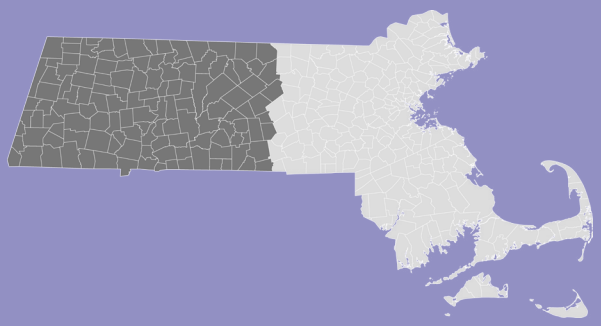
**Case Study**

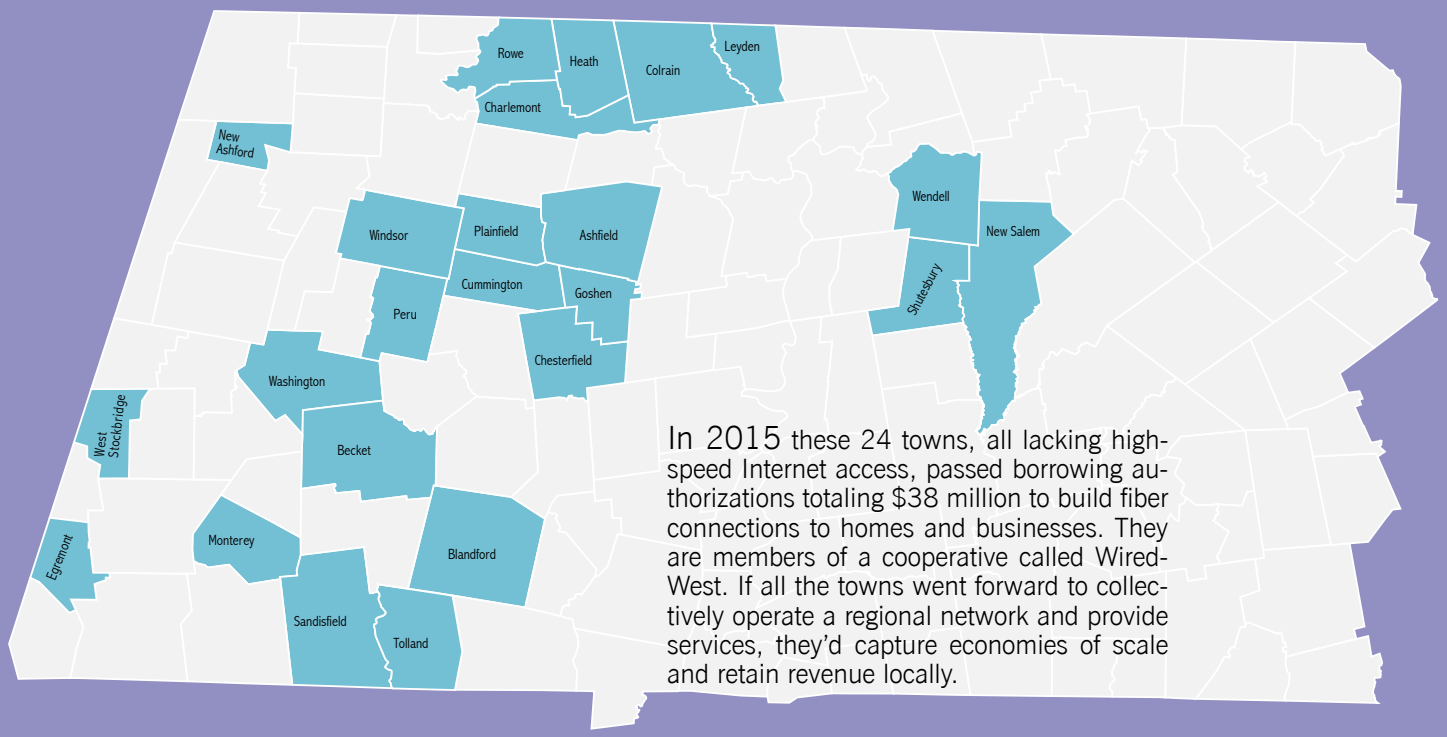
Berkman
The Berkman Center for Internet & Society at Harvard University

# WiredWest: a Cooperative of Municipalities Forms to Build a Fiber Optic Network

David Talbot
Waide Warner
Susan Crawford

## Western Massachusetts Towns Create a New Model for Last-Mile Connectivity, but a State Agency Delays Approval and Funding






In 2015 these 24 towns, all lacking high-speed Internet access, passed borrowing authorizations totaling $38 million to build fiber connections to homes and businesses. They are members of a cooperative called WiredWest. If all the towns went forward to collectively operate a regional network and provide services, they'd capture economies of scale and retain revenue locally.

## Abstract

This report describes WiredWest, a cooperative formed by towns in rural western Massachusetts. WiredWest has put forward a detailed proposal to provide "last-mile" high-speed Internet access connections to homes and businesses in a region policymakers have long lamented suffers from poor Internet access. On behalf of its member towns, WiredWest plans to operate and provide services over a state-of-the-art fiber optic network in these chronically underserved communities. WiredWest has taken a regional approach to spread risk and achieve economies of scale. Thirty-one towns passed Select Board resolutions declaring their intent to participate in a cooperative network with WiredWest. Under the plan, they will pay about two-thirds of the network's costs; so far 24 of them have authorized borrowing a total of $38 million. To cover remaining costs, they will need to receive a portion of $50 million already authorized by the Commonwealth of Massachusetts to subsidize high-speed Internet access in the region. The state agency responsible for disbursing the funds, the Massachusetts Broadband Institute (MBI), recently tabled any decision on the project. The administration of Gov. Charlie Baker subsequently asked MBI to "develop policies to ensure that it is reviewing and analyzing all options" for making last-mile grants. WiredWest's future hangs in the balance.

## Key Findings

• WiredWest enabled dozens of small towns to come together through a unified structure and a shared vision of citizen cooperation across municipal borders, a model replicable nationwide.

• WiredWest has developed and vetted a detailed financial model, drafted an operating agreement, and obtained $49 deposits from more than 7,100 residents who have pledged to subscribe to Internet access services.

• WiredWest's plan is designed to achieve economies of scale by centralizing operations and aggregating demand for network equipment and services. WiredWest still must resolve the question of how to balance cooperative versus local ownership of network assets within the boundaries of individual towns.

• The scale of the project would also allow WiredWest—in likely contrast to single-town networks in the same area—to provide television services, which a majority of pre-subscribers want.

• WiredWest plans to offer 25 Mbps service for $49 a month, 100 Mbps service for $79 a month, 1 Gbps service for $109 a month, telephone services for an additional $25, and TV services at prices to be determined.

