



**Broadband Infrastructure Application
Submission to RUS – Broadband Infrastructure Program**

Submitted Date: 3/29/2010 9:37:34 PM	Easygrants ID: 7555
Funding Opportunity: Broadband Initiatives Program	Applicant Organization: VTEL WIRELESS, INC.
Task: Submit Application - BIP	Applicant Name: Dr. Michel Guite

There are five features of this \$146.8 million Wireless Open World (WOW) application to highlight here. In summary we seek an \$81.6 million RUS grant, and a \$35.1 million RUS loan, supported by our \$30 million of independently-valued FCC wireless licenses, to serve 61,497 homes in Vermont, and small parts of New York and New Hampshire.

These homes include all of the 33,165 unserved households in Vermont, and an independently verified 714 community anchors. These households represent 114,110 people, comprising virtually 100% of Vermont’s unserved population (as permitted by BIP rules), and 18.7% of Vermont’s entire population.

Part 1: WOW Includes Tri-Band 4G/LTE Mobile Broadband

Our 700 MHz wireless licenses, in combination with our other FCC licenses, are unusually cost-effective, enabling WOW to reach to every unserved home, business, and community anchor, including in the rolling timberlands of Vermont’s Northeast Kingdom, and in the notoriously unserved contiguous rural towns and villages with some 18,000 homes from Brookfield to Barnard to Windsor.

We propose to use 119 wireless towers, with the same technology Verizon Wireless and AT&T Wireless recently announced for their U.S. 4G/LTE urban builds, at a WOW wireless project cost of \$42.9 million.

Recent developments in 4G/LTE impacted our plans in very positive ways. Over the past decade we have been a buyer of wireless licenses in seven FCC wireless auctions, two bankruptcy wireless auctions, and three private wireless auctions, with a goal of assembling a deep footprint of FCC wireless spectrum licenses covering all of Vermont. Because Vermont has been historically sub-divided, by FCC wireless footprint designations, into four quadrants that adjoin larger neighboring states, our acquisition of the Vermont wireless footprint proved costly. There was frequently stiff competition from Verizon Wireless, AT&T Wireless, T-Mobile, Sprint, Clearwire, U.S. Cellular, and many others.



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The acquisition program is virtually complete, and today we own 100-130 Meg of bandwidth covering all of Vermont, comprising 12-24 MHz within the 700 MHz band, 10-30 MHz within the AWS band, 10-15 MHz within the PCS band, and 60-72 MHz within the BRS (WiMax) band (see <http://www.vermontel.net/stim/wirelessmaps.html>).

Our understanding from Ericsson, Motorola, Nokia, and others, is there are few examples worldwide of a 4G/LTE build in any region with so much unencumbered spectrum. The opportunity is almost unique. Our 4G/LTE wireless mobile speeds to many rural customers should be significantly higher than those experienced by customers in most urban markets.

Furthermore because we propose a \$10 rate for “lite” users, as well as \$35/month for most users, we believe WOW will be welcomed by many lower-income Vermont rural families who might today consider Internet a costly luxury. Our modest opinion survey, completed by volunteers at the Springfield, VT, River Valley Technical Center, is based entirely on respondents from these unserved Vermont towns.

The survey is unusual in two ways. It shows that many residents of these unserved towns are so very well-informed about Broadband. It also shows slightly more confidence, in the rural unserved Vermont towns, about the survivability of wireless high-speed mobile broadband compared to copper and fiber-based broadband (<http://www.vermontel.net/questionnaire>).

Part 2: WOW Includes GigE over Active Fiber to Every VTel Home

A second highlight of our application is we propose to invest \$73.8 million to upgrade all of the existing territory of Vermont Telephone Company, of 14 towns and villages comprising the most extremely rural region of Vermont, to GigE over Active Fiber. The Vermont Telephone Company rural footprint serves 15,614 census addresses, with 1,790 miles of plant, with an extraordinarily low 8.7 homes per mile.

The unusual history of our predecessor companies in our rural Vermont towns, receiving RUS/REA funding in the 1950’s and 1960’s, and our own history since 1994, when we bought this from Contel/GTE, makes clear that we have succeeded in significant part because of RUS and NECA and USF rural support. We bought this company for \$40 million in 1994 from



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Contel/GTE, we have never paid an investor dividend (though we pay dividends to Vermont National to support VTel debt), we have invested another \$60 million since 1994, and the overall picture makes extremely clear that rural Vermonters want broadband. They want more speed, more bandwidth.

We envision a future where non-rural America is served primarily by three large telephone companies, Verizon, AT&T, and Comcast, and each offers voice/video/data, with a ‘thick route’ of fiber to homes, and a ‘thin route’ of affiliated wireless for mobility. We also know, from Vermont experience, that these large publicly-owned companies are often compelled to focus on bringing innovation to the largest 100 U.S. markets, with smaller rural markets as a lower priority. To us, building GigE over Active Fiber to homes in our 14 Vermont towns and villages is an immediate priority, as well as a survival need. We see a strong need, and a useful future, for those small rural telephone companies who are willing and able to adapt to new technologies, and to serve rural customers in ways the giants are less willing to do.

