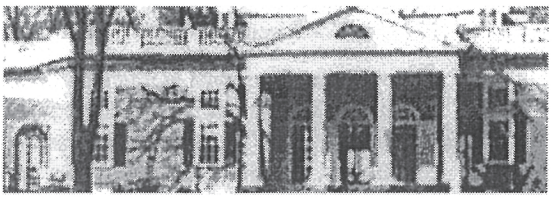

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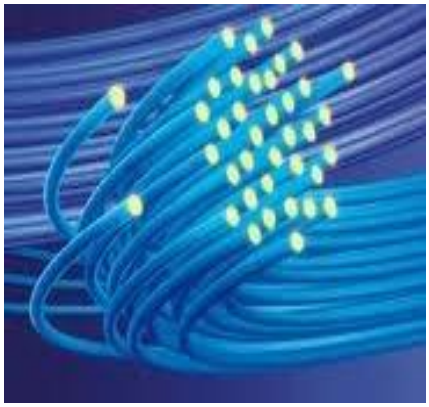
Connecting Virginia:

The economic benefits to expanding advanced broadband internet access

By: Daniel Meges



November 2011

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Connecting Virginia:

The Economic Benefits to Expanding Advanced Broadband Internet Access

Introduction

Virginia has always considered itself among the more "advanced" technology hosting states in the country. With a nationally recognized vibrant internet highway coursing through Northern Virginia, and a large number of government contractors in the Commonwealth providing "technology services" to the public, private and non-profit sectors of our economy, it is only natural for public policy to take a look at how well Virginia is doing in providing access to the up-to-date broadband coverage throughout our state and especially in the rural, out-of-the-way areas.

The Thomas Jefferson Institute looked at this issue and asked Chmura Economics and Analytics to research the current situation on rural broadband, look at the potential that exists for economic development in areas with little or limited broadband, and determine if there were additional steps that could be taken to improve coverage.

What we found was that Virginia is doing very well in basic coverage. There is only a little of one percent of our state that has no access to broadband technology and that fully 89 percent of our state has access to fixed-line and mobile broadband, while just under 9 percent have access to the new, faster and more capacity offering 3G and 4G broadband.

As Virginia continues to struggle with expanding economic prosperity from the Golden Triangle (Northern Virginia-Richmond-Hampton Roads) to the more rural areas, the need to offer the best possible broadband is important. How to do this is key to our future. As the author makes clear in this paper, the best avenue is to develop a public-private-partnership relationship with as much reliance on the private sector as possible. But if Virginia is to unlock the mystery of how best to develop our rural areas, broadband access and keeping that access as "up-to-date" as feasible will be critically important.

We hope this research and analysis helps those who craft public policy in their decision making process and that broadband is a central part of those plans. The private sector is key to making this happen and the government should play as limited a role as possible.

Michael W. Thompson,
Chairman and President
Thomas Jefferson Institute for Public Policy
November 2011

Connecting Virginia:

The economic benefits to expanding advanced broadband internet access

By: Daniel Meges

Overview

Expanding advanced broadband services is good for jobs, innovation, and rural development.

The benefits from expanding access, bandwidth, and speeds of broadband or high speed internet[a] in the Commonwealth of Virginia are vast and vital, particularly for Virginia's rural areas; and the need for expanding quality broadband[b] has never been more clear. America, overall, is lagging the world in broadband access as well as in terms of the price Virginians pay for high speed service.[1234] Virginia, however, scores better than the national average on measures of penetration, with only about one percent of Virginians remaining without access to any form of broadband. Meanwhile, the benefits from broadband lie in its ability to spur job creation and innovation, drive cost reductions and increased market access, and improve the delivery of education and health-related services. Broadband can promote conservation by eliminating travel time via e-commerce and reducing paper consumption as businesses and households go digital. For maximum benefit, broadband access must be widely available (reaching the largest number of Virginians), deep (providing the necessary capacity/speed), and cost-competitive (low prices driven by competing providers). While Virginia does better than national norms on measures of availability, it scores poorly in terms of its depth and prices vary significantly across the Commonwealth. For instance, 4G mobile broadband (the fastest mobile broadband service on the market) is not available to more than 30 percent of Virginians and is largely confined to portions of Northern Virginia, Greater Richmond, Hampton Roads, and a few other urban areas; furthermore, in many of these areas competition (multiple service providers) is limited.[c] In order for Virginia to fully capture the economic benefits related to broadband access, the number of broadband service providers and advanced broadband technologies and infrastructure need to be expanded throughout most of Virginia.