• In December of 2015 a consultant hired by the Massachusetts Broadband Institute (MBI) issued a highly critical analysis of the WiredWest financial model, but WiredWest responded with a point-by-point rebuttal asserting that the analysis was inaccurate and misleading.

• In January of 2016 the administration of Gov. Charlie Baker asked MBI to "pause" on funding last-mile projects and later asked MBI to analyze all options, without mentioning WiredWest.

# Executive Summary

Nearly 30,000 residents across western Massachusetts live on the wrong side of the digital divide. In 45 towns, most can access the Internet only through satellite connections, DSL, or a dial-up telephone connection—suitable only for email and basic browsing. A market dominated by the major cable and telephone companies has failed to provide these citizens with what is fast becoming a basic need like electricity or water. Similar problems afflict many rural communities in the United States.

In 2009, a state agency, the Massachusetts Broadband Institute (MBI), took advantage of a matching federal economic stimulus grant to finance an $89.7 million "middle-mile" fiber optic network called MassBroadband 123 (MB123) in the region. In line with federal requirements, this 1,200-mile network was designed to connect only libraries, schools, hospitals, and government buildings (known as community anchor institutions) in the unserved towns plus 79 other towns that had partial or full Internet access services over cable but not state-of-the-art fiber networks.[1]

To realize the full promise of MB123, new last-mile networks are needed to connect homes and businesses. The state legislature in 2014 authorized the issuance of $50 million in bonds for MBI to finance network construction, but didn't prescribe a process by which the money should be spent.[2] MBI decided to devote $40 million to provide last-mile connections in the unserved towns and $5 million to incentivize Comcast to complete networks in several partially served towns. Some of the remainder has been devoted to state administrative costs and planning grants. To date, one town—Leverett—has built a municipal fiber optic network that connects to MB123 (Leverett got started before the legislature created the last-mile fund but later received $806,000 from MBI).[3]

The library in Peru, Massachusetts, received a fiber connection to the MB123 network, which serves important community institutions.

WiredWest began in 2010 as a community organization, but grew into a legal cooperative formed by western Massachusetts towns. Technically, the cooperative is made up of municipally owned utilities called "municipal light plants" (MLPs) that the towns created in order to enter the telecommunications business. (Generally speaking, cooperatives are collectively owned organizations established to provide goods or services to their members.) Under WiredWest's plan, member MLPs would be obligated to pay approximately two-thirds of the cost of building a last-mile fiber network throughout the towns, which could be financed through municipal borrowing. So far, 31 WiredWest towns have passed a nonbinding resolution to participate and voters in 24 of these towns have authorized the necessary borrowing. (These votes do not obligate the towns to go forward as a cooperative; some are discussing other options. But most of the towns strongly support this approach.)[4]

In accordance with MBI policy that it must control construction, WiredWest would collect funds raised by the member towns and provide these funds to MBI, which, after adding its subsidy, would design and build the network.[5] WiredWest would own the network as a cooperative venture. The network—if built to serve 31 towns participating in WiredWest—would pass 20,000 homes and businesses in these towns. WiredWest plans to hire staff to provide and market services over the network,

but might outsource certain aspects of its operations to a commercial provider. To move the concept forward, WiredWest drafted an operating agreement and business plan and built a detailed financial model.

WiredWest hired a consulting firm with extensive experience in municipal Internet access projects to examine the WiredWest financial model. The consultant reported that WiredWest's plan was "likely to be sustainable," highlighting that a regional network would provide economies of scale that would make it more likely to succeed than any single-town network.[6] But WiredWest's future depends on MBI agreeing to WiredWest's plan. In December 2015, an MBI consultant released a sharp critique of WiredWest's financial model.[7] WiredWest published a rebuttal asserting that the MBI consultant's analysis contained misleading statements and inaccurate data.[8] MBI made no public reply to this rebuttal. The two sides have since held nonpublic meetings.

MBI also questioned the wisdom of collective network ownership through a cooperative instead of each town owning the network infrastructure within its boundaries. WiredWest is considering revising its plan to give individual towns local ownership of fiber cables in the town and equipment at customer premises.

Cooperatives are not new (see box on pages 14 and 15). Since the early years of the 20th century, electricity and telephone cooperatives have worked well in many rural areas of the United States. More recently, a cooperative called RS Fiber was formed to provide high-speed Internet access to several municipalities in a farming region around Gaylord, Minnesota. WiredWest would be unique in that it is a cooperative of municipal utilities, rather than of individual customers. But like most cooperatives, WiredWest has generated a sense of community that has helped towns agree to share risks in exchange for the prospect of cost savings and mutual support. Cooperatives do require compromise; once a municipality signs up, it must agree to abide by majority rule and give up direct control of the enterprise even within its boundaries. In WiredWest's case, control would be held by a majority of municipal neighbors rather than a cable or telecommunications company.

Twenty-four WiredWest towns have already passed $38 million in local borrowing authorizations to build a fiber network.

| **Funding achieved by 24 WiredWest towns:** | **Potential funding for 31 WiredWest towns:** |
|---|---|
| **$38,140,000** town borrowing authorizations | **$49,200,000** town borrowing authorizations |
| **$21,860,000** available state subsidy | **$28,070,000** available state subsidy |
| total: **$60,000,000** | total: **$77,270,000** |

Funding levels based on town-by-town cost estimates by a consultant to MBI.[9] Actual costs to be determined.

The question now is whether WiredWest will get the chance to realize its cooperative vision. In January 2015, a new governor, Charlie Baker, took office. Shortly after, he announced that the administration remained committed to the $50 million program to improve connectivity in western Massachusetts, saying that the funds "will be used to catalyze significant additional municipal and private investment, and will support innovative, sustainable, locally led projects."[10]

WiredWest believes it has created a detailed proposal to do just that. But a breakdown in the relationship between MBI and WiredWest was evident by the end of 2015. And in March 2016, the administration ordered MBI to "ensure that [MBI] is reviewing and analyzing all options" including "technologies, cost projections, and various project design and delivery, governance and operating models."[11] The statement did not mention WiredWest.

## The Formation of WiredWest

In 2010, anticipating the new MB123 backbone network's arrival, a small group of residents of western Massachusetts—co-led by Monica Webb, a former marketing executive from the Berkshire mountain town of Monterey—began meeting to discuss how their towns could build last-mile networks. They soon concluded that the complexity of the task required a collective approach. Forty-five towns—not precisely overlapping with the 45 underserved towns—initially formed a group that they called WiredWest. The group had a clear mission: "designing, building, and operating a community-owned, fiber-optic network in member towns."[12] Several local leaders formed the nucleus of the effort.[13]

WiredWest next set up a way for towns to join. The towns would vote on an article—proposed town legislation—at local "town meetings," a form of municipal governance dating back to colonial times that is still used throughout New England. By June 2010, 47 towns had passed the article, authorizing town representatives to participate in WiredWest decisions.[14]

WiredWest needed a legal structure that would allow it to enter the telecommunications business. The group sought advice from a municipal consultant and an attorney, both funded by planning grants from MBI and another regional organization. WiredWest settled on creating local utility companies called municipal light plants (MLPs).