We welcomed the news about Google’s February 10, 2010 advocacy of the urgent need for GigE to homes in the US, and we contacted Google several times over the past two years inviting them to assist, and proposed Springfield, VT. We urge the reader to view our Vermont Telephone TV commercial about GigE, that ran during Super Bowl, on February 7, 2010, on CBS channel WCAX (<http://www.vermontel.net/VTelCommercialV3.mp4>). We invite the reader to also take a few moments to view TV news coverage regarding attempts by another company to compel us to not mention our GigE tests and progress (http://www.vermontel.net/VTel_WCAX_Story.html).

The participants in our Super Bowl commercial are actual VTel customers, and all but one are among our 185 homes with Passive Optical Network (PON) fiber. The exception, the enthusiastic high-school student in the commercial who almost steals the show by speaking so enthusiastically about GigE over Active Fiber, is a baby-sitter to a family who is part of our GigE over Active Fiber test. Our field tests, over the past eight months, using Juniper Networks and Calix Networks technology, are producing very consistent results of 850,000 to 950,000 bits per second over Active Fiber.

Furthermore, while speed alone is important, we believe GigE may also produce a less obvious benefit. We believe next-generation GigE over Active Fiber will help make many current costly cable television and satellite TV tiers of hundreds of mandatory channels obsolete. We believe



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GigE over Active Fiber will accelerate 'a la carte' video programming, and more consumer choice, and we want to be part of it. If it does, and massive costly bundles and tiers of rarely viewed video channels are here to stay, and video programmers forbid us to offer 'a la carte' programming, we will agree to offer conventional-video bundles and tiers.

Part 3: WOW Includes Rural Broadband Farm Forums

A third feature of our BIP application replicates, and seeks to revive, a development model once known as Rural Radio Farm Forum. In the early 1940's, when many farm families in Canada and the U.S. struggled to survive the waning years of the Great Depression, and radio was seen as a relatively new and intriguing technology, a number of organizations began experimenting with gathering small groups of 5 or 6 rural neighbors -- with similar interests and backgrounds, facing similar challenges -- to discuss matters of common concern. Topics might have been grain prices, or water access, or children's health, or railroad transport costs, but a unifying concept of these many Rural Radio Farm Forum projects was that a lot of under-recognized information, and wisdom, and practicality, exists within small groups of concerned rural neighbors, when a mechanism is put into place to permit this wisdom, and practicality, to be shared.

The use of radio technology was no doubt helpful, and the field workers as organizers were helpful, but much of the true strength of the model was the simple recognition that 'experts' are often less helpful, compared to informed local neighbors -- including some neighbors who don't necessarily get many invitations to talk or lead group discussions. One of the founders of VTel, when a scholarship student at Stanford and MIT, worked very closely over several years with Rural Radio Farm Forum pioneers Professors Wilbur Schramm, Ithiel de Sola Pool, and Dan Lerner, and also worked on several Rural Radio Farm Forum projects overseas. The model has been proven in hundreds of sites, worldwide, and is widely documented in books published by UNESCO, and in textbooks. We propose to adapt Rural Broadband Farm Forums to rural Vermont and, at our sole cost, to send workers into the field, to organize thousands of small-group meetings, driving bright yellow VTel Broadband Vans (<http://www.vermontel.net/stim/VTelBroadbandVan.pdf>).



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We used a BTOP Council of Economic Advisors recommendation to estimate ARRA direct, indirect, and induced full-time jobs created. By dividing project size of \$116.8 million by \$92,136, we concluded this investment should yield 1,268 BIP-created jobs. However we believe our Rural Broadband Farm Forum investment can significantly enhance any conventional job creation methodology.

We believe the two VTel Broadband Vans proposed here, with four field workers, can guide 40 small meetings each week, with five rural Vermonters attending per meeting, for a total of 6,000 meetings over three years. We are optimistic that by our field workers, and our Broadband Vans, helping neighbors discuss how Broadband can help identify jobs, train for jobs, help family members support job seekers, identify local and federal programs to help families in need, help start small businesses, and the like, we can add a further 600 new jobs to the result.

Part 4: WOW Includes Smart-Grid

The fourth highlight of our BIP application concerns Smart-Grid. We work closely with Central Vermont Public Service (CVPS), Green Mountain Power, and the affiliate of Vermont's electric companies known as VELCO. Our roots working closely together began in the 1950's when CVPS owned our core telephone company under the name Central Vermont Public Service Telephone. Several years ago, when VELCO had dark fiber to lease, they came to us and we agreed.

Today our several hundred miles of optical fiber on VELCO's transmission system forms a core of our 1,000 mile optical fiber network to New York and Boston. This is meaningful in part because VELCO and its members recently received over \$90 million from federal Smart Grid and other funding sources to build massive amounts of new optical fiber to hundreds of VELCO electric sub-stations throughout all of rural Vermont, and under our VELCO contract we have a first right to use any fibers they don't need for internal communications.