Commonwealth of Virginia: Percentage of the Population with Access to Broadband:

Access to Fixed-Line and Mobile Broadband	89.2%
Access to Fixed-Line Broadband only	0.7%
Access to Mobile (3G & 4G) Broadband only	8.9%
No Access to Broadband	1.1%

[a] The Federal Communications Commission as of 2010 specifies "Basic Broadband" as data transmission speeds of at least 4 megabits per second downstream (from the internet to the user's computer) and 1 Megabit upstream (from the user's computer to the internet) ""Sixth Broadband Deployment Report" 2010. http://transition.fcc.gov/Daily_Releases/Daily_Business/2010/db0720/FCC-10-129A1.pdf

[b] This includes both fixed line broadband (such as DSL or cable) as well as mobile broadband (such as 3G or 4G).

[c] Analysis by Virginia Tech Center for Geospatial Information Technology of the broadband coverage map found at: http://mapping.vita.virginia.gov/broadband/ —approximate 4G area based on speed analysis > 3 mbps.

It's about jobs

Enhancing broadband access creates jobs. Several studies have shown that improving broadband access drives job creation.[5678] These jobs are created through direct effects (jobs directly related to the design, manufacturing, and deployment of broadband technology and infrastructure), indirect effects (jobs related to the servicing and supplying of the broadband service and technology providers), induced effects (jobs that result from the spillover from money spent by workers and firms in the first two categories), and the network effects (the jobs that result from the innovation of new goods, services, and even entire industries that arise from increased information flow and communication).

Virginia will benefit from the direct, indirect, and induced impact from broadband expansion. Studies have estimated that 500,000 jobs could be created nationally and another 1.8 million jobs retained (saved from going oversees) based on the projection of nearly $125 billion invested by the industry in broadband over the next five years.[910] Virginia's share of these job gains could be close to 13,000 new jobs and the retention of another 50,000 jobs. Some of these job gains could be realized by upgrading Virginia's remaining 3G mobile broadband infrastructure to accommodate 4G mobile broadband services. The direct, indirect, and induced impact of these upgrades alone would support between 7,600 and 11,400 jobs per year over the next five years, and yield additional tax revenue to the state between $73 and $110 million over the same period.[d]

Economic Impact of 4G Broadband Investment in VA

Low Estimate of Antennas Needing Upgrade to 4G

	Direct	Indirect	Induced	**Total**
Total 5-Year Spending ($Million)	$2,804.1	$1,046.1	$1,234.5	**$5,084.6**
Annual Average Employment	4,495	1,276	1,830	**7,601**

Estimated Fiscal Benefits for Virginia (5-Year Total)	
Individual Income Tax	$28,239,638
Corporate Income Tax	$8,362,763
Total Construction	$36,602,402
Total Estimated Tax Revenues to VA	**$73,204,803**

High Estimate of Antennas Needing Upgrade to 4G

	Direct	Indirect	Induced	**Total**
Total 5-Year Spending ($Million)	$4,206.1	$1,569.2	$1,851.7	**$7,626.9**
Annual Average Employment	6,743	1,914	2,744	**11,401**

[d] Based upon a high (22,500) and low (15,000) estimate of the number of antennas in Virginia that would need to be upgraded to 4G, assumes the antennas needing upgrades are split 50-50 between GSM and non-GSM antennas.

