Western MA and MBI

Dialing-Up Broadband

Introduction

Why are we here

- We want broadband at similar pricing and speed/capacity everywhere
- We want to create discussion among providers, vendors, and consumers to aid in the design of a solution to the lack of broadband access in areas of western, MA
- A forum to discuss MBI's process of funding the deployment of broadband

What must MBI wrestle with

- Broadband? What is it? 768k DSL or 100Mbps FiOS?
- Trading off bandwidth, upfront costs, reliability, and sustainability

How fast is the market moving? FAST!

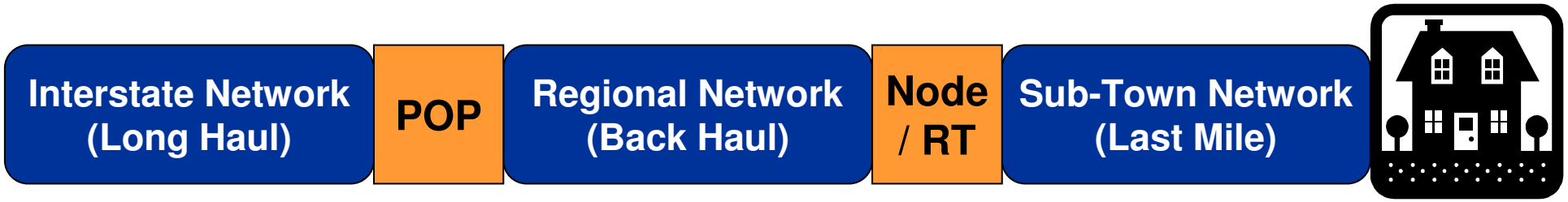
- Years to 25% penetration of the population:
- **Cars: 55, Electricity: 45, Telephone: 35, TV: 26, Computer: 14, Cell phone: 12, Broadband: 6**

Framework for considering technologies

Cost & Speed of Deployment	• How fast can the technology be deployed? • How much will the deployment cost? • What existing assets can be used in the deployment
Bandwidth / Capacity	• How much bandwidth can the technology support? • How many users can the technology support? • What services can the technology support?
Ongoing Operations	• How much does it cost to operate and maintain? • Is the network impacted by issues like weather?
Ease of Upgrading	• How much will it cost to upgrade the network? • How much of the network will need to be upgraded? • How often will the network need to be upgraded?
Flexibility of the System	• Can the infrastructure support multiple platforms? • Can the network be wholesaled to other providers?

General network architecture and design

– The network consists of three major sections (interstate, regional, and local) and two major interconnection points



Connection to All Major Cities	Springfield or Albany	Network Connecting Towns or Neighborhoods	Town or Neighbor-hood	Network Connecting Homes
Already Exists		Patchy / Minimal		Exists for Some Technologies but not Others