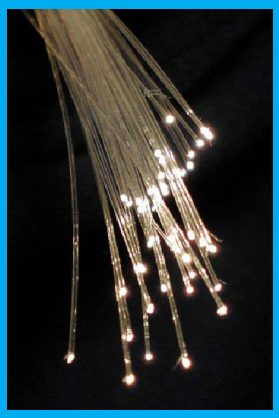
Monica Webb and her horse, Cody, take part in a WiredWest marketing effort.

Massachusetts municipalities originally formed MLPs more than a century ago to provide electricity. State law authorizing the creation of MLPs has been amended in recent years to allow MLPs to provide cable TV and telecommunications services.

By September 2010, the WiredWest town delegates and their advisors had decided to form a cooperative consisting of MLPs from WiredWest's member towns, as allowed under state

### THE LONG VIEW: WHY WIREDWEST TOWNS ARE VOTING FOR FIBER TECHNOLOGY

- Fiber optic cable is widely considered future-proof, allowing upload and download speeds that are orders of magnitude better than alternatives. A report last year by the intergovernmental Organization for Economic Cooperation and Development found "important economic and social developments related to the high availability of fiber access networks," when provided by either private companies or municipalities.[16]
- Currently, 45 western Massachusetts towns lack any high-speed Internet access. The area's sparse population makes high-speed networks commercially unattractive to private ISPs.[17] As is true in many of the nation's rural areas, the region is primarily served by slow DSL service, with some communities relegated to dial-up, satellite, or cellular service. Dial-up service often provide speeds of only 56 Kbps (0.056 Mbps). Satellite service is subject to transmission delays, usage caps, and high prices.
- In rural areas, DSL download speeds are typically between 1 Mbps and 3 Mbps. While upgrades to copper networks in the unserved towns of western Massachusetts could boost speeds substantially over short distances, the results would fall far short of what fiber can provide while still requiring significant infrastructure investments.



law.[15] Forming a new MLP requires approval by two-thirds votes taken at two separate town meetings. By mid-2011, 22 of the WiredWest towns had created MLPs. In August of 2011, WiredWest was officially incorporated as a cooperative of these 22 MLPs. This new entity was called the WiredWest Communications Cooperative Corporation (WWC). By the fall of 2014, its membership had grown to 44 MLPs.

Not all western Massachusetts towns are associated with WiredWest. Seventy-nine towns reached by MB123 have sufficient high-speed Internet access that they are not eligible for state funding to aid in building a last-mile network, and thus cannot be part of WiredWest's plan (which itself depends on state funding in order to be viable). Similarly, seven WiredWest member towns are partially or fully served by cable, and thus ineligible for the funding that WiredWest seeks. Finally, not all towns that joined WiredWest stayed with the group. One town, Otis, decided last fall to withdraw and explore building its own single-town network.[18]


The town green in Chesterfield, a WiredWest town, is decorated with a WiredWest pre-subscription lawn sign.

## Developing a Business Plan and Raising Money

In 2012, WiredWest sent out cards asking residents what types of services would interest them—Internet access, digital phone, TV—and enlisted a local market research firm to assess demand for a last-mile fiber network and help design specific service offerings.[19] In 2015, WiredWest launched a pre-subscription effort, encouraging residents to submit a $49 deposit and indicate what combination of Internet access, phone, and TV services they wanted. To date, WiredWest has collected more than 7,100 pre-subscription deposits from residents of 31 towns.[20]

WiredWest initially planned to finance the entire last-mile network itself. But then the Massachusetts legislature passed a bill in 2014 that set aside $50 million for MBI to use to support last-mile construction. MBI decided it would oversee construction projects using its grant funds plus local funds. A consultant to MBI estimated that building out a fiber network to all 45 unserved towns would cost $112 million—a figure that included the cost of Leverett's network.[21] The estimates for the 31 towns that have passed resolutions indicating they intend to participate in WiredWest add up to $77 million (see box on page 5).

During the fall of 2014 MBI and WiredWest jointly conducted nine public meetings for town officials about the concept of a cooperative last-mile project. A joint PowerPoint presentation made at these meetings said MBI and WiredWest had worked together. It said MBI had made a preliminary evaluation and that "MBI finds the current WiredWest proposal to be a high-quality solution to address the need for ubiquitous service." The presentation said MBI found that WiredWest had drafted a "credible outline of a sustainable business plan" that nevertheless needed further due diligence.[22] In December 2014 and January 2015, 31 town Select Boards passed resolutions stating that they intended to participate in the project as WiredWest members. WiredWest set the goal of getting each town to authorize borrowing for its share of funding for the project. So far, 24 WiredWest towns have done so, authorizing total borrowing of more than $38 million.

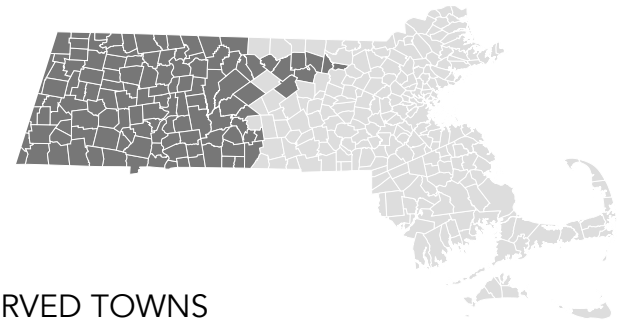
Residents of Monterey, Massachusetts, gather in the town firehouse in the summer of 2015 to hear a presentation by WiredWest leaders including Steve Nelson, standing at center, and Jim Drawe, in red.

In January of 2015, MBI hired a new director, Eric Nakajima. On July 30, 2015, the MBI Board of Directors adopted a Last-Mile Program Policy, written by Nakajima, which stated that "regional broadband networks … will be owned by their respective municipalities."[23] Massachusetts state law allows formation of MLP cooperatives, and WiredWest's draft operating agreement, produced in late 2015, has a corporate structure that WiredWest says complies with state law.[24]

In August 2015, the Select Board of Otis, Massachusetts, voted to withdraw from WiredWest, citing a desire to own and control all network infrastructure within its borders. Town Manager Chris Morris also said he was skeptical that WiredWest could be financially viable. In an interview, Morris said he had not sought an expert third-party evaluation of whether a stand-alone town network represented a more viable path. Otis town leaders cited additional concerns including that the financial model included $1.5 million in salaries for administrative, sales, and marketing staff. Town leaders regarded the figure as excessive given that WiredWest would not be operating the network, and would be purchasing services from third parties. Otis also said it wished for its buildout to include "drops"—final connections from poles to premises—to all properties even if the property owners were not subscribing.[25]