Estimated Fiscal Benefits for Virginia (5-Year Total)	
Individual Income Tax	$42,359,457
Corporate Income Tax	$12,544,145
Total Construction	$54,903,603
Total Estimated Tax Revenues to VA	**$109,807,205**

Note: Numbers may not sum due to rounding.

Source: IMPLAN Pro 2009, Dominion, and Chmura Economics & Analytics

Network effects of broadband add even more jobs. Additional job creation can also stem from the network effect of expanded high quality broadband access,[e] boosting employment an additional two to six percent with this impact likely higher in rural areas which typically gain disproportionally from these network effects compared to their urban peers.[1112] These positive outsized effects on rural areas are understandable because broadband access links rural businesses with national and global markets in terms of customers, suppliers, and potential employees. Additionally, these effects are magnified in areas that already have strong and established information technology industries, such as Northern Virginia's Dulles Technology Corridor as well as southern Virginia's emerging data storage industry.[1314] Key to capturing these network effects is the wide availability of low-cost, high-quality broadband access, which for Virginia increasingly means expanding the competitive landscape and infrastructure of 4G mobile broadband services.

It's about innovation & rural development

Broadband enables long-tail strategies and boosts innovation. Broadband enables new business models to develop. Previously, services and goods produced by small or home-based businesses were confined to a customer base that was geographically limited while the cost to reach a wider number of customers was cost prohibitive. Broadband access allows these small businesses to access a global market place to offer their goods and services. This enables "long-tail" strategies to emerge whereby a good or service valued by only a small segment of consumers can cost-effectively be marketed across the country and globe and thus secure enough demand to sustain a business. For instance, via broadband connections, Virginia's numerous heritage tourist sites, or a specific handicraft or local product such as Virginia peanuts, can market themselves cost-effectively to a national and even international clientele, thus increasingly tapping into a larger supply of customers.

Similarly, new services and industries can be stimulated by broadband. The rise of "onshoring"—the growing movement to retain or bring back jobs that could or have moved oversees—is directly enabled by an up-to-date broadband services. The affordability of living in many of Virginia's rural communities,

[e] Defined as moving from no broadband providers to 1 to 3 providers.

coupled with an advanced broadband network, could become the basis for a competitive advantage for creating jobs in call centers, back-office processing, and information technology services in Virginia as it has in Pennsylvania and Utah.[15] Because of the ever-growing data demands of business, making this strategy work in Virginia will require the quality of broadband services—in terms of transmission speeds and the reliability of coverage—to be improved.

Up-to-date Broadband is a key driver of rural development. A number of national organizations, governmental agencies, and public-interest groups have provided studies documenting the importance of broadband for rural areas.[16][17][18][19] The overwhelming conclusion is that access to quality broadband internet services in rural areas is a significant economic development tool for small businesses and home-based businesses driving innovation, cost reductions, and market expansion. Broadband also fosters economic development by enabling telecommuting, e-education, and telemedicine in these areas. As was noted earlier, broadband-derived job growth is greater in relative terms in rural areas than in more urban settings. Rural areas—precisely because of their dispersed nature and low population density—benefit the most from the time savings associated with utilizing "remote" or "virtual" technologies that supplant the need for physically travelling to a location—a quality from which the advanced-aged populations in rural Virginia would conceivably benefit the most. These time-saving, broadband-enabled technologies allow for more cost-effective delivery of health care and many government services. Similarly, businesses utilizing telecommuting—where employees work from home rather than from a central office—can enable rural Virginians to find jobs with these types of firms anywhere in the country.

