



Stimulus Funding for Broadband Access: A Best Practices Guide for Receiving NTIA and RUS Funds

White Paper

The American Recovery and Reinvestment Act of 2009—the so-called “Stimulus Bill”—appropriates some \$7 billion for expanding broadband access into previously unserved or underserved (read: unprofitable) areas. It is a genuine, once-in-a-career opportunity for service providers, and the time to act is now!

The first Notice of Funds Availability (NOFA) is expected sometime in June 2009 with funding by the end of the year, and it is anticipated that there will be two additional rounds of funding by the deadline of September 30, 2010. No project is too big or too small for consideration. Indeed, the government may favor relatively small “shovel-ready” projects in the first round of funding to give the agencies administering the programs more time to learn how best to fund large-scale projects in later rounds.

Even though details about the stimulus funding are still emerging, this guide provides a wealth of advice to help you get started now on your application. The first section explains why WiMAX is the ideal solution because it best satisfies all of criteria established in the American Recovery and Reinvestment Act (ARRA) for providing broadband access to rural, unserved, and underserved populations. The next section provides an overview of the two grant/loan programs being administered by the National Telecommunications & Information Administration and the Rural Utilities Service. The third section provides tips for preparing a winning application.

WiMAX—The Best Way to Go

The fundamental objective of the broadband access portion of the American Reinvestment and Recovery Act (covered in the next section) is to provide the highest possible speed to the greatest number of people in the shortest possible timeframe, and in the most cost-effective way.

In targeted rural, unserved, and underserved areas, a wireless solution best satisfies the requirements for high-speed Internet access. The local loop in these locations is generally inadequate for the fastest DSL technologies, especially at the extended distances involved in rural settings. Pulling fiber optic and/or coaxial cabling to the curb and/or home will be enormously expensive, and the time involved in securing the necessary rights-of-way and agreements undermines the urgent nature of stimulus spending. Of course, some cabling may be required in the project for backhaul, but such a requirement will be on much smaller, more manageable scale.

A Decade of Wireless Broadband Leadership.

The Lightly Licensed 3.65 GHz Spectrum

In areas where external radio frequency (RF) interference may be a problem, carriers generally prefer to use licensed spectrum. Recognizing that such spectrum is prohibitively expensive in many situations, the Federal Communications Commission (FCC) now allows operators to apply online and pay only a nominal registration fee for non-exclusive use of the "lightly licensed" spectrum in the 50 MHz band from 3650 MHz to 3700 MHz. WiMAX also supports this special spectrum, which can operate at higher power levels compared to license-exempt bands, and affords superior non-line-of-site (NLOS) propagation compared to higher frequencies. Of course, in rural areas that are devoid of any wireless communications infrastructure, and therefore unlikely to experience RF interference, WiMAX also supports license-exempt spectrum.

Additional information about this lightly licensed spectrum can be found at http://wireless.fcc.gov/services/index.htm?job=licensing&id=3650_3700, where you will also find detailed instructions and a link to the FCC's online Universal Licensing System (ULS).



PacketMAX 3000

Stackable, rack-mountable, single-sector Micro base station for delivering IEEE802.16-2004 WiMAX services. PacketMAX 3000 is RUS-accepted.

Many wireless technologies available suffer from limitations that make them fall short of fulfilling the full set of requirements, however. Wi-Fi, especially when deployed in a mesh topology, can provide adequate coverage in rural areas encumbered with non-line-of-sight challenges, but the access speed is relatively slow. Third generation (3G) technologies also suffer from this same limitation. And 4G technologies are simply not available in required timeframe.

That leaves WiMAX as the fastest, most readily deployed, and most cost-effective wireless solution available today. Of particular interest to the agencies granting stimulus funding will be the proven ability of WiMAX to reach unserved, underserved, and rural populations with its broad coverage and genuine broadband data rates. No other access solution today can do so much, so quickly, and so well. Indeed, WiMAX is "shovel-ready" in every respect.