Increasing Aggregation of Internet Traffic

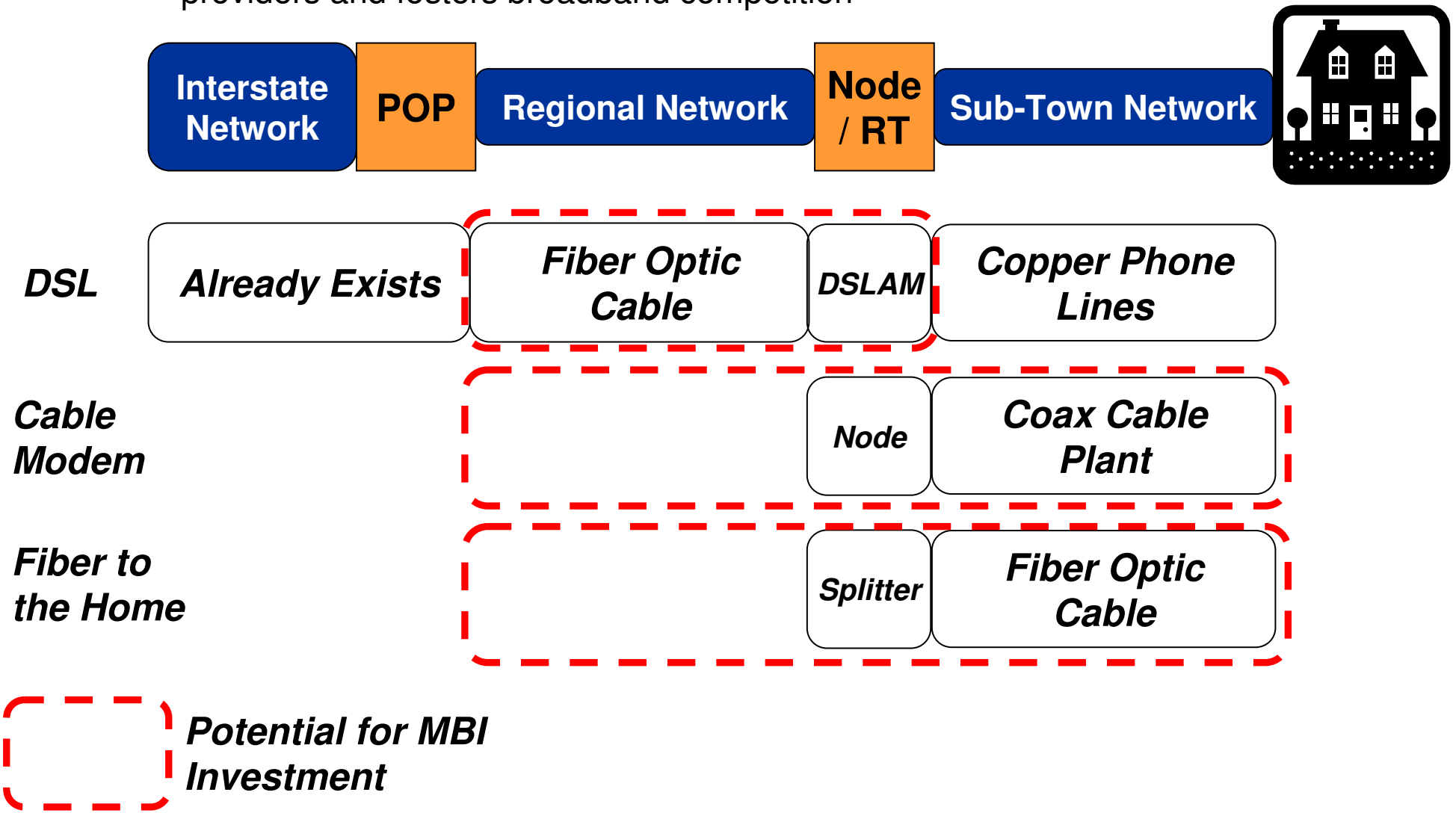
Increasing Need for Capacity / Bandwidth

There are five major technologies for delivering broadband service

DSL	• Broadband service over existing telephone lines
Cable Modem	• Broadband service deployed over cable TV networks
Fiber to the Home	• Fiber optic networks built for voice, video, and data
Wireless	• Wireless networks built specifically for broadband • Existing cell phone networks upgraded to offer broadband
Broadband over Powerline	• Broadband service over electrical power lines

DSL, Cable Modem, and Fiber to the Home…

– MBI investment could result in a regional network that supports multiple service providers and fosters broadband competition