Quality broadband access is increasingly critical for rural communities to remain attractive for potential business investment—and no Virginia community should find itself on the wrong side of a digital divide. Government studies and surveys of businesses show that broadband access is an important component that factors into a business's decision to locate or expand its operations in an area.[20][21] Similarly, surveys show the general public feels that limited broadband access inhibits their ability to find work.[22] After all, nearly all job search functions and job advertising is now either partially or completely conducted over the internet.[23]

The health of Virginians would benefit from up-to-date broadband. The health care sector offers a compelling context in which broadband-enabled services can reduce costs, increase the quality of services, and spur innovation. Enhanced broadband enables a suite of health information technologies that can simultaneously empower individuals, control costs, and extend the reach of Virginia's limited pool of health care professionals. Surveys in Kentucky found that broadband internet users that took advantage of the internet to access health information overwhelming reported their enhanced access to health care information "empowered them to become healthier," and 63 percent of these survey respondents indicated that utilizing the internet for health care purposes saved them money.[24] Similarly, a Maine study concluded that broadband internet access allows instantaneous, interactive contact between health professionals and patients permitting remote monitoring, efficient chronic disease management, and more effective responses to emergencies.[25]

Enhanced broadband internet access can help senior citizens and people with disabilities live independently, improve their quality of life, and reduce the costs of care. One study estimated that the cost savings from broadband-enabled telemedicine, which delayed or avoided institutionalized living arrangements for senior citizens and individuals with disabilities, would reach over $200 billion for the nation over the next ten years.[26] Expanding quality broadband services and bandwidth is critical for Virginia to capture some of these cost savings.

It's about efficiency & education

High-speed internet fosters transparency and efficiency in local government. Broadband's benefits extend to enabling greater transparency, efficiency of service, and communication between the public and local governments and public safety providers.[27] Online e-Government applications have facilitated substantial savings in Utah and West Virginia. In the Commonwealth of Virginia, the DMV's online e-services both saved money for the DMV as well as facilitated lower fees for all Virginians.[28] Meanwhile, international studies have shown that e-Government services improve transparency and reduce corruption and government malfeasance.[29] Broadband also promotes cost-effective civic engagement. Government legislative sessions, public hearings, and other civic events can be videotaped and placed on a variety of social media outlets or made available for viewing on a government's website. The cost for this public outreach is minimal. Similarly, public safety providers can better engage and communicate with the public via public service announcements distributed via the internet. In the case of an emergency, public safety officials can quickly and cost-effectively convey important public safety information that can save lives and reduce the health risks facing the public.

Broadband delivers an advantage to educating Virginia's next generation. From kindergarten to institutions of higher education, education is moving digital. Classrooms that lack adequate broadband connections will increasingly find themselves behind the curve as learning techniques and online learning resources advance without them. With broadband, students and teachers can expand instruction beyond the confines of the physical classroom and collaborate with educators and students throughout the world.[30] Broadband can also provide more customized learning opportunities for students to access high-quality, low-cost, and personally relevant educational material such as online learning websites and free instructional videos.[31] Access to this type of low-cost, tailored educational material is likely to disproportionately benefit students of minority or low-income households who have less access to non-school-provided educational material. The digital delivery of textbooks is in its infancy, but the trend is towards a reduced-hardbound book classroom.[32]

Broadband can facilitate energy conservation and benefit Virginia's environment. Every online purchase of a product supplants a trip to a physical retail establishment—saving time and gas, reducing air pollution, and avoiding wear and tear on Virginia's roadways. Broadband enables "smart" technologies for residential and commercial real estate to provide every Virginian real-time assessments of their energy consumption so to help them minimize their energy usage, saving them money and reducing carbon emissions for all Virginians.[33] Kentucky is estimated to have reduced 46.7 million pounds of carbon emissions annually by aggressively expanding broadband internet access throughout the state.[34]

Similarly, smart-grids could enable energy providers to better ration energy usage through flexible pricing strategies and fine-tuning supply, thus contributing to energy conservation.[35] In transportation, broadband can help logistics planners understand and model traffic flows in real time and use this information to divert traffic patterns, inform drivers of faster routes, and change traffic light timing thus saving time, fuel, and reducing emissions.[36]