Getting the Max from a WiMAX Solution

WiMAX products are not all created equal, of course. To be competitive with a grant or loan application, the solution being proposed must fulfill the objectives of the program. And as outlined in the next section, there are many objectives that all need to be met satisfactorily. Naturally, some WiMAX solutions do this better than others. To ensure your best chances of success, choose a WiMAX solution with the following carrier-grade capabilities:

- **Genuine broadband data rates** – The WiMAX solution will need to compete with DSL and cable, so it should offer multiple-megabits-per-second service to multiple users concurrently. Anything less than 54 Mbps per-cell (e.g. a single cell with three separate 120° sectors operating at 18 Mbps each) will put you at a competitive disadvantage.
- **Scalability** – With some solutions, scalability sacrifices performance. Truly scalable solutions use advanced techniques like multi-sector synchronization and sophisticated channel management to maintain high per-user throughput while adding more users. And the best ones can do this in a "pay-as-you-grow" fashion.
- **Quality of Service** – The solution should be able to support data, voice, and video applications with differentiated QoS. This is particularly important for supporting bandwidth-intensive applications like telemedicine and distance learning.
- **Broad coverage** – Locations that are unserved or underserved with broadband access are generally sparsely populated. This is especially true in rural areas. WiMAX solutions that offer greater range are able to provide more coverage more cost-effectively. And providing access to more people makes an application more likely to be approved.
- **Rural certification** – Grants and loans made by the Rural Utilities Service (RUS) are certain to require use of RUS-accepted solutions. So be sure yours is.
- **Support for lightly licensed spectrum** – The 3.65 GHz spectrum was allocated by the FCC specifically to support broadband deployment in rural areas, making a WiMAX solution operating in this lightly licensed band ideal for projects being funded under ARRA. (See sidebar for more details.)
- **Cost-effectiveness** – The agencies will be seeking the best "bang for the buck" when evaluating applications. With more cost-effective solutions, more residents can be served with more affordable service fees. Note that the total cost must also take into account the price of Customer Premises Equipment (CPE).
- **Robust management** – A fully capable element management system not only helps ensure a successful (and rapid) rollout, it helps ensure that the government gets years of dependable operation for its investment.

Eligible Expenditures

Funding under the ARRA may be used for virtually every aspect of a project to provide broadband access. The legislation explicitly allows funds to be used to:

- Acquire equipment, instrumentation, networking capability, hardware and software, digital network technology, and infrastructure for broadband services
- Construct and deploy broadband service related infrastructure
- Ensure access to broadband service by community anchor institutions
- Facilitate access to broadband service by low-income, unemployed, aged, and otherwise vulnerable populations in order to provide educational and employment opportunities to members of such populations
- Construct and deploy broadband facilities that improve public safety broadband communications services
- Undertake such other projects and activities as the Assistant Secretary finds to be consistent with the purposes for which the program is established



Aperto offers a complete line of RUS-accepted base stations and CPE including PacketMAX 5000, PacketMAX 4000, PacketMAX 3000, PacketMAX 510, PacketMAX 400, PacketMAX 320, and PacketMAX 120.

Maximizing Your Chances of Being Funded

The American Recovery and Reinvestment Act of 2009 (ARRA) is an unprecedented effort to jumpstart the American economy, create or save millions of jobs, and put a down payment on addressing some long-neglected challenges to help the country thrive in the 21st century global economy. One of these long-neglected challenges is universal broadband access for all Americans, and the ARRA has allocated some \$7 billion for two programs to provide broadband access to rural, unserved, and underserved citizens. Details about ARRA are available on the Web at www.recovery.gov.

In addition to the obvious objective to close the “broadband gap” in the US, the ARRA has four additional goals: 1) to create jobs; 2) to stimulate investment (meaning that anyone receiving federal money must make at least some matching investment); 3) to encourage the demand for broadband; and 4) to build out broadband to schools, hospitals, libraries, universities, and other public institutions.

These last two points are critical. “Build it and they will come” is not good enough. Winning proposals will need to address how residents in the service area will be encouraged to subscribe, and this may require a means for providing training and even PCs for some segments of the population. Special provisions should also be made to benefit schools, hospitals, and libraries. These two goals need not be the focus of the program, of course, but applications addressing both will be more likely to receive funding.

