Massachusetts Broadband Solution

Executive Summary

Free Press applauds the bold action taken by Gov. Deval Patrick and the Legislature to bring broadband to the 32 unserved communities of Western Massachusetts and to expand service in the more than 60 underserved communities across the state. For too long, citizens of this region have been deprived of the tremendous social and economic benefits that this transformative technology can offer. The Massachusetts Broadband Incentive Fund is the best chance of turning our collective hope for the Internet into reality.

We are excited to add our voice to the Massachusetts Technology Collaborative and the Massachusetts Broadband Institute's "Call for Solutions." We were heartened to hear the words of Berkshire Connect's Donald Dubendorf during the Oct. 25 town hall meeting in Greenfield, where he said, "If we have to wait a little longer to get it perfect, we will." While Free Press is not advocating slowing down the process of connecting Western Massachusetts, we believe those implementing the build-out of Internet service should strive for solutions that maximize public interest outcomes.

This response to the Call for Solutions answers the Massachusetts Broadband Institute's (MBI) specific questions about business and technical model development and approaches. Free Press' response offers specific suggestions that will strengthen the vision of the governor, our state legislators and MBI, by establishing vital protections for the public. Our analysis reveals that due to underlying economic market factors, the MBI network will likely result in the establishment of a single broadband provider serving each community; that is, the project will result in the establishment of a monopoly. Natural monopolies in telecommunications networks are common, and monopoly harms are easily avoided through the implementation of consumer protection policies. We believe that consumer protections governing the use of the MBI network will not discourage market entry or

private investment. Recognizing that building the infrastructure is only one step, we are asking MBI to adopt a set of public interest principles to guide the project and to encourage a set of community services to increase adoption of new technologies.

These pro-consumer principles are:

- Anti-Discriminatory Network Management Rules: MBI should seek network providers that commit to a prohibition on discriminatory network management practices that block, degrade or privilege lawful Internet content.

- Open Access Rules to Promote ISP Competition: If a single provider is given a facilities-based monopoly, then that provider must provide all facilities- and nonfacilities-based competitors network access on a reasonable wholesale basis.

- Interconnection Rules: MBI should seek to fund networks that are committed to reasonable and nondiscriminatory interconnection with adjacent and competitive network infrastructure.
- Universal Service Area Commitments: MBI should seek to fund networks that serve everyone in our communities in a timely manner.

- Reasonable Rates: MBI should seek to fund networks that make broadband service available at affordable rates.

- Investment in Digital Inclusion: MBI should seek to fund networks required to redirect a percentage of their revenue back into our communities to promote digital literacy, community technology centers, and infrastructure for community media.

- Data Disclosure: MBI should require all service providers using public funds to disclose granular data on broadband subscribership, availability, price and speed to MBI, the state legislature, and federal agencies.

Our analysis also reveals that the deployment of a high-capacity fiber-to-the-home network will result in greater interest from private providers and will maximize consumer benefits. Such networks are "future-proof" and are capable of providing consumer video products as well as enabling users to create and share rich media content with others. This capability will result in higher adoption levels and higher revenues per user — both of which increase the long-term viability of the network. It will also be a boon to local economies – especially rural economies – by stemming the tide of outmigration and providing infrastructure necessary to support existing home-based business and telecommuting opportunities. Because of this, we encourage the MBI to study the feasibility of a fiber-to-the-home solution, which has superior economic benefits than other broadband options. As many Massachusetts residents have been affected by the country's economic crisis, a fiber-to-the-home deployment project will create more new jobs than other broadband scenarios. Data suggests that construction of such a network falls within the budget allocated by Gov. Patrick.

Technical & Business Models and Approaches/Financing and Public Role

Free Press' response to the Call for Solutions answered the following of MBI's key questions:

TECHNICAL MODEL AND APPROACH
- What technical approach is most appropriate and why?
- What specific services and product offerings will be available beyond entry level, commercial Internet access (e.g. video, telephony)?
- What service and speed levels are achievable with your conceptual approach?

BUSINESS MODEL AND APPROACH
- What business models should be used or considered in the deployment of broadband?
- What conditions and services are necessary for a sustainable business model?