Broadband is a source for enhancing quality of life. Like all infrastructure, quality broadband access enables Virginians to more effectively, quickly, and cost-effectively engage in whatever they are passionate about. A national level study found that utilizing broadband internet can help consumers bargain hunt and leverage the power of group buying, which can result in savings of nearly $8,000 annually for the typical American family.[37] Similarly, broadband is revolutionizing the entertainment industry as an ever growing volume of digital media is available to download, view, listen to, or engage with on a daily basis. High speed access to the internet saves people time in many day-to-day mundane tasks, thus allowing them more personal and family time to engage in and pursue their favorite activities for longer periods of time. Broadband services, particularly mobile broadband providers, are beginning to bridge the digital divide for many minority communities.[3839] Increasingly inexpensive smartphones and low-cost, pre-paid plans are facilitating access to the internet for many minority communities; surveys have shown that many traditionally disadvantaged communities are embracing these technologies to access the internet.[4041]

It's about policy

Policy recommendations to enhance Virginia broadband coverage:

To maximize the benefits to Virginia, broadband internet access has to be affordable as well as widely available and deep in terms of its functional capacity. Undoubtedly, private sector firms and entrepreneurs need to lead this initiative with the Virginia government primarily providing a level playing field so competition and innovation can flourish.

Rural Virginia, like most rural areas, is characterized by low population density; with fewer people in any geographic space, the per capita costs of providing telecommunication services are higher. This leads to the private sector underinvesting and underserving many rural markets as compared to urban communities—both nationally and in Virginia. To counteract this, Virginia has already utilized roughly $16 million in federal money and $5.5 million from the Virginia Tech Foundation to expand broadband access to public schools in southern Virginia and to improve the fiber-optic infrastructure between Blacksburg and Bedford City.[42] This is prudent because distance education and development in rural Virginia spur an increase in economic well-being, not only for rural Virginians, but for all Virginians. Without this government initiative, rural households would likely be at a long-term economic disadvantage as the rural-urban technological divide deepened.[43] Because all of Virginia benefits from increased education opportunities and economic development in its rural areas, Virginia's lawmakers should consider additional targeted uses of state and federal funds to expand coverage to some underserved areas. This

should be designed as a public-private partnership with at least equal investment from the private and non-profit sectors.