National Telecommunications & Information Administration (NTIA)

The NTIA under the Department of Commerce received \$4.7 billion, of which not less than \$4.35 billion is for the Broadband Technology Opportunities Program (BTOP). Objectives of BTOP, details of which are available at www.ntia.doc.gov/broadbandgrants/index.html, are to develop and expand broadband services to rural and underserved areas, and to improve access to broadband by public safety agencies. The program is expected to be modeled after NTIA’s existing Technology Opportunities Program (TOP), which

BTOP Project Priorities

The ARRA gives some explicit guidance to NTIA regarding the underlying purposes of BTOP funding. Specifically, projects receiving funds should:

- Provide access to broadband service to consumers residing in unserved areas
- Provide improved access to broadband service to consumers residing in underserved areas
- Improve access to, and use of, broadband service by public safety agencies
- Stimulate the demand for broadband, economic growth and job creation
- Provide broadband education, awareness, training, access, equipment, and support to the following:
 - Schools, libraries, medical and healthcare providers, community colleges, and other institutions of higher education, and other community support organizations and entities to facilitate greater use of broadband service by or through these organizations
 - Organizations and agencies that provide outreach, access, equipment, and support services to facilitate greater use of broadband service by low-income, unemployed, aged, and otherwise vulnerable populations
 - Job-creating strategic facilities located within a state-designated economic zone, Economic Development District designated by the Department of Commerce, Renewal Community or Empowerment Zone designated by the Department of Housing and Urban Development, or Enterprise Community designated by the Department of Agriculture

was designed to promote the widespread availability and use of digital network technologies in the public and non-profit sectors through grants for model projects demonstrating innovative uses of network technologies. Detailed information about TOP and successful recipients is available at www.ntia.doc.gov/top/.

Choosing Between NTIA and RUS Funding

Both agencies are coordinating their respective efforts, and both will utilize the same set of standards for establishing what constitutes “broadband” and “underserved”. Most projects should, therefore, be eligible for funding from either agency. But the ARRA states that “no area of a project funded with amounts made available under this paragraph [RUS] may receive funding to provide broadband service under the Broadband Technology Opportunities Program [from NTIA].” What this might mean for a large-scale and comprehensive project is unclear as of this writing. Different aspects of the same project may be able to receive funding from both agencies, and this should be made clear in the Notice of Funds Availability (NOFA).

When deciding where to apply, keep in mind these two key differences between the agencies:

- With RUS, at least 75% of the population to be served shall be in a rural area without sufficient access to high-speed broadband service to facilitate rural economic development. Of course, NTIA can also fund rural areas that are unserved or underserved.
- With NTIA, the federal share of funding for any project may not exceed 80% unless a waiver is obtained from the Assistant Secretary of Commerce for Communications and Information. With RUS funding the federal share can be up to 85% for grants and 90% for loans, assuming the existing programs are adopted for the stimulus spending.

All stimulus funds must be awarded by September 30, 2010, and are, as of this writing, likely to be awarded in three tranches: one in the summer of 2009, and the remaining two in the spring and summer of 2010. The second and third tranches of funding are likely to be influenced by a national broadband plan being developed by the Federal Communications Commission (FCC), which is due by February 17, 2010 (see sidebar). The NTIA is also working on a national broadband map, which is expected to be available around the same time.

The ARRA instructs NTIA to ensure that all awards are made before the end of fiscal year 2010, which is on September 30th, and that the agency must seek assurance as may be necessary or appropriate from grantees that they will substantially complete projects within two years following an award. Small projects should have no difficulty meeting the two-year deadline, but the scope of large projects may need to be limited so that they can be “substantially” complete in time. Of course, with wireless technologies like WiMAX, two years can be a generous time frame regardless of the project’s scale.

RUS Project Priorities

The ARRA gives some explicit guidance to RUS for prioritizing grant and loan applications. Specifically, priority shall be given to projects that:

- Afford end-users with a choice of more than one service provider
- Provide service to the highest proportion of rural residents who do not currently have access to broadband service
- Include organizations as the applicant or co-applicant that are previous recipients of grants or loans under Title II of the Rural Electrification Act of 1936
- Are fully funded and can be completed in the proposed timeframe
- Can commence promptly following approval (i.e. are “shovel-ready”)

Unless the Notice of Funds Availability (NOFA) specifies otherwise, virtually any entity should be eligible to apply for BTOP funding. Indeed, the ARRA casts quite a wide net of public and private entities that should be eligible. The only requirements for broadband service or infrastructure providers to be eligible will be that the project is “in the public interest” and, that in making such a determination, the Assistant Secretary “shall to the extent practicable promote the purposes of this section [BTOP] in a technologically neutral manner.”