FINANCING
- How and on what terms should the Broadband Institute structure the deployment of the publicly owned assets for use by participants?

PUBLIC ROLE
- What reporting requirements are appropriate for service providers?

Free Press[1] appreciates this opportunity to offer our analysis and perspective on solving the broadband availability problems in Western Massachusetts, and on the specific questions posed above. Our organization is based in Hampshire County, giving us first-hand experience with the problems created by this region's lack of adequate broadband access.

As a public interest organization focusing on communications policy, Free Press is well aware of the difficulties inherent in making broadband deployment a reality.

Free Press is impressed by the opportunity this legislation creates to connect the unserved residents of Western Massachusetts. But because the legislation involves the allocation of scarce taxpayer resources, it is paramount that the $40 million allocated to the Massachusetts Broadband Institute (MBI) is spent wisely. Such a large investment requires that the public's interest comes first.

The MBI has a responsibility to maximize the efficiency of the funds allocated to bring broadband to Western Massachusetts by investing in "future-proof" technologies. The MBI must also ensure parity between Western and Eastern Massachusetts: Those living in the western part of the state deserve access to a reasonably comparable level and quality of broadband service as citizens in Boston have — and at a reasonably comparable monthly cost. MBI should study the feasibility of a fiber-to-the-home solution where possible and

[1] Free Press is a national, nonpartisan organization working to reform the media. Through education, organizing and advocacy, we promote diverse and independent media ownership, strong public media, and universal access to communications.. We are based in Florence — a neighborhood in the city of Northampton, Massachusetts. This report was authored by S. Derek Turner, with assistance from Adam Lynn and Julie Schwartz.

practical, as this future-proof infrastructure is most likely to attract private investment and maximize consumer adoption.

At its core, this project involves using public funds to lower barriers to entry for private companies, with the hope that public investment will promote private investment in these very rural areas. But this characteristic creates a challenge: ensuring that the resulting monopoly does not behave like a monopoly.

In competitive markets, consumers benefit from lower prices and a higher quality of service. Competition also disciplines "bad actors" by empowering consumers with the freedom to vote with their wallets and their feet. Unfortunately, the underlying factors that have thus far kept the 32 communities of Western Massachusetts without broadband service will remain no matter the level of public infrastructure investment. It is simply uneconomical for more than one facilities-based broadband provider to deploy service in these extremely challenging geographic areas. Therefore, the likely end result of the MBI project is the establishment of a broadband monopoly.

In these "natural monopoly" situations, consumers need not be abused. MBI can enact policies that bring the benefits of competition to Western Massachusetts. Indeed, such policies are commonplace in many European and Asian countries where consumers have access to only a single broadband facilities-based infrastructure, but multiple retail service providers using that same infrastructure. This is made possible through the successful implementation of "open access" policy. We outline below the details of open access policy, and discuss this policy in the context of the MBI project.

But access policy is not by itself enough to fully protect consumers from the natural whims of private monopolies. This is why MBI must build a network that preserves and promotes the open and non-discriminatory traits of the Internet. MBI must affirm that consumers using the new network infrastructure have a right to access all lawful content, applications and services of their choosing. Private companies that use the MBI network to offer consumer broadband access must not be allowed to discriminate against Internet content by blocking, degrading or privileging. All content, regardless of source, ownership or destination, should be treated equally on the MBI network.

Additionally, MBI must create a structure that guarantees basic public benefits, such as funding for technology training and community media infrastructure. MBI should recognize that the barriers to Internet access extend beyond a broadband connection; many people in Western Massachusetts do not have the equipment or skills to successfully use the Internet.

Affordable access to broadband is only part of the solution. In order to bridge the digital divide between those who are accustomed to utilizing these resources and people and communities that have been left offline, attention must be focused on education and skill development in order to increase and facilitate adoption of new technologies. Typically disenfranchised groups in society, such as seniors, racial minorities and low-income households, often lack access to new developments in technology, affording them fewer opportunities to gain the skills needed to maximize the benefits of a broadband connection. Outlined below are suggestions for how MBI can implement these practices.