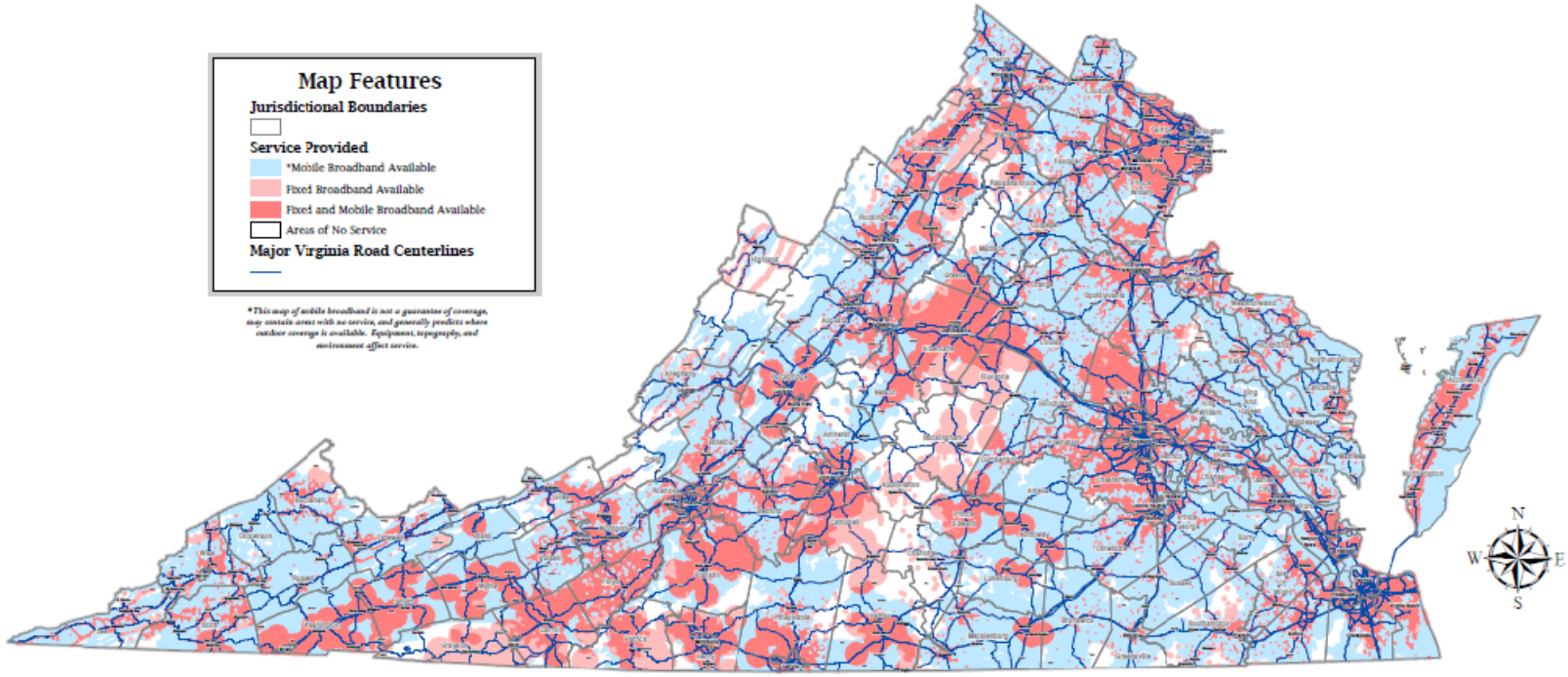
Newer technologies delivering mobile broadband (as opposed to fixed-line providers) are likely to provide the greatest potential to expand high-quality broadband services to rural areas cost-effectively. Virginia lawmakers should pursue public policies designed to foster mobile broadband competition and to ensure that smaller broadband providers are given access to adequate bandwidth to compete with larger firms. Additionally, Virginia lawmakers should lobby the federal government to unlock additional bandwidth for all broadband service providers.

Below are additional strategies that other states are using – and Virginia could consider -- to encourage or incentivize providers to expand advanced broadband service to unserved or underserved areas:[44]

- Lawmakers could consider establishing a task force with public and private stakeholders to evaluate the current state of broadband deployment and identify beneficial policy changes.
- Virginia lawmakers could consider providing tax incentives designed to encourage investment in broadband infrastructure as well as other related equipment and expenses—particularly for targeted areas.
- Virginia lawmakers could consider creating dedicated funding that allows our state to leverage private sector funds for investing in the infrastructure, thus maximizing Virginia's return on investment and expanding advanced broadband services in the most efficient way possible.

Virginia Broadband Coverage

A Production of Virginia's Center for Innovative Technology and Participating Service Providers



This map is a compilation of service areas provided by the participating broadband providers and it includes wireline, fixed wireless, and mobile wireless providers. Not all providers in the Commonwealth are participating. This map does not depict satellite broadband service.