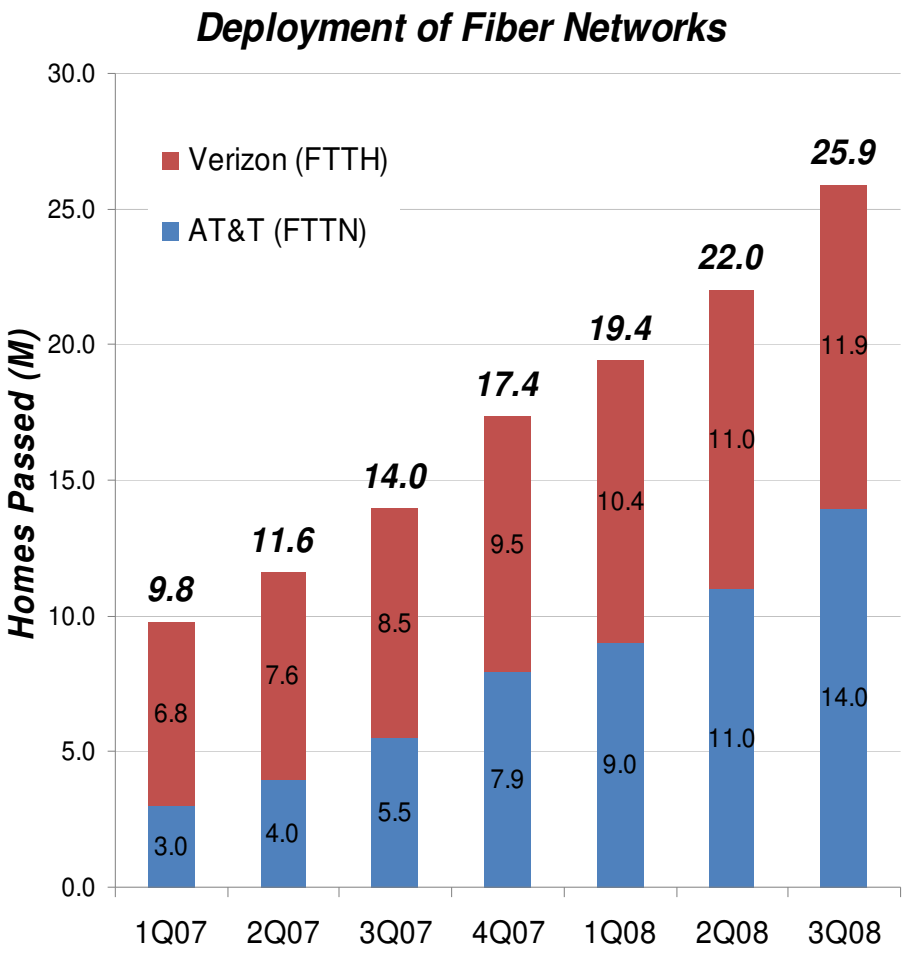


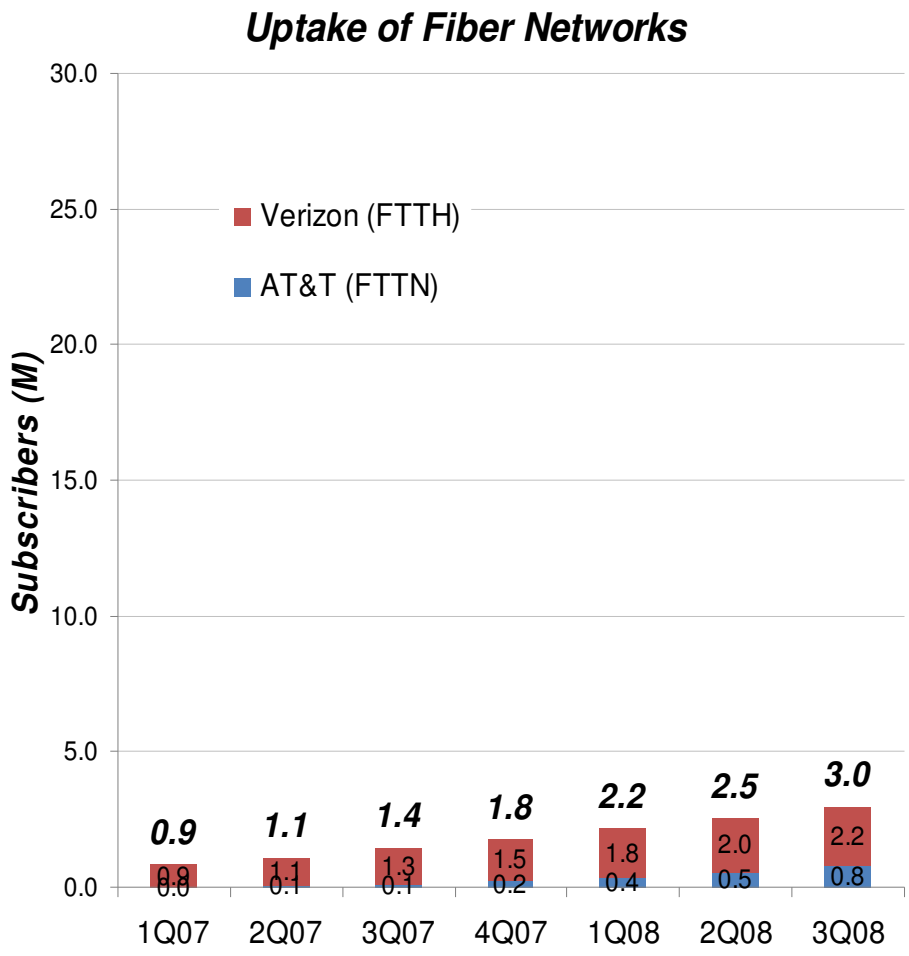
How do these technologies compare?