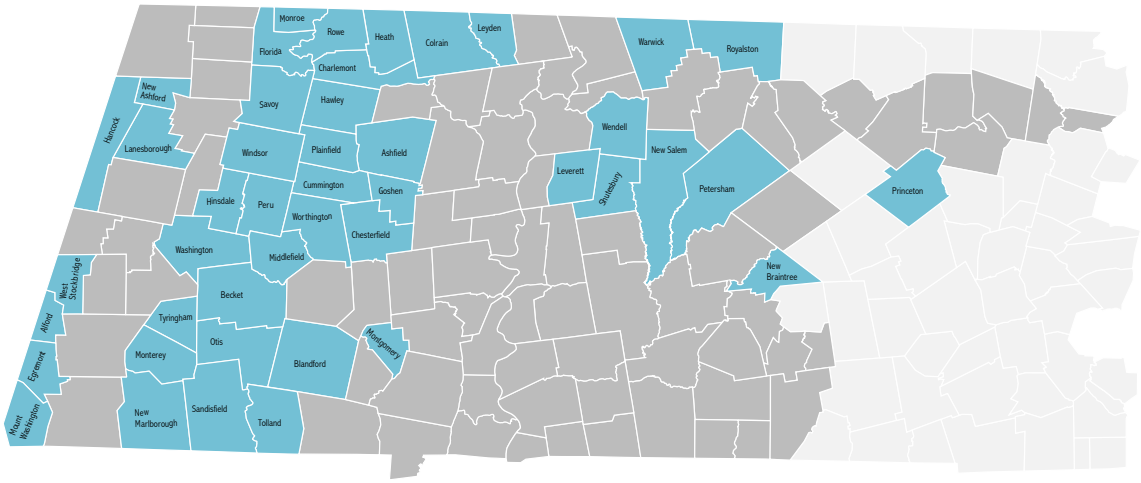
WiredWest responded that its scale would reduce costs; that staff were important to making the business succeed and that the $1.5 million for salaries reflected conservative modeling assumptions, not a budget; and that it would install "drops" to properties that took service at the time of construction with others able to connect later for a fee, which it said was standard business practice.[26] In October 2015, Otis authorized borrowing $4 million for a fiber buildout; under the town's plan, the town will work directly with MBI on the buildout and then seek firms to operate the network and provide services.[27]

# A Cooperative in Context: Trying to Finish the Job



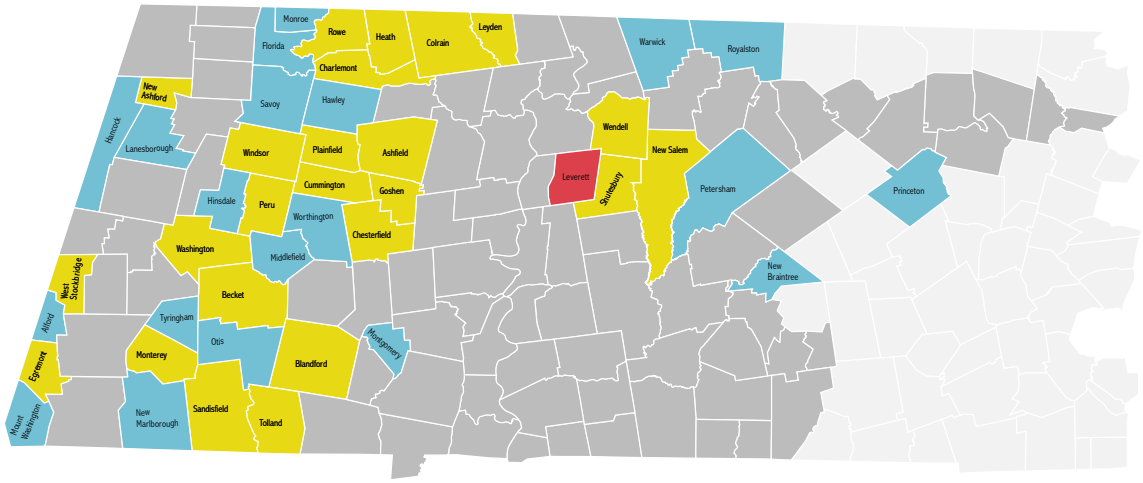
## 2009-2013: A MIDDLE-MILE BUILDOUT REACHES UNSERVED TOWNS

In 2009 a Massachusetts state agency, the Massachusetts Broadband Institute (MBI), started building an $89 million "middle-mile network," funded partly by a federal grant. The network now connects public buildings and community institutions in 123 towns including 45 (shown in blue) deemed "unserved" because they lacked any high-speed Internet access. The state later authorized $50 million in borrowing to subsidize Internet access connections to homes and businesses in these towns plus seven more with partial cable service.




## 2016: WIREDWEST PROPOSES TO SERVE MUCH OF THE REGION

As of 2016, only one of the 45 unserved towns (Leverett, in red) has built a last-mile network. WiredWest has made the most substantial proposal for the remainder. Twenty-four towns (in yellow) are WiredWest members that have passed bond authorizations totaling $38 million. Nothing requires them to stay with WiredWest, but most are strong supporters. Other unserved towns are discussing a variety of options or are taking no action.



## WiredWest's Financial Model

As part of its planning, the WiredWest executive team developed a detailed financial model and business plan covering the first 20 years of network operation. WiredWest contracted with CTC Technology & Energy, a consultancy with extensive experience in municipal Internet access projects, to review WiredWest's plans. In a report released in late 2015, CTC found the WiredWest financial model "well designed and depicts a reasonable portrayal of its business, given the model's underlying cost and revenue assumptions" and added that the "scale of the project will allow towns to save on many fixed costs, provide stronger purchasing power, and enable service options that would not be feasible for a single town to offer on its own." CTC pointed out some areas that needed adjustment. For example, it questioned WiredWest's prediction that customers would tend to buy more expensive plans over time. In response to this and other concerns, WiredWest made several changes. Notably, it increased its estimate—to 55 percent from 47 percent—of property owners who would need to subscribe (often called the take rate) in order to cover costs, repay debt service incurred by the towns, and retain maintenance reserves.[28] The network in Leverett has so far achieved an 80 percent take rate despite not offering TV service. (The comparison is not perfect; Leverett has propor-

# Prices Proposed by a Multi-Town Cooperative

### WIREDWEST'S PLANNED SERVICE OFFERINGS

WiredWest has advertised the following prices and service levels (reflecting identical, or "symmetrical," upload and download speeds) with its pre-subscription campaign.[29] WiredWest hopes to generate enough revenue to cover payments on debt incurred by member towns to fund network construction. If that doesn't happen, property owners in WiredWest towns would also pay an average annual property tax increase of between $150 and $220.