For these and other reasons, when Green Mountain Power and VELCO approached us, with the Smart Meter group of GE (General Electric Co.), and invited us to work closely with them to use our WiMax wireless licenses for one of America's first two tests of GE's WiMax Smart Meters,



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in Montpelier, VT, we readily agreed and offered to lease our WiMax licenses for the nominal cost of \$1.00/year (<http://www.vermontel.net/stim/GMPSmartGridLetter.pdf>).

Now that 4G/LTE is accelerating, and WiMax seems to be decelerating, we have initiated talks with Green Mountain, VELCO, CVPS, and GE, urging that we need to concurrently test 4G/LTE, and offering use of our VTel 700 MHz licenses in addition to WiMax for a similar \$1.00. We increasingly see our 700 MHz licenses as a better choice, because the amount of information coming from Smart Meters is not large, and the 700 MHz signals travel long distances. A further feature of this WOW application to BIP, is that WOW here and now provides a mechanism to make best-use of over \$90 million of federal Smart Grid funding for Vermont that has already been committed. The 'right' Smart Grid decision in Vermont can help 600,000 users of electricity in Vermont make more informed, more flexible, wiser energy use decisions.

Part 5: WOW Includes Access to the Best Fiber Network in Vermont

VTel was the driving force in Vermont behind reducing broadband Internet wholesale costs, and wholesale data transport costs, by over 80% during the last four years. It happened like this. We were the first telephone company in Vermont to offer Internet, in 1994-95, and as our Internet usage increased we became one of Vermont's largest purchasers of wholesale bandwidth.

As our wholesale costs began to approach \$1 million a year, at \$180 to \$250 per Meg (standard in rural Vermont at the time), we approached the largest carriers to explain that if we couldn't find much lower prices it would cost less to build our own competing fiber network. We explained that high Internet wholesale prices were suffocating demand, and stifling innovation. We learned, nonetheless, that small rural areas such as Vermont are often simply not a highest priority. We were therefore compelled to build our own new fiber network, and we did so, at a cost of some \$12 million, and the result has exceeded our expectations.

Our fiber network today serves Dartmouth College, Dartmouth-Hitchcock Medical Center, McGill University in Montreal, MIT in Cambridge, University of Vermont, the State of Vermont, the state's largest media company, the state's largest financial manager, and more. We continue to be an enthusiastic Vermont price leader in reducing wholesale and retail Broadband



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prices, and we guarantee to all customers we will always try to be lowest-cost. A recent set of public price quotes sent to University of Vermont, for a GigE path from Burlington to the Harvard/MIT Internet II hub in Boston, provides an illustrative example. Our successful quote was \$4,925/month for three years. The next lowest offer was Level 3 at \$12,125/month for three years. The highest bidder was Fairpoint at \$29,702/month for three years. And we further offer all customers -- and we always have -- and we repeat it here for each and all customers in this BIP application -- The VTel Guarantee. If you are our customer, and you ever feel we could have done more to serve you, you need only tell us, and we will give you a free month service once a year no questions asked.

We also, several years ago, proposed to Vermont's Department of Education a Public/Private Partnership, at our sole cost, to extend fiber to the state's largest High Schools in Burlington, Montpelier, Rutland, Hartford, Hanover, NH (which is part of Vermont's schools system), Springfield, St. Albans, Morrisville, and others.

This history of growing high-demand Internet customers is relevant because these steps enabled us to acquire more massive amounts of bandwidth, from some of the largest carriers in the world, in New York and Boston. Furthermore, because we had also acquired 12 dark fibers on the core "backbone" of the former \$300 million Telergy network, in New York, we were able to trade dark fibers from Montreal to New York for yet more bandwidth.

We have more Internet bandwidth that we can use, and our fiber trades are likely to bring in much more. We virtually give bandwidth away. Every school on our system is configured with full GigE Internet bandwidth. We estimate we have much more bandwidth than anyone in our region, and with the correct 4G LTE technology, and GigE over Active Fiber to rural Vermont homes, we can use this to help make rural Vermont what it wants to be -- the leading rural Broadband prototype in America.

Finally we point with some pride that this BIP application includes the formal support and endorsements of the major rural independent telephone companies in Vermont. We consider this important because we are not familiar with any similar project where these companies have agreed to similarly work together. We intend to interconnect hubs with these companies for highest-speed data exchange, to cooperate on offerings, and most significantly to cooperate on selling 4G/LTE wireless Broadband services. We believe strongly in supporting the proud history of independent telephone companies in Vermont, and we believe they can do an excellent



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job participating in the sale of 4G/LTE wireless Broadband services inside their rural service areas. We also believe a good opportunity exists in Vermont for us to all work together, with Burlington Telecom, Topsham, Waitsfield, and ION in New York, to share video head-end services. We anticipate that GigE over Active Fiber means sufficiently ample bandwidth to every home -- with a lightwave to every home -- that it will be possible to offer rural Broadband customers a menu of video offerings including for example, the Topsham Telephone bundle or tier of 200 channels, the Burlington Telecom bundle or tier of 200 channels, the Google or Apple menus of 10,000 programs, and the like. Our goal with this BIP WOW project is to serve rural Vermont customers better than anyone, and to support other telephone companies who are similarly dedicated to Vermont rural Broadband.