The MBI project has most of the elements needed to succeed. First, it recognizes that a state-owned and state-funded infrastructure solution is the best option for the unserved portions of Western Massachusetts. Though the legislation is somewhat vague in this area, it seems to leave the door open for a full-scale backbone-to –home deployment model. This is likely the best solution for Western Massachusetts, as it may be difficult to attract providers to build out "last mile" infrastructure in these areas even if the state builds the POP-connections, fiber rings and wireless towers.

The legislation, however, lacks basic consumer protection language, and does not establish any guidelines for, or obligations on, winning network providers. We feel this oversight can and should be remedied. We have put forth a series of recommendations that incorporate the lessons from other state-level broadband deployment efforts and federal-level policy initiatives. We believe these recommendations will strengthen already well-designed legislation.

Solutions for Western Massachusetts

The recently enacted legislation provides a bold and well thought-out policy framework for bringing broadband to the 32 unserved communities in Western Massachusetts and the more than 60 underserved communities across the state. MBI has received a generous amount of funding to bring service to these areas, and has been endowed with enough latitude and autonomy to make difficult and highly technical decisions.

As consumer advocates, we feel that MBI can build on this solid foundation by adopting the following guiding principles and consumer protections.

Protection from Monopoly Harms

The underlying economic roadblocks that currently keep providers from deploying in the 32 unserved communities will remain even if the state finances the build-out of a network. At best, a single facilities provider will be enticed to offer service on the MBI network, and it is even possible that the RFP will be designed to achieve such an outcome.

This high likelihood of MBI establishing a broadband monopoly in the 32 communities necessitates basic consumer protections. In general, these protections are:

- Anti-Discriminatory Network Management Rules: No provider using the MBI network should be allowed to discriminate against Internet content by blocking, degrading, or privileging. All content, regardless of source, ownership or destination, should be treated equally on the MBI network.

- Open Access Rules to Promote ISP Competition: If a single provider is given a facilities-based monopoly, then that provider must provide all facilities-based competitors unbundled network access on a reasonable wholesale basis. The monopoly provider must also provide all non-facilities-based Internet Service Providers access on a reasonable wholesale basis via line-sharing arrangements.

• Interconnection Rules: Those entities offering service on the MBI network must interconnect on a reasonable basis with all other network operators. For example, if different retailers serve two communities on the MBI network, then those retailers must interconnect with one another on a reasonable basis. Interconnection arrangements on the MBI network will enable the unserved communities to form an "intranet," allowing for more efficient communications between the communities on the network.

• Universal Service Area Commitments: Any entity granted the right to offer service on the MBI network must provide service to all customers in their service area who request it. No "redlining" will be permitted.

• Reasonable Rates: MBI should establish guidelines that prevent network operators from unjustly increasing service rates. MBI should seek to keep retail rates in line with state averages.

Ensuring Parity with Eastern Massachusetts

The legislation does not set specific service quality thresholds, but does discuss building a "future-proof" network. We strongly believe that the $40 million in taxpayer funds should be used to build the most efficient and future-proof network possible.

Though establishing specific speed definitions in the legislation may be too restrictive, the legislation should direct MBI to construct networks that have a service quality that is reasonably comparable to that available on networks serving the citizens of Boston.

Though the difficult geographic terrain may necessitate wireless solutions in some areas, we strongly encourage MBI to study the feasibility of a fiber-to-the-home solution. A fiber-to-the-home (FTTH) network would be the most future-proof, and because of its high capacity, would enable providers to offer video distribution services (like cable TV). This ability to offer video over the network will add tremendous value to the network, value that will increase the potential ARPU and ultimately entice more interest from private providers.

It is very likely that a fiber-to-the-home solution will fall within the $2,500 per home budgeted under the legislation. An engineering study commissioned by the Berkshire and Pioneer Valley Connect programs indicated an approximate cost of $1,000 to $1,500 per home deployment under a backbone-to-wireless infrastructure model.

This estimate, however, was done under a framework that considered the cost of connecting three individual Western Massachusetts towns — separately. It is likely that the construction of a region-wide network connecting the 32 unserved towns would result in scale cost-savings. These savings could be directed toward deploying a FTTH solution for as many homes as possible (see Figure 1).