| | |
|---|---|
| 25 Mbps Internet access | $49 monthly |
| 100 Mbps Internet access | $79 monthly |
| 1 Gbps Internet access | $109 monthly |
| Phone service + nationwide calling | Additional $25 monthly |
| TV service | Pricing and offerings not yet determined |
| Seasonal rates for summer visitors | Pricing and offerings not yet determined |

### A LOCAL FRAME OF REFERENCE: LEVERETT

Leverett, Massachusetts, is the only town that has yet built a last-mile network from the MB123 network. For 1 Gbps symmetrical service, Leverett's price is lower than what WiredWest proposes to charge. WiredWest plans to offer lower service tiers for lower prices and to offer TV services, which WiredWest says is only possible because of the cooperative's scale. In Leverett, the average property owner also pays $219 annually in additional property taxes to pay for network construction.

| | | |
|---|---|---|
| 1 Gbps Internet access | $24.95 + $49.95* | $74.90 monthly |
| Telephone | $24.95 + $49.95* | $74.90 monthly |
| Both | $39.95 + $49.95* | $89.90 monthly |

*$49.95 is Leverett's "MLP fee," which may decline as more subscribers join.

### ADJUSTING THE PLAN TO ALLOW LOCAL OWNERSHIP OF SOME ASSETS

The draft WiredWest operating agreement says that member towns are not permitted to withdraw from the cooperative for 10 years, allowing time to complete the buildout and stabilize operations. After 10 years, a town could withdraw and surrender its ownership interest in the coop in exchange for having the balance of its debt paid off. But ownership of all network infrastructure would be retained by the cooperative, which would continue to provide services to the residents of that town.

In response to concerns expressed by a few towns and by MBI in December of 2015, WiredWest leaders began discussing how to revise the ownership model in the operating agreement. At its meeting on April 2, 2016, WiredWest's board of directors approved pursuing development of a revised model, under which WiredWest would own the central network and each town would own its local fiber infrastructure and the equipment at customer premises in the town. If a town withdrew and chose to retain ownership of that infrastructure, it would then be able to operate its own single-town network and retain its own ISP.[30]

tionally more permanent residents than many WiredWest towns.) In rural electrical coops in other parts of the country, take rates for Internet access offerings in unserved areas are typically between 50 percent and 60 percent.[31] The average property owner in the 31 towns could experience an annual property tax increase of between $150 and $220 to cover debt service, but WiredWest expects that earnings above its breakeven point will be used to repay the towns' debt instead.[32]

As a final step, WiredWest made a change to its proposed ownership structure under a draft operating agreement that it circulated to member towns in late 2015. The new draft agreement established WiredWest's MLP cooperative as a limited liability company, or LLC. Under this structure, the towns would own the WiredWest coop on a basis proportional to the towns' investments, and the WiredWest coop would, in turn, directly own the network.[33] With that, as of late 2015, following five years of community organizing and marketing, and development of a business plan, financial model, and operating agreement for dozens of towns, one significant milestone remained: obtaining MBI approval.

Town delegates pose in Cummington, Massachusetts, on August 13, 2011, after signing the agreement creating the WiredWest cooperative.

## MBI Moves to Steer Towns Away From WiredWest

On December 1, 2015 (coincident with the release of CTC's study), MBI's director, Eric Nakajima, set up a conference call with Steve Nelson and Jim Drawe of WiredWest.[34] During the call, Nakajima said MBI would encourage towns not to sign WiredWest's proposed operating agreement. A short time later, MBI posted on its website a letter to that effect from Nakajima to municipal leaders in the WiredWest region. The letter urged the towns to consider "new pathways." Nakajima wrote: "The MBI believes that the current draft WiredWest operating agreement is not compatible with the best interests of the Commonwealth, the towns, or their residents. The operating agreement cou-

pled with the business plan would require substantial, in some ways fundamental, revision in order to succeed as a reliable framework for the start-up and operation of broadband service in the region."

Nakajima's letter said that WiredWest "would own and operate the network on behalf of the towns" and cited concerns that individual towns were surrendering direct local control. MBI also questioned whether the WiredWest cooperative would be competent to manage the business. The letter said single-town networks were a viable option for WiredWest towns: "As Leverett's success shows, a single-town approach to broadband service can work. However, MBI believes that a regional approach to policy making, procurement and shared services is the preferred pathway, and that there are ways to make a regional model work."[35]

Several days later, WiredWest rebutted MBI's statement, which it said had "sown confusion in the towns, thrown the project into chaos, and subjected it to further delays." The WiredWest rebuttal, issued on December 9, 2015, stated: "It is misleading to imply that WiredWest has changed its mission, or that it is an entity separate from the towns ... It is a cooperative of the towns, by the towns and for the towns. WiredWest is nothing but the towns." It added: "The towns are choosing to jointly own the network and WiredWest serves as the mechanism to manage it. WiredWest is committed to repaying the debts of its members, which no other provider of Internet service is proposing to do."[36] WiredWest is now considering revising its draft operating agreement to address concerns over local ownership (see preceding page).

Eric Nakajima, MBI's director, resigned in February 2016.

Further details of MBI's objections emerged publicly at a December 10, 2015, meeting of MBI's board of directors attended by consultants to MBI: Wipro, a technical consulting firm; and Mintz Levin, a law firm. The consultants have performed a variety of tasks for MBI, including studying WiredWest's plan.[37] At the meeting, Wipro released a study itemizing what it said were omissions or other flaws in the WiredWest financial model. Wipro's report said WiredWest's plan was "not viable as currently defined" and went on to list what it contended were cost assumptions omitted from WiredWest's model.[38]

In WiredWest's view, the Wipro study was based in substantial part on inaccurate data and misleading statements. On December 15, WiredWest offered a point-by-point rebuttal. For example, Wipro said WiredWest had failed to include general and administrative expenses in its model, but WiredWest said those expenses were fully detailed.[39]

The events of December 2015 suggested a breakdown in communication between the state agency tasked with ensuring that high-speed Internet access service reaches people in western Massachusetts and the entity attempting to provide such service to the largest number of potential customers in that region. The MBI board chair, Katie Stebbins, assistant secretary of innovation, technology, and entrepreneurship in the state Executive Office of Housing and Economic Development, concluded the meeting by saying the board wanted MBI staff and WiredWest to work together to resolve whatever differences could be resolved and then make a mutual presentation at a subsequent board meeting. As of April 15, 2016, MBI had not hosted such a joint meeting.