	Capacity / Bandwidth	New Construction Required	Services Enabled	Leverage of Existing Assets	Cost
DSL	• 768kbps to 22Mbps • Loop length and plant quality	• Some regional fiber • DSLAMs or extended RTs	• Voice • Data • Some video	• **High** • Existing fiber and last mile phone lines	• **$$$**
Cable Modem	• 1.5mbps to 300Mbps • Docsis level, homes per node	• Regional fiber network • New last mile Coaxial cable	• Voice • Data • Video	• **Moderate** • Neighboring fiber or nodes	• **$$$$**
Fiber to the Home	• Over 1Gbps	• Entire fiber network	• Voice • Data • Video	• **Minimal** • Some regional fiber	• **$$$$$**

Deployment of fiber networks is growing, but uptake is slower than originally anticipated

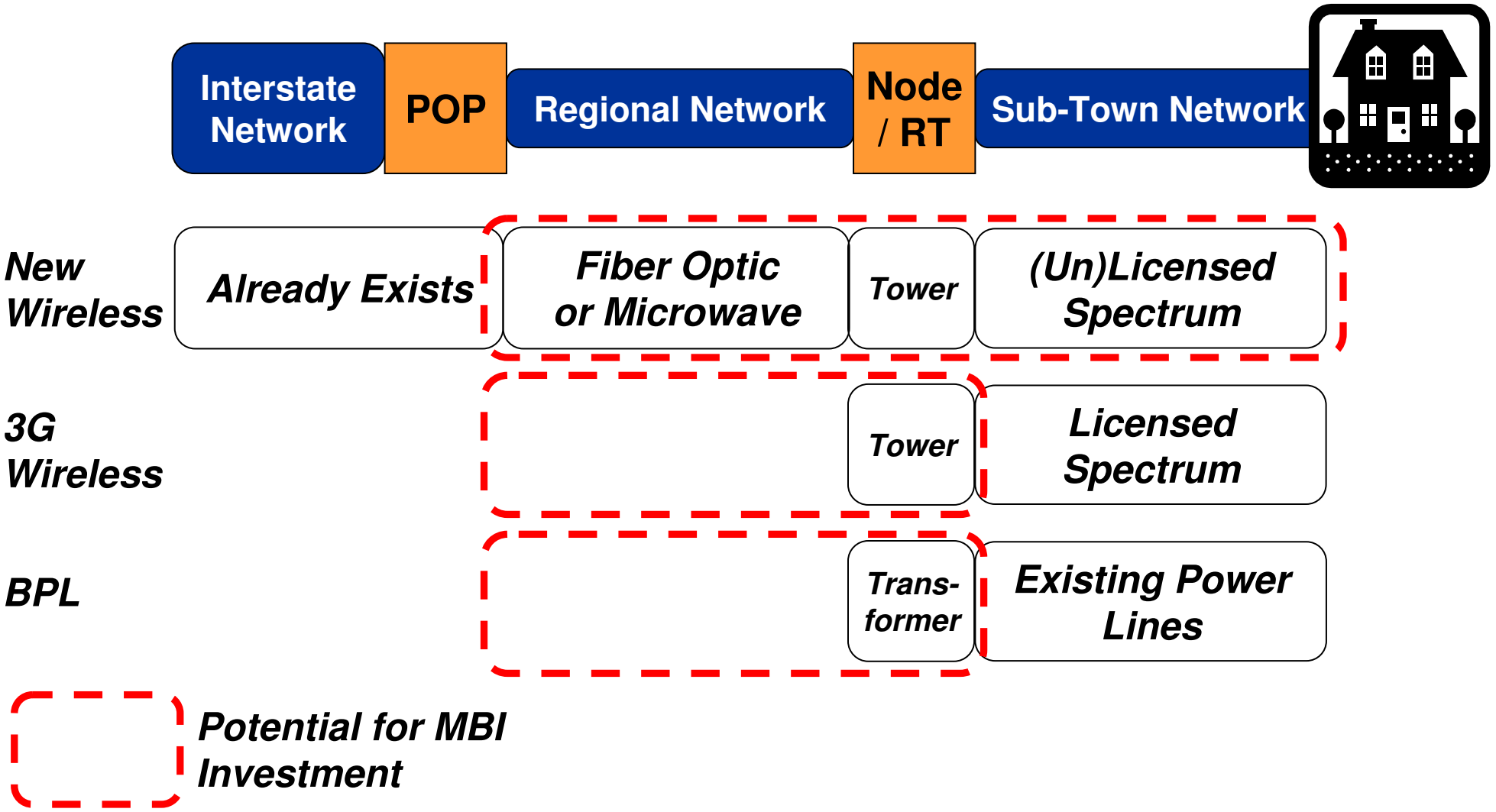
– Neither at&t nor Verizon are generating profits from their fiber deployments yet