Map Updated: June 19, 2009

0 25 50 75 100

Miles

CIT VGIN VITA

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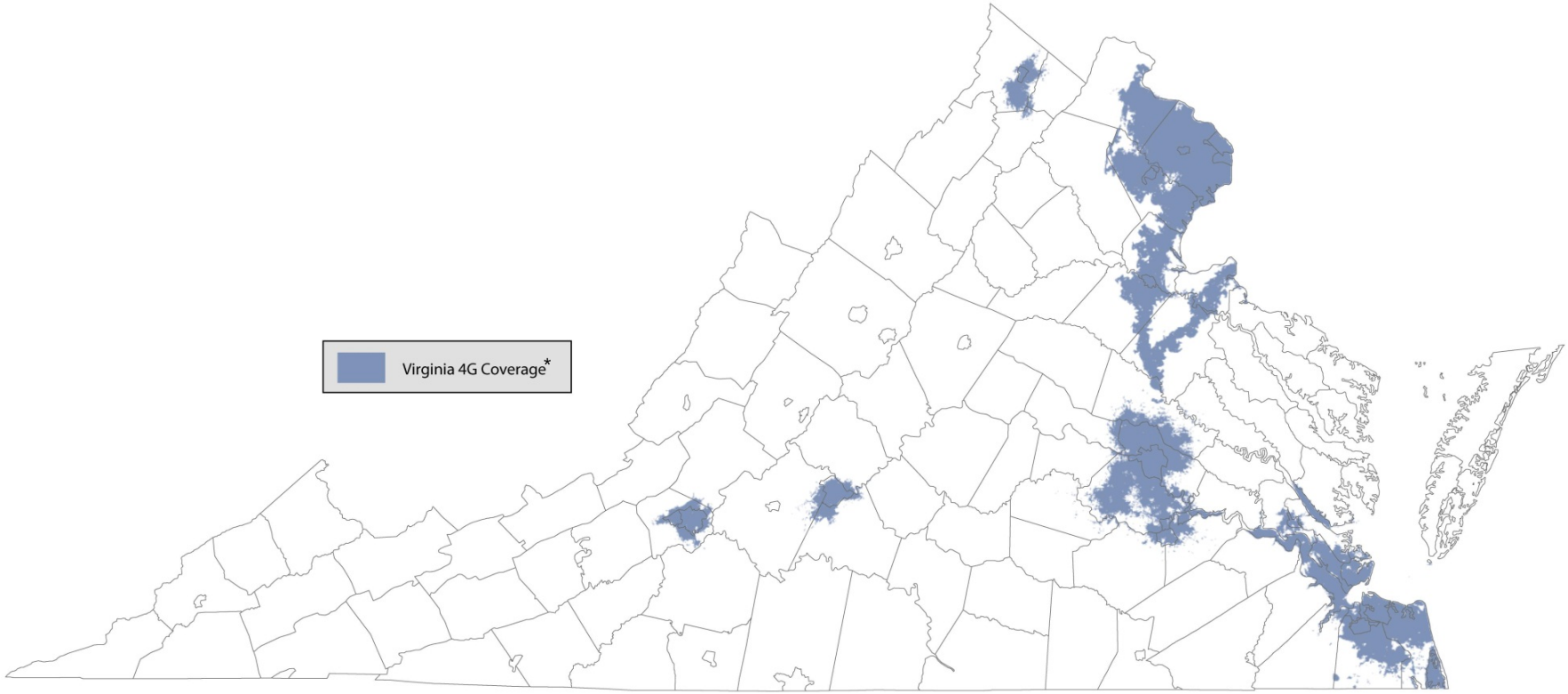
High Potential to Expand 4G Coverage to Rural Virginia



*Approximate 4G coverage, based on VITA defined "Mobile Wireless- Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2555) used to provide service

Source: VITA broadband map (http://mapping.vita.virginia.gov/broadband/)

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Daniel Megas joined Chmura Economics & Analytics in 2011 as an economist and business development manager. Prior to joining the Chmura team, Daniel worked eight years as an economist for the US Government specializing in economic development, international assistance, and trade policy. In this capacity he travelled widely in Europe advancing US foreign policy as well as serving as a special advisor for political affairs for two US Ambassadors.

Meges also has deep experience in industrial and labor relations having worked several years in the auto and steel industries in the capacity of a human resources/labor relations manager. Hel has BS from Cornell University, a MA from the University of Chicago, and an MBA from Loyola University Chicago. Mr. Meges can be reached by email at: E-mail dan.meges at chmuraecon.com

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Robert W. Woltz, Jr: Retired President and CEO of Verizon-Virginia.

"… a wise and frugal government, which shall restrain men from injuring one another, shall leave them otherwise free to regulate their own pursuits of industry and improvement, and shall not take from the mouth of labor the bread it has earned. This is the sum of good government, and this is necessary to close the circle of our felicities."

Thomas Jefferson

1801

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