On Christmas Eve, 2015, MBI issued sections of a draft request for proposal (RFP) for design and engineering services for last-mile networks in up to 44 unserved towns. The draft RFP said

the design might be organized around "smaller groupings or clusters of towns that decide to participate in a centralized design and construction process administered by Mass Tech Collaborative." (MTC is the parent agency of MBI.) The language did not mention any cooperative structure or control but rather described a process in which towns would answer to MTC. "Towns and their MLPs are the customers of Mass Tech Collaborative. Each town will ultimately own the last mile network built in the town. A town may have its MLP serve as the political body responsible in the decision making process for each town and will provide high-level requirements for its Last Mile network. Mass Tech Collaborative will communicate directly with the towns or their MLPs."[40]

MBI gave towns in the region until January 15 to offer feedback. Many town administrators wrote letters expressing surprise at the short deadline. Many said their rural Select Boards were not planning to meet over the holidays and that scheduling an emergency meeting during the period was infeasible. Several wrote letters to MBI opposing any RFP issuance before WiredWest's status was clarified. For example, the broadband committee in Charlemont, a WiredWest town, said that the document should explicitly allow for MLP cooperatives and that because local governments would pay two-thirds of the costs, they should have a say on bid specifications and network design.[41] MBI extended the comment period until January 29. As of April 15, 2016, MBI had not issued a final RFP.

WiredWest board members Jean Atwater Williams, Becky Torres, and Monica Webb at a March 2016 meeting.

At a March 2016 MBI board meeting, Elizabeth Copeland, center, was appointed interim director.

At a January 26, 2016, MBI board meeting, the MBI chair, Katie Stebbins, said the Baker administration had ordered a review by two additional agencies, Administration & Finance (A&F) and the Department of Revenue (DOR), triggering what she described as a "pause" in any last-mile funding for the 45 unserved towns. She explained: "We've been asked to just pause ... so that we have time to really work clearly with A&F and DOR so we can answer all their questions and make sure we are all on the same page."

On February 12, 2016, Nakajima resigned from his position as MBI's director. In a February 26, 2016, email, an MBI spokesman said that MBI's reviews and discussions with WiredWest were continuing but that he could not provide details. On March 14, 2016, Stebbins and Nakajima's interim replacement, Elizabeth Copeland, sent a letter to western Massachusetts community leaders and state legislators stating that the Baker administration wanted to ensure MBI was "reviewing and analyzing all options." It gave no timetable for the review and did not mention WiredWest.[42] On April 13, 2016, an agency spokesman said the ongoing study included the exploration of an alternative governance model in which towns could form a voluntary consortium and jointly seek bids for services. But he said this was only one approach under consideration, adding: "In the coming weeks, we'll be working with the administration and the MBI on a proposed path forward." He said the details of this proposal could not yet be shared.[43]

## A Long History of Cooperative Enterprise

The modern cooperative can be traced to 18th century England and France, where weavers agreed to make purchases as a group in order to get better prices. The idea spread quickly after the Industrial Revolution to include worker cooperatives, consumer cooperatives, farm cooperatives, cooperative schools, credit unions, building societies, and mutual insurance companies. These ventures were owned and operated by their members for their members, typically under a set of principles that emphasized the values of self help, democracy, and social responsibility.

President Franklin Delano Roosevelt signs the Rural Electrification Act with U.S. Rep. John Rankin (left) and Sen. George William Norris (right).

Cooperatives provide benefits in terms of economies of scale and market power. Central purchasing, coordinated production and marketing, shared business information, and collective purpose are all hallmarks of cooperative enterprise. Cooperatives that follow traditional cooperative principles typically govern themselves on a "one-member-one-vote" principle rather than voting on the basis of the amount of each member's investment and allocate surplus earnings or profits on the basis of "patronage" of the coop's goods or services rather than capital contributed. Most also qualify for favorable tax treatment.

Some of the unique aspects of traditional cooperatives can also be detriments, however. In particular, restricting governance and investment returns solely to members deprives cooperatives of access to outside equity capital, which can be a major competitive disadvantage in capital-intensive businesses. Similarly, allocating votes and profits on the basis of membership and participation rather than capital contribution creates disincentives to investment and often leads to inefficiency in operations. In light of these issues, a number of cooperatives have found ways to mitigate these disadvantages through different governance and legal structures, joint ventures, and changes to the laws governing cooperatives.

## Cooperatives for Utility Services

Although companies such as General Electric, Westinghouse Electric, and American Telephone & Telegraph were providing electricity and telephone services in large cities and towns by the turn of the 20th century, Americans in rural areas were left behind. Just as municipalities in rural Massachusetts provided their own electricity and telephone services in response to that private sector failure, farmers in a number of states formed cooperatives to build their own telephone and electricity systems. Lack of adequate financing and poor management doomed many of these early cooperatives, however.

## A New Deal

President Franklin Roosevelt's New Deal saw the introduction of the Federal Communications Commission and the Rural Electrification Administration, both of which began to attack the problem of rural connection directly in order to achieve universal utility service. The telecommunications and electricity industries fought back, arguing that government had no right to

The Rural Electrification Administration (and, later, the Rural Utilities Service) provided financing to rural cooperatives that erected power and telephone lines.

compete with private enterprise, even as they continued to refuse affordable service to farmers because of the lower financial returns they would get from wiring all of rural America.

Rather than take on the task of building needed infrastructure through direct government action, the Rural Electricity Administration and, later, the Rural Utilities Service, began providing long term, low cost financing and guarantees to rural electricity and telephone cooperatives.

## Cooperative Utility Finance

Although substantial, the financing support provided by the Rural Utilities Service proved insufficient and too uncertain to meet the needs of America's rural cooperatives. Taking matters into their own hands, the nation's rural electricity cooperatives formed the National Rural Utilities Finance Corporation to provide a reliable source of additional funding controlled by the cooperatives themselves. Over the years, the Cooperative Finance Corporation (CFC), as it is known, has become a highly rated issuer of bonds in the capital markets, channeling long-term, lower-cost financing through to its members.

Rural telephone funding faced similar uncertainty in budget battles that occurred during the administration of President Ronald Reagan, prompting rural telephone providers to join with the CFC to form the Rural Telephone Finance Cooperative. The RTFC provides financing to its members, including rural cooperatives and small telephone companies that are independent of the former Bell system companies, like AT&T and Verizon.

## The Benefits and Challenges of a Cooperative Approach

WiredWest was created by towns in western Massachusetts as a collective effort aimed at tackling the challenge of bringing last-mile high-speed Internet access to homes in an underserved rural area. But the model has national relevance. Without the need to generate high dividends for shareholders, groups of municipalities elsewhere could form cooperatives to do regional buildouts.

Nationally, the entities most similar to WiredWest are electricity or telecommunications cooperatives that, while not affiliated directly with member towns, offer Internet access services to their member-owners, with profits returned to the customers. Paul Bunyan Communications, for example, is a telecommunications cooperative based in rural Bemidji, Minnesota. It was formed in 1950 as a telephone cooperative and has slowly added services since then, including fiber Internet. Co-Mo Electric Cooperative, a similar company in central Missouri, is also beginning to offer Internet access service. And in Gaylord, Minnesota, RS Fiber is a consumer-owned coop providing fiber-based Internet access. WiredWest differs in that it is a cooperative of municipal light plants, not of consumers.