Optimal Network Designs from Wireless Connections

Wireless Connections is a leader in providing the expertise needed for complete network design, equipment purchases, implementation, and maintenance of wireless networks in both the licensed and unlicensed spectrums. The company provides comprehensive wireless network design services that include advanced propagation models to ensure rapid and trouble-free deployment—just what is needed for the stimulus. Their sophisticated designs can help you achieve superior QoS end-to-end and seamless integration of the WiMAX network into any existing infrastructure. Wireless Connections staff is fully equipped to provide design and troubleshooting services for advanced WiMAX networks, as well as full support for the wired network, with its in-house staff of technical engineers.

Any application for grant or loan funding will benefit from the state-of-the-art modeling, and global information system (GIS) software used by Wireless Connections to create optimal network designs based on the best predictive modeling results possible. To learn more about how your project can benefit from this cutting-edge service, please visit Wireless Connections on the Web at www.wirelessconnections.net, or call them at 419-660-6100.

Rural Utilities Service (RUS)

The USDA Rural Development Broadband Program under the US Department of Agriculture received \$2.5 billion in flexible budget authority for grants, loans, and loan guarantees to support the expansion of broadband service to facilitate economic development in locations without sufficient access to such service.

While the agency has yet to create a special Website for the stimulus funding, information about its existing broadband access programs is available at <http://www.usda.gov/rus/telecom/index.htm>.

As of this writing, the USDA is working with its federal partners, the NTIA, and the Federal Communications Commission, to develop guidance for this new initiative. It is anticipated that RUS will model its stimulus loans and grants after two existing programs: a Broadband Loan and Loan Guarantee Program, and a Community Connect Broadband Grant Program. Both programs are available to corporations, LLCs, cooperatives, Indian tribes, and public entities. Both also have a minimum match requirement: 10% for the loans, and 15% for the grants. In addition to capital expenditures, grant funding can be used for operating expenditures when free service is provided to subscribers.

National Broadband Plan and Map Coming in Early 2010

Anticipate the FCC's national broadband plan and NTIA's national broadband map. These requirements of the ARRA are due in early 2010—in time for at least one and maybe two additional round(s) of funding. The purpose of the FCC's plan is "to ensure that all people of the United States have access to broadband capability and shall establish benchmarks for meeting that goal." Projects that fill out the map being created by NTIA and help fulfill the purpose of the FCC's plan stand an excellent chance of being funded—sooner or later. In your application, therefore, be certain to address these required elements of the FCC's plan:

- Analysis of the most effective and efficient mechanisms for ensuring broadband access by all people of the United States
- Detailed strategy for achieving affordability of such service and maximum utilization of broadband infrastructure and service by the public
- Evaluation of the status of deployment of broadband service, including progress of projects supported by the grants made pursuant to this section
- Use of broadband infrastructure and services in advancing consumer welfare, civic participation, public safety and homeland security, community development, health care delivery, energy independence and efficiency, education, worker training, private sector investment, entrepreneurial activity, job creation and economic growth, and other national purposes.

RUS also has a Distance Learning and Telemedicine Loan and Grant Program that is synergistic with the stimulus spending, and may be worth consideration for projects that include one or both of these applications.

Tips for Preparing a Winning Grant/Loan Application

Important Note: The guidance provided in this section is based on existing programs from both NTIA and RUS, and stimulus funding is expected to be modeled after these. The Notice of Funds Availability (NOFA) will provide additional and specific guidance required to receive funding.

Check www.grants.gov regularly for Notice of Funds Availability (NOFA) for both NTIA and RUS grant opportunities. The site has a search engine where you can search by agency as a keyword. You can also browse for programs specific to the ARRA. The first NOFA is expected around June 2010, with two additional solicitations likely to follow around November 2009 and May 2010.