A recent estimate by a rural Vermont FTTH company put the cost per rural home for FTTH at $2,900 ($1,100 to pass each rural home and $1,800 for the actual "hook up" of the home).[i] Of course, some rural homes are more "rural" than others, while some unserved

homes lie in urbanized clusters inside rural areas. Thus, a FTTH solution for Western Massachusetts is certainly within the paramers set by the legislation.

In the long run, a FTTH solution will have more benefits, as more homes will adopt the service, and reap a higher value from the network.

Figure 1: Per Household Costs & Benefits of the MBI Project

Deployment Solution	Infrastructure Deployment Costs (per deployed household)	Monthly Operational Costs (per adopting household)	Potential Monthly Revenues (per adopting household)
POP/Backhaul/Mesh	$1,000-$1,500	$1.50-$10	$15-$50*
POP/Backhaul/FTTH	$1,500-$3,000	$5-$25	$15-$150*
Budgeted Under House No.4311	2500#	N/A	N/A

Amount is calculated based on $25M bond allocated to serve the 10,000 homes located in the 32 unserved towns

* Amount reflects willingness to pay per subscribing household; FTTH estimate reflects potential additional video revenue

source: authors estimates, based on data gathered by the Berkshire and Pioneer Valley Connect Projects as well as Vermont's VallyFiber company

Incorporating Open Access and Non-Discriminatory Broadband Principles

Telecommunications markets are not like grocery stores: Deploying communications networks comes with extremely high fixed costs and economies of scale and scope. Thus, the barriers to entry are high, and such markets can be characterized as "natural" monopolies. In fact, many telecom network infrastructures around the world are monopolies. It is simply too costly from an economic perspective to deploy more than one network infrastructure. In the United States and Canada we see an exception to this economic rule, due to the large deployment of cable television infrastructure. In the United States, we have a "natural duopoly;" much of the rest of the world lacks cable infrastructure, due to a long and complex regulatory and social history.

The practical result of a natural monopoly (or natural duopoly, to a lesser extent) is the loss of the benefits of competition. Unregulated monopolies will reduce output, provide a lower quality of service, raise prices far above marginal cost, avoid innovation, and potentially engage in service behavior that would not be permissible in a competitive market. But if a monopoly is "natural," then what is the appropriate response? Natural monopolies are a classic example of market failure that requires some level of governmental intervention to ensure the market functions closer to the competitive ideal. The intervention of choice in telecommunications markets is found in "open access" policy.

Given that the MBI network will likely result in, at best, a single provider per unserved area, it is clear that open access policy is needed to bring consumers some of the benefits of competition that they would not otherwise receive from an unregulated monopoly.

In practice, this would mean that an incumbent would control the network infrastructure all the way to the customer premises, but customers could choose a third-party company like Earthlink as their Internet Service Provider. The ISP would line-share from the incumbent on a wholesale basis, and would handle all billing and customer service duties. The option for a customer to choose among ISPs would bring some of the benefits of competition, such as lower prices and better customer service. And it would create an incentive for incumbents to not engage in any unseemly network practices, such as blocking or degrading certain Web sites.

This last point is important. Federal law currently provides no consumer protection against broadband providers that would choose to block, degrade or otherwise discriminate against Internet content based on its source, ownership or destination. In theory, a competitive marketplace would provide such consumer protection, as any deviation from an open and neutral Internet architecture implemented by network operators would be met with consumers' exercising their ability to choose another operator. But the U.S. broadband marketplace is not competitive, even in the largest cities. It certainly is not competitive in rural areas and will not be in the areas served by the MBI network. This will be the case even if open access policies govern the network.

Community Set-Asides on the MBI Network

The MBI's approach to increasing broadband adoption should be two-pronged. First, these should include the funding for and establishment of community technology centers to provide digital literacy and computer training, and to promote computer donation programs. Second, MBI must ensure that the consumer protections which are currently being undermined by changes in video service franchising are protected – including build-out requirements and the protection of funding and distribution for public access, educational, and governmental (or PEG) channels.

Although the fine print may vary, the principle remains quite simple: The use of public funds to dig up public rights of way must ensure adequate and forward-thinking consumer protections. Much like the franchise agreements negotiated between cable and telephone companies as they enter localities, MBI's future network should ensure strong pro-consumer, public interest protections. MBI, as the advocate for the public interest, must ensure that all contracts negotiated between MBI and potential service providers include public interest set-asides for our communities that will work to bridge the digital divide. These set-asides should include the establishment and continued funding of community technology centers (CTCs), provision of low-cost computers and technology training classes, and protections for community media.