# Conclusion: Next Steps for MBI and the Commonwealth

The Baker administration, which in 2015 approved going ahead with a $50 million subsidy program, has asked MBI to examine all options for providing high-speed Internet access service to unserved towns in western Massachusetts.

In that context, we offer the following recommendations to MBI:

• **Favor the better, long-term solution over the cheaper, short-term fix.** If the options to be reviewed for Internet service in western Massachusetts include alternative telecommunications technologies, MBI should conduct a thorough life-cycle analysis and give preference to technologies that demonstrate superior value over a minimum of 30 years. In that regard, MBI should be aware that, compared with fiber optics, copper-based technologies typically have significantly lower capacity, degrade more quickly, and have greater potential for technological obsolescence. Similarly, while wireless technologies can play important roles over short distances, they have not been shown to offer the proven reliability, capacity, and environmental suitability of high-speed networks based primarily on fiber optics.

• **Give careful consideration, if not deference, to the preferences of local communities.** Many WiredWest towns have already voted overwhelmingly to incur debt to finance approximately two-thirds of the cost of a fiber network and have indicated a preference to go forward as part of WiredWest. WiredWest's plan has been vetted by a nationally recognized municipal broadband consultancy, and WiredWest's detailed rebuttal of an MBI consultant's critique has not been publicly challenged. If there are objectively clear ways to improve WiredWest's plan, MBI should focus on working with WiredWest to implement those improvements. Such an approach would be more constructive than public disagreements over business plans and proposed legal structures and would make less likely the waste of years of good-faith efforts by the WiredWest communities. For example, the experts engaged by MBI and WiredWest could be encouraged to work together to come to a consensus professional view or, at the very least, reduce the scope of their professional differences and agree on what differences remain. In a similar vein, if towns prefer to act collectively to share costs and risks, MBI should be cautious about advocating stand-alone single-town networks or imposing a policy of single-town ownership of network assets unless those approaches are demonstrably better at reducing overall costs and risks.

• **Consider models that could increase competition rather than favor incumbent monopoly providers.** Given that reliance on incumbents has failed to bring western Massachusetts the level of Internet access service enjoyed by the rest of the state, if MBI's review of options includes different business models, MBI should opt for models that would increase the number of competitors serving the region. In that regard, MBI should consider the feasibility of separating the utility function of network ownership and operation from the provision of Internet access services over the network. Although WiredWest was advised early on that an open-access model might not be feasible for the project, successful examples of that approach exist both in the United States and in Europe.

A WiredWest lawn sign on a rural road.

• **Proceed cautiously when considering federal funding programs.** If the western Massachusetts options include the exploration of possible federal funding, MBI should take seriously the possibility that any applicable federal program could result in significant delays, complications, and loss of flexibility. MBI should weigh carefully the chances of successfully securing significant additional federal funding for a regional high-speed Internet access buildout against the risk that pursuing that funding might prove harmful to the project in the long term.

• • •

The road to connectivity in western Massachusetts continues to be a long one. In July of 2010, when a federal grant was announced to help build the MB123 network, lawmakers lined up to declare an end to rural digital inequality. A statement from U.S. Representative Richard Neal (D-Milford), was typical: "The $45 million federal investment announced today will bring high speed internet access to more than one million people in western Massachusetts, thousands of businesses in the region, and hundreds of community organizations. It will create jobs and help strengthen our local economy."

That hasn't happened yet. Six years later political uncertainty casts a pall over progress toward the goals Neal and many other policymakers articulated.

## Authors

David Talbot is a Fellow at the Berkman Center for Internet & Society at Harvard University. Waide Warner is a Senior Advisor and Lecturer on Law, Cyberlaw Clinic, Harvard Law School. Susan Crawford is John A. Reilly Professor at Harvard Law School and Co-Director of the Berkman Center.

## Acknowledgments

Thanks to Rob Faris, Research Director at the Berkman Center for invaluable comments on drafts of this report; Daniel Dennis Jones, Digital Media Producer at the Berkman Center for tireless assistance in designing the final product; and Kelley McGill for research assistance.

## Funding

The authors gratefully acknowledge the support of the Open Society Foundations, which provided a grant to the Berkman Center to further research aimed at helping communities explore options for providing high-speed Internet access.

# ENDNOTES


1: “The Middle Mile: MassBroadband 123.” MassBroadband 123. Accessed March 6, 2016. http://broadband.masstech.org/building-networks/middle-mile/massbroadband-123

2: “Bill H.3770.” The 188th General Court of The Commonwealth of Massachusetts. Accessed March 6, 2016. https://malegislature.gov/Bills/188/House/H3770/History

The enabling legislation describes the $50 million as “A reserve to provide funds to the Massachusetts Broadband Incentive Fund established by section 6C of chapter 40J of the General Laws...”

3: Crawford, Susan P., and Robyn Mohr. “Bringing Municipal High-Speed Internet Access to Leverett, Massachusetts.” *Berkman Center Research Publication No. 26*, December 17, 2013. http://ssrn.com/abstract=2366044

A case study of LeverettNet published by the Berkman Center.

4: *Appendix H Survey Results*. PDF. WiredWest, February 4, 2016. http://wiredwest.net/2015s2/wp-content/uploads/2016/03/Appendix-H-Survey-Results-Feb-4-2016.pdf.

Survey of the status of each of the 31 WiredWest member towns.

5: *Last Mile Broadband Policy*. PDF. Massachusetts Broadband Institute, July 30, 2015. http://broadband.masstech.org/sites/mbi/files/documents/building-the-network/mbi-last-mile-program-policy-07-30-2015%20.pdf

6: Columbia Telecommunications Corp. *High-Level Assessment of the WiredWest Financial Model*. Report. December 1, 2015. http://wiredwest.net/2015s2/wp-content/uploads/2015/12/CTC-Report-to-WiredWest-final-20151201.pdf

7: *WiredWest Business Model Review and Potential Options for Unserved Towns in Western Massachusetts*. PDF. Wipro Technologies, December 10, 2015. http://broadband.masstech.org/sites/mbi/files/documents/building-the-network/wiredwest-business-lan-analysis-wipro.pdf

8: *WiredWest Rebuttal of Wipro Paper of December 10, 2015*. PDF. WiredWest, December 2015. http://wiredwest.net/2015s2/wp-content/uploads/2015/12/WiredWest-Rebuttal-of-Wipro-paper-of-December-10-2.pdf

9: Markarian, Joe. “Cartesian_MBI Fiber Cost Model_v35 2015 02 23 Deliverable (112 Model).xlsx.” Spreadsheet. Created for Massachusetts Broadband Institute, February 23, 2015.

