the business of business and to see the benefits of those changes in a relatively short time. Vermont is at a pivotal moment both in its funding opportunities and in the development of sound partnerships that aim to modernize the state's economy while maintaining a reputation for high living standards and environmental appreciation. Vermont's telecommunications policy is to enable Vermonters to connect with one another, access necessary resources and constantly improve the value of communications networks by adding users. When Vermonters expect to have abundant broadband capacity, we will keep finding ways to use it that change quality of life standards by expanding personal, community and professional networks and how we use them.