Towers and utility poles may provide additional options for deployment of wireless and BPL systems

- Microwave radios can rival fiber connections over distances up to 3 miles
- MBI may also consider owning licensed spectrum



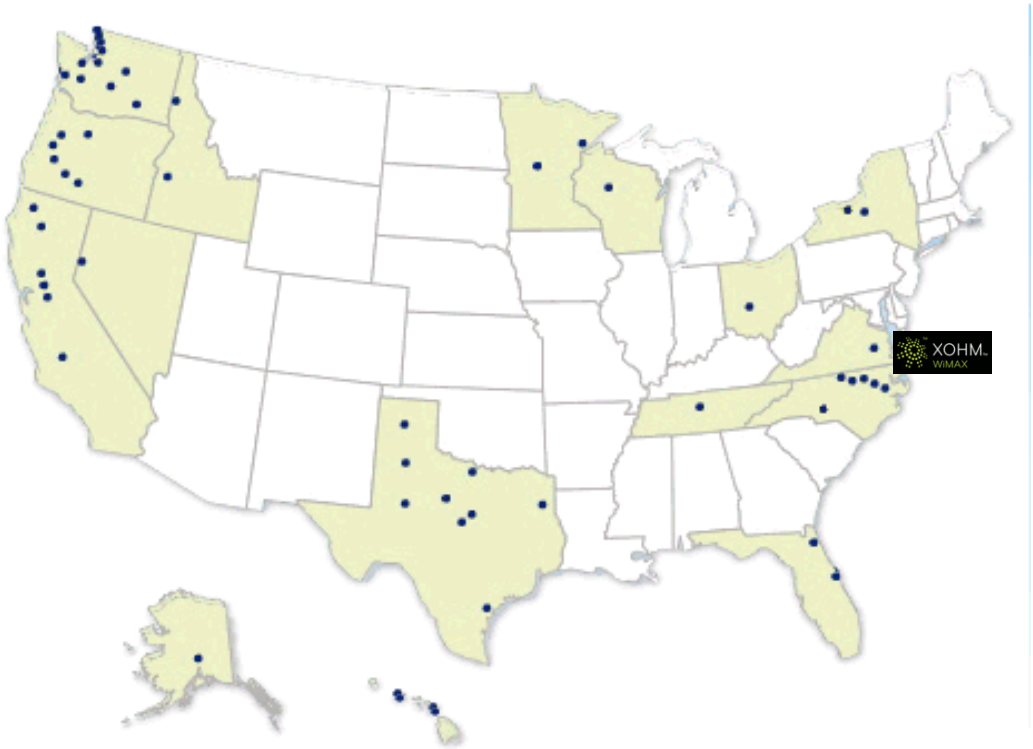
Wireless and BPL offer lower bandwidth than DSL, Cable or Fiber, but also are more cost efficient to deploy

– Both technologies avoid installing new cabling on long rural routes

	Capacity / Bandwidth	New Construction Required	Services Enabled	Leverage of Existing Assets	Cost
Wireless	• 3G Limited to 7Mbps • Fixed up to 50Mbps • Spectrum and technology	• Towers • Backhaul network	• Voice • Data • Limited video	• **Moderate to low** • Towers and Spectrum	• **$$**
BPL	• Up to 10Mbps • Power plant quality and transformer density	• Regional fiber network • Power grid replacement	• Voice • Data • Limited video	• **Moderate** • Last mile and some fiber	• **$$$**