10: “Baker-Polito Administration Announces State Support for High-Speed Internet Expansion in Western Massachusetts.” News release, February 18, 2015. http://www.mass.gov/governor/press-office/press-releases/fy2015/support-for-high-speed-internet-expansion-in-western-ma.html

11: “MBI Letter to Town Officials.” Letter from Katie Stebbins, assistant secretary of technology, innovation and entrepreneurship in the Executive Office of Housing and Economic Development, and Elizabeth Copeland, MBI interim director. March 14, 2016. http://www.townofhawley.com/wp-content/uploads/docs/Broadband/MBI-Letter-to- Towns-3-14-16.pdf

12: WiredWest. “22 Towns Have Voted so Far—Most Unanimously—To Direct Their Selectboards To Join WiredWest’s Community Fiber-Optic Network.” News release, May 10, 2010. http://wiredwest.net/2015s2/uploads/2010/07/WiredWest-press-release-May-10-2010.pdf

13: The leadership team included Reva Reck, vice-chair and town liaison (Reck passed away in 2014); Steve Nelson, chair of the legal/governance committee; Jim Drawe, chair of the finance committee; Jean Atwater-Williams, clerk; Kevin Cahill, chair of the technology committee, and Glenn Cardinal.

14: WiredWest. “All Towns Ratify WiredWest Warrant Article and Convene for First Meeting.” News release, June 27, 2010. http://wiredwest.net/2015s2/uploads/2010/07/WiredWest-press-release-Jun-27-2010.pdf

15: “General Laws: Chapter 164, Section 47C”. Massachusetts State Legislature. Accessed April 1, 2016. https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXXII/Chapter164/Section47c

16: Mölleryd, B. (2015), “Development of High-Speed Networks and the Role of Municipal Networks”, *OECD Science, Technology and Industry Policy Papers*, No. 26, OECD Publishing, Paris. http://dx.doi.org/10.1787/5jrqdl7rvns3-en

17: WiredWest. “Is Verizon DSL Service Good Enough?” News release, October 2010. http://wiredwest.net/2015s2/wp-content/uploads/2012/10/Is-DSL-Good-Enough1.pdf

18: Lindsay, Dick. “Otis Drops Out of Wired West; Will Pursue Own Broadband Service.” Berkshire Eagle, September 8, 2015. http://www.berkshireeagle.com/local/ci_28775639/otis-drops-out-wired-west-will-pursue-own

19: WiredWest. “WiredWest Celebrates Milestones and Path Forward on First Anniversary.” News release, August 13, 2012. http://wiredwest.net/2012/08/13/wiredwest-celebrates-milestones-and-path-forward-on-first-anniversary-2/

20: “Campaign Zones.” Become a Fiber Town!, WiredWest. Accessed March 14, 2016. https://register.wiredwest.net/#campaign_zones

21: Markarian.

22: *Solving the Last Mile: Fall 2014 Municipal Leaders Meeting*. PDF. Massachusetts Broadband Institute; Wired West; and FRCOG, November 06, 2014. http://broadband.masstech.org/sites/mbi/files/documents/building-the-network/mbi-wiredwest-municipal-outreach-presentation-11062014.pdf

23: *Last Mile Broadband Policy*.

24: “General Laws: Chapter 164, Section 47C”

An MLP cooperative is “a body politic and corporate.”

25: Morris, Chris. Interview by David Talbot. November 2015

26: WiredWest. “Response to the Withdrawal of Otis from WiredWest.” News release, 2015. http://middlefieldma.net/wp-content/uploads/comcom/lastmile/otis-withdrawal-ww-response.pdf

27: “Otis Broadband Plan.” Town of Otis - Technology Committee. Accessed March 26, 2016. http://www.townofotisma.com/Pages/OtisMA_Commissions/OtisMA_Technology/technology

28: *High-Level Assessment of the WiredWest Financial Model*.

29: “Campaign Zones.”

As of late 2015, 22 WiredWest towns had obtained $49 subscription precommitments from at least 40 percent of their households.
30: A concept paper for "Plan A2," allowing towns to own local infrastructure, was presented by Steve Nelson to the WiredWest board of directors on March 26, 2016.
31: Clemsen-Roberts, Alyssa. "Transcript: Rural Utilities Building Broadband Networks." Interview. Community Broadband Networks. October 7, 2014. http://muninetworks.org/content/transcript-rural-utilities-building-broadband-networks
Alyssa Clemsen-Roberts is manager of industry affairs for rural infrastructure issues at the Utilities Telecom Council.
32: "If There Were No Debt Reimbursement from Revenue, What Would Be the Tax Impact?" WiredWest. Accessed March 6, 2016. http://wiredwest.net/faq-items/if-there-were-no-debt-reimbursement-from-revenue-what-would-be-the-tax-impact/
33: *Operating Agreement of WiredWest Municipal Light Plant Cooperative*. PDF. WiredWest, February 16, 2016. http://wiredwest.net/2015s2/wp-content/uploads/2012/10/WiredWest-Operating-Agreement-2-10-16-Draft.pdf
34: Nelson, Steve. Interview by David Talbot. December 10, 2015.
35: "MBI Statement on WiredWest Plans". Letter from Eric Nakajima, Director, Mass. Broadband Inst., to Municipal Broadband Leaders. December 1, 2015. http://broadband.masstech.org/sites/mbi/files/documents/building-the-network/mbi-statement-on-wiredwest-plans-12-01-2015.pdf
36: "Rebuttal to the Statement by the Massachusetts Broadband Institute of December 1, 2015." WiredWest. December 09, 2015. http://wiredwest.net/2015/12/09/wiredwest-rebuttal-of-mbi-statement-of-dec-1/
37: Agenda and Meeting Documents, Massachusetts Technology Park Corporation Procurement Committee. PDF. Massachusetts Technology Collaborative, February 17, 2016.
38: *WiredWest Business Model Review and Potential Options for Unserved Towns in Western Massachusetts*.
39: *WiredWest Rebuttal of Wipro Paper of December 10, 2015*.
40: *Request for Proposals for Design and Engineering Support Services for the Last Mile Networks Project*. MBI, December 24, 2015. RFP No. MBI-2016-02. http://broadband.masstech.org/sites/mbi/files/documents/building-the-network/2016-MBI-02_RFP_Design_Engineering_Support_Services_Excerpts- Municipal_Review_Draft.pdf
41: "Town of Charlemont Comment Letter in Response to MBI RFP." Charlemont Broadband Committee to Eric Nakajima, Director, Massachusetts Broadband Institute. January 11, 2016. http://mbi-rfp-comments.info/wp-content/uploads/2016/01/MBI_BBC_RFPResponse_2016Jan11-1.pdf
42: "MBI Letter to Town Officials."
43: Noyes, Brian. Email to David Talbot. April 13, 2016.

## Photo Credits

Page 4: Mary Serreze; page 6: Maggie Leonard; page 7: Mary Serreze; page 8: Tim Newman; page 11: Bob Armstrong; page 12: Mary Serreze; page 13: David Talbot; Tim Newman; page 14: public domain; page 15: USDA; page 16: Tim Newman