Community Technology Centers – Training and Equipment

Community technology centers (or CTCs) are a vital public resource in bridging the digital divide in America. These centers provide residents access to computers, training and assistance, and digital literacy skills. States across the country are realizing that in order to attract businesses and promote healthy communities, funding is needed for both broadband

deployment and digital education and training. These funds should be used to create CTCs in Western Massachusetts and to establish a continual funding stream for digital literacy training and courses. Massachusetts has at least 19 CTCs in operation across the state, the majority of them situated in the greater Boston area, with at least two located in the western part of the state.

MBI should ensure that all contracts with private ISPs incorporate language that guarantees seed funds for CTCs throughout Western Massachusetts. MBI contracts should also include funds to be set aside in order to supply low-cost computers to CTCs, libraries and schools in the region. The residents of Western Massachusetts must be able to make the most of the vast economic, educational, governmental, health, and other benefits that are made possible through both accessing and utilizing a broadband network.

Public Interest Protections for Community Media

As broadband connections provide not only connectivity to the Internet but also the opportunity to distribute video and voice services, these networks provide tremendous opportunities for diversifying the marketplace of telecommunications services. Whenever public rights of way are used to build these networks, it must be ensured that communities are able to negotiate for public interest set-asides. Traditionally, these terms have been established through local franchise agreements, which have given communities the ability to ensure build-out to all homes as well as funding, facilities and distribution for public access, educational, and governmental channels (PEG channels). Statewide video franchising agreements have replaced local franchise agreements in many states and have undermined and eroded important public interest protections. These changes have caused significant damage to provisions that ensure providers do not "redline" certain neighborhoods, and have eroded the PEG system, which offers some of the last space on the television dial for public use. These channels are often the only media outlets that broadcast local voices and issues, provide space for communities traditionally shut out of commercial media, and show the inner workings of local government.

The MBI network can establish itself as a nationwide leader in innovation by ensuring the viability of PEG in the broadband age. By negotiating a structure that ensures continual funding of twenty-first century community media centers, MBI's network can become a trailblazer in nurturing the development of a growing public media sector in Western Massachusetts. By providing space for alternative media production and distribution on the network, the region will advance the public interest instead of shutting it out of the picture.

In order to fund initiatives that will work to bring digital inclusion to Western Massachusetts along with universal access, MBI should negotiate contracts with any private investors that will require that a percentage of revenues be redirected back into the community. There are a number of approaches that could be used to achieve this. One example is the model employed by the City of Minneapolis, which established a Digital Inclusion Fund. This fund received a substantial investment by the Internet service provider, and sustained its funding by receiving 5 percent of the ISP's pre-tax income, 100 percent of community portal revenues, and 2 percent of all net profit of revenues from other local governments utilizing the network.

Public Role and Reporting Requirements

Currently, federal broadband data collection is woefully inadequate. In order for progressive governments to ensure that their residents are getting connected to high-speed Internet, service providers must be required to disclose granular data on broadband subscribership, availability, price and speed to MBI and the state legislature, as well as be prepared to provide this information on the federal level.[ii]

Conclusion

Free Press is thankful to DTC Commissioner Sharon Gillette and the MBI for their efforts in reaching out to the residents, advocates and potential Internet providers in Western Massachusetts during the most recent planning stages of this project. Your commitment to building a sustainable, feasible and timely broadband deployment plan is evident. We believe that by integrating public interest protections into the plan, Western Massachusetts will soon see a robust and exceptional broadband network.

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[i] *See* "Rural FTTP 'perfectly economical,' says Muni Fiber Veteran," *Telephony Online*, April 29, 2008).

[ii] *See* Comments of Free Press, *In the Matter of Development of Nationwide Broadband Data to Evaluate Reasonable and Timely Deployment of Advanced Services to All Americans, Improvement of Wireless Broadband Subscribership Data, and Development of Data on Interconnected Voice over Internet Protocol (VoIP) Subscribership*, Federal Communications Commission, WC Docket No. 07-38.