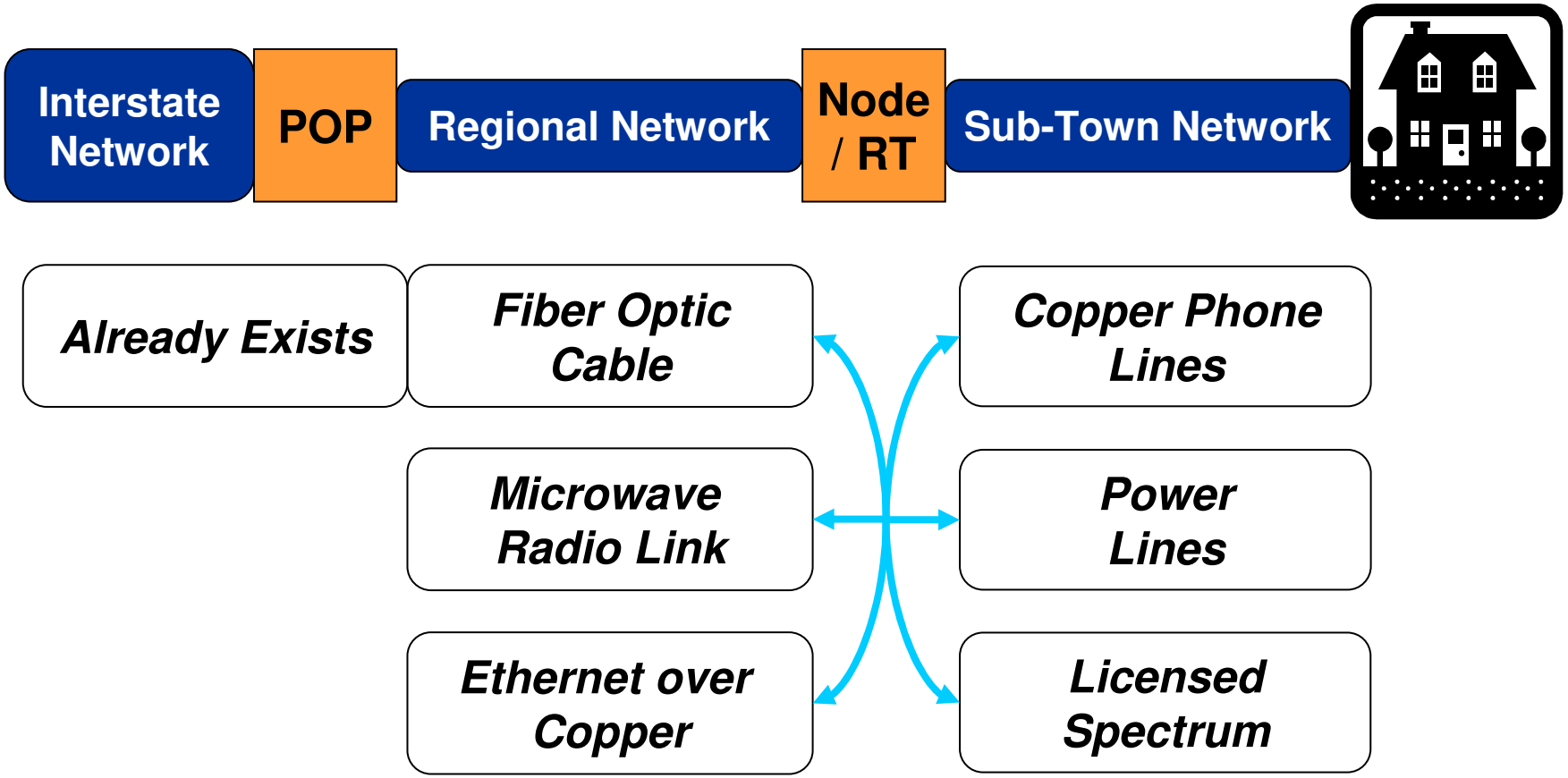
A large group of companies has teamed to deploy a nationwide WiMAX network

- Cellular carriers will not release 4G services until 2010 at the earliest
- Monday, Xohm and Clearwire completed their merger under the Clearwire name



Ultimately, the design will likely be a variety of technologies for each stage. Some examples below

– A portfolio of solutions could allow for each to be specifically tailored for a geographic region of Western, MA



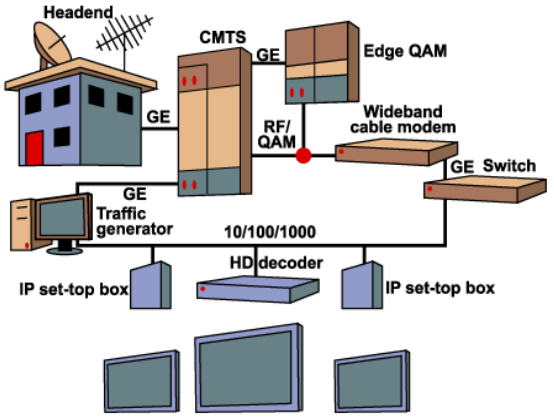
Whitespace spectrum, DOCSIS 3.0

Whitespace

- Additional spectrum wireless broadband
- Preliminary approval from FCC
- Final rulemaking unlikely until Obama FCC seated

DOCSIS 3.0

- Increase cable modems to over 300Mbps
- Widespread deployment beginning in 2009



Every technology has pros and cons, the purpose of the Call for Solutions is to learn what will work for Western Massachusetts

To help us bring broadband to Western Massachusetts