Start now to make your project "shovel-ready" in time. If you are not currently involved in a project, consider becoming a partner in an existing one—provided, of course, you can bring real value to the effort. If you are just beginning to organize a project, use the information in this section to put together one that has the best chance of being approved.

Work with state government. Neither NTIA nor RUS is required to consult state governments, but both agencies are very likely to do so to ensure that funds

Distance Learning and other Value-added Applications from Edgenics

Broadband access is a means to an end, and the government has identified several "ends" desirable in the ARRA, such as economic development, telemedicine, and education. Distance learning has proven to be particularly successful in bringing educational opportunities to underserved and rural populations. And Edgenics is a leader in this field.

The services provided by Edgenics (www.edgenics.com) utilize advanced communications infrastructure and networking technology that Edgenics provides as a component of its Value-Added Application Services. Edgenics has built data center facilities and a core backbone network in collaboration with key partners. This infrastructure is being expanded using WiMAX wireless technology. These resources facilitate the provision of state-of-the-art Interactive Multi-Media On-Line continuing professional development and education services. Edgenics services are provided through centralized Education Exchange™ Centers that are interconnected with the networks of its communications carrier and Internet service provider partners, and linked to interactive classroom facilities of participating universities and secondary schools.

By focusing on innovative education services, such as professional development, corporate training, secondary academic programs, and accredited college courses, Edgenics has created a unique business strategy for distance learning that can substantially enhance the quality of the educational experience.

Another competitive advantage available in a partnership with Edgenics is the fact that the company has already been funded by the USDA's Rural Utilities Service, and previous recipients of grants and loans will be given favorable consideration for stimulus funding.

are going to the most desirable projects. This is especially true because NTIA is required to make at least one grant to each state. Here are three resources that should be helpful when working with any state:

- The Alliance for Public Technology (APT) and the Communications Workers of America (CWA) prepared a report in July 2008 titled State Broadband Initiatives: A Summary of State Programs Designed to Stimulate Broadband Deployment and Adoption. The report is available at www.speedmatters.org. The Website also provides an up-to-date listing of various programs in all 50 states.
- The National Conference of State Legislatures, which maintains a list of State Broadband Task Forces and Commissions and Other Broadband Resources at www.ncsl.org/programs/lis/connectamericapubs.htm.
- The National Governors Association, which maintains a Center for Best Practices that published a report on State Efforts to Expand Broadband Access available at www.nga.org/files/pdf/0805broadbandaccess.pdf.

Explain why the project would not have been implemented during the grant period without federal assistance, and how any funding received will be used to carry out the program's purposes in an efficient and expeditious manner. This requirement raises a dilemma with "shovel-ready" projects. If a project is ready enough to be implemented in an expeditious manner, why is it not already funded? Two explanations are possible here. One is that it did not "pencil out"; that is, there is an insufficient return on the investment required to proceed. The other is that the project is (tentatively) scheduled for the distant future, and federal funding makes it feasible to move up the date to within the stimulus timeframe.

The PacketMAX 3650 Bundle

The PacketMAX 3650 satisfies all of the requirements outlined in the first section for a carrier-grade WiMAX solution, and possesses other advanced capabilities that give it industry-leading scalability, quality, manageability, and affordability. To take full advantage of the stimulus funding opportunity, Aperto Networks has created a special bundle. As an all-inclusive kit for a single cell site, the bundle simplifies ordering and configuring the equipment. And the bundle is priced at under \$20,000 to help make your grant or loan application even more competitive.

The PacketMAX 3650 Bundle includes a quantity of three (3) each of the following:

- PM3000-AC1-01 Base Station (Indoor Unit)
- PM-BSR-35 Base Station Radio (Outdoor Unit)
- PWA3500V-90 Outdoor Antenna (Outdoor Unit)
- PA-SP-OUTDOOR-08 Surge Protector
- PA-RFCABLE-03 Connector Cable
- CLK-WCP-1PK EMS Sector License (One for each Base Station)
- CLK-PM3000-A-E Unlimited CPE Licenses (One for each Base Station) v

The bundle also includes Aperto's WaveCenter EMS Pro element management system for centralized FCAPS management and provisioning of all cell sites, the three base stations and all customer premises equipment.

Demonstrate the ability to complete the project in a competent, timely manner, and in compliance with all applicable federal, state and local laws. This requirement of the programs should actually give established service providers an advantage. Who better to complete a project in a competent manner than a company successfully in the business of providing broadband access? Prudent partnerships may be necessary or beneficial, but with this requirement, service providers are certain to be part of any project.

Choose partners wisely. With RUS, priority is likely to be given to previous loan/grant recipients. And with both agencies, the more support a project has from various stakeholders and constituencies, the more likely it is to get funded. For example, complement the project with partners providing "value-added" solutions that are also part of the stimulus effort, such as telemedicine, distance learning, public safety, etc.

Plan big. Small projects can get funded (and likely will), but the bigger the better for this reason: both agencies need to award a lot of money in a very short period of time. A single project with a large scope serves to simplify their task by getting more broadband to more people more quickly. State agencies may be particularly helpful in pulling together more partners into a larger project.

Fulfill the purposes of the stimulus. This may seem rather obvious, but grant funding can be fiercely competitive. Applicants who do a better job explaining why this particular project best satisfies the objectives of the stimulus are more likely to get funded. At a minimum, all five of the ARRA's goals (covered above in that section) should be satisfied. In addition, preference will be given to projects that will:

- Increase the affordability of, and subscribership to, service to the greatest population of users in the area
- Provide the greatest broadband speed possible to the greatest population of users in the area
- Enhance service for health care delivery, education, or children to the greatest population of users in the area
- Not result in unjust enrichment as a result of support for non-recurring costs through another federal program for service in the area

Include in the project some program for encouraging residents to become subscribers. The government is not interested in broadband access availability for the sake of availability. What is desired is actual adoption by rural, unserved, and underserved populations.

Emphasize job creation. The project itself will obviously create some jobs during its implementation, and even some for ongoing operation. But projects that include some form of economic development are likely to be viewed more favorably. Explain how the availability of broadband access will help existing businesses be more successful, and help create new business opportunities for local residents.

Because speed is of the essence—in terms of both rollout and bandwidth—it will be important to emphasize the use of WiMAX as the most cost-effective technology for satisfying both needs. As a proven technology, WiMAX is a low risk solution. And to a risk-adverse government agency, its use will be a real competitive advantage.

Conclusion

The fundamental objective of the American Recovery and Reinvestment Act of 2009 is to stimulate the economy now. The best technology for closing the “broadband gap” and getting high-speed broadband service to the most people in the shortest possible timeframe is WiMAX. WiMAX is also very cost-effective, with its relatively low capital and operational expenditures. And the PacketMAX solution from Aperto Networks is carrier-grade in every respect. Putting it another way: it's the right solution available at the right time.

The “shovel-readiness” of WiMAX is important for another reason. The agencies are facing a daunting task: to quickly award an unprecedented sum of money to invest in the “right” projects in the “right” way while under tremendous scrutiny by the Administration, the Congress and the public. Haste normally makes waste, and any wasteful spending will certainly call “unwanted attention” to an agency that fails to invest taxpayer money wisely. So avoid any suspicion of waste in your proposal by emphasizing WiMAX's proven cost-effectiveness for providing the greatest broadband speed to the greatest population in the service area.

Contact Information

To learn more about how you can get the most from the American Recovery and Reinvestment Act of 2009, please contact Aperto Networks or one of our partners, Wireless Connections and Edgenics.



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■ ■ About Aperto Networks

Aperto Networks helps leading service providers deliver affordable wireless voice and broadband profitably by building the world's most advanced WiMAX base stations and subscriber units. Aperto fundamentally changes the economics of delivering voice and broadband services through IP-rich, point-to-point and point-to-multipoint networks, allowing carriers to offer a wider variety of services to more customers using less equipment. Its carrier-class WiMAX technology offers industry-leading subscriber density, quality of service, ease of use and reliability. Aperto is a founding board member of the WiMAX Forum as well as a founder and lead contributor to IEEE 802.16 and the ETSI-BRAN standards. Serving more than 400 customers in over 90 countries, Aperto Networks is based in Milpitas, California. For more information on Aperto Networks, go to www.apertonet.com.