Broadband Planning for Electric Utilities

December 17, 2015
Agenda

- Broadband technologies & drivers
- Common myths vs. realities
- Financial analysis structure
- Consumer services & margins
- Common mistakes in financial analysis
- Consumer density impact to model
- Funding considerations
- Partnerships considerations
- Potential approach
Broadband Technologies & Drivers
Diagram showing data speed capacity and wireline technology.

- **Data Speed Capacity**
  - Fiber-to-the-Premises (8-PON, G-PON, 10G-PON)
  - NG-PON-2, WDM-PON
  - Cable Modem (through DOCSIS 3.0)
  - DOCSIS 3.1
  - DSL

- **Wireline Technology**
  - Max Bitrate:
    - 50 kbps - 100 Mbps
    - 100 Mbps - 1 Gbps
    - 1 Gbps - 10+ Gbps

- **Wireless Technology**
  - WiFi current technologies
  - WiFi MU-MIMO
  - LTE Advanced (Release 10)
  - 4G (through LTE)
  - TV “White Spaces” Unlicensed TV Frequencies
Benefits to Pioneering Gig Communities

- Documented increase in home values and rental rates
- Only a handful of gig communities to date, all of which have had extensive press coverage and host international visitors
- Bond rating improvements? Fitch cited fiber as one reason for increasing rating of Kansas City, KS
- Documented impact in attracting and retaining businesses, workers, and graduating students (anecdotal thus far, given early stage)
Chattanooga, TN

- Amazon.com: 2,000+ jobs and growing
- HomeServe: new call center
- Volkswagen & Claris Networks: expanding in Chattanooga
- Startup Activity: Retickr, Lamp Post Venture Capital, The Company Lab
Common Myths
Common Myths vs. the Reality

- Deployment of fiber is an economic development strategy
  - Fiber is a tool, part of the overall strategy which includes training, utilities, financing, taxes, and other tools
- A “large” pent up demand exists for broadband access
  - Marketing is critical. Must create demand by showing value it delivers to consumers.
  - Unlike electricity, consumers have an option of not purchasing broadband
Common Myths vs. the Reality

- **Cable television service has substantial positive net margin**
  - Often is a “break-even” in competitive markets needed to increase broadband penetration
  - Rural consumers not “hooked” on by bundling
- **Advertising offers a modest revenue stream**
  - Websites, search engines, Facebook, and others have eroded the opportunity
  - Opportunity varies market-by-market, need to find niche
Common Myths vs. the Reality

► Wireless will offer the long-term solution for broadband
  ► Wireless will play a role, but requires fiber access
  ► Wireless has a 5 to 7 year depreciation cost vs. 20-plus for fiber (need to compare total cost of ownership)
  ► Wireless has limits on supported service speeds
► Advanced Metering Infrastructure (AMI) will pay for FTTP
  ► AMI can be enhanced with fiber, but does not require it
Financial Analysis Structure
Financial Statements

- Income Statement
  - Revenues
  - Allocations
  - Expenses
  - Depreciation
  - Interest
  - Taxes
- Cash Flow Statement
  - Implementation capital
  - Allocations
  - Equipment replenishments
  - Sources and uses of funds
  - Debt service
- Balance Sheet
Key Inputs Beyond Revenue

- Depreciation & replenishments
  - Electronics (5 year, 7 year, and 10 year)
  - Fiber (20 plus years)
- Expenses (partial)
  - Staffing
  - Contracted services
  - Churn
  - Sales and marketing
  - Locates
  - Electronics (license and annual maintenance)
  - Network operations center (NOC)
  - Content (Internet access, programming, dial-tone)
Consumer Services
Consumer Services

- Data (Internet and transport)
- Telephone
- Cable television
- Advertising

Which service has the greatest revenue potential?
Which service offers the greatest “net” revenue potential?
Which service has the lowest threat of substitute products?
Trends in Broadband Speeds & Price

- Monthly Fee ($)
- Speed (Mbps)
- Cost ($ per Mbps)

Year:
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015

Y-axis:
- Speed (Mbps)
- Cost ($ per Mbps)

From 2004 to 2015, the monthly fee has remained relatively constant at $17.00, while the cost per Mbps has decreased from $1.00 to $1.00.
The Landline's Great Decline

% of U.S. household with and without a working landline telephone*

- Green circle: Landline phone
- Orange circle: Cell phone only

* based on the CDC's biannual National Health Interview Survey of ~20,000 U.S. households
Source: CDC

Cable Television Contribution Margin as a Percent of Revenue
Top 8 MVPDs Total Subs Y/Y % Change and Penetration Of Total Households

Pace of cord-cutting appears very stable.

NetflixF is Almost as Popular as Cable Among Young Adults
% of American adults who subscribe to the following Pay-TV services, by age (as of October 2013)

n= 2,368 U.S. adults

Source: Harris Interactive

Common Mistakes
Common Mistakes

- To account for “inflation”, add a multiplier for expenses and revenues
  - This approach will greatly overstate margins in the out-years (uses “inflation” to increase net margins)
  - A flat model is more appropriate
    - Do not inflate any revenues or expenses except maybe salaries and cable programming
Common Mistakes

- Add churn - with a consumer payment for connection fee greater than the cost of acquiring a new customer
  - This approach makes churn a contributor of revenue, rather than a loss
  - Churn needs to be included, but as a net cost
- Using the same depreciation & replenishment period for fiber and electronics
  - This approach overstates cash flow projections in out-years since electronics need replenishment every 5 to 7 years
Common Mistakes

- Underestimate the “value” of buying power

**Percent of Programing Expenses to Cable Revenues**

- 2003: 32.32%
- 2004: 32.18%
- 2005: 33.84%
- 2006: 32.53%
- 2007: 32.87%
- 2008: 33.81%

<table>
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<th>Year</th>
<th>Comcast</th>
<th>NCTC Muni</th>
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<tr>
<td>2003</td>
<td>32.32%</td>
<td>48.85%</td>
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<tr>
<td>2004</td>
<td>32.18%</td>
<td>52.98%</td>
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<td>2005</td>
<td>33.84%</td>
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<td>2006</td>
<td>32.53%</td>
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<td>2007</td>
<td>32.87%</td>
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<tr>
<td>2008</td>
<td>33.81%</td>
<td>72.03%</td>
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Impact of Consumer Density
Capital Cost Recovery

Example only – actual results will vary from market to market. Based on a 20 year fiber life and 3 percent annual interest rate. Cost does not include network equipment, consumer electronics. Cost also assumed 100 percent overhead with no make-ready costs.
Funding Areas
Funding Sources

- Subscriber revenues
- Federal programs
  - Health connect
  - E-rate
- Grants
  - Capital
  - Ongoing O&M
- Bonding
- Internal loans
- Consumer payments
- Electric utility allocations
  - Capital
  - Ongoing O&M
Partnership Considerations
Framework for Understanding Options

Balance risk, benefit, and control

- Municipal broadband
- Incumbent upgrade
- Partnerships
  - Model 1: Private risk & investment
  - Model 2: Public risk & private execution
  - Model 3: Shared risk, investment
Framework for Understanding Options
Balance risk, benefit, and control

- **Municipal & Cooperative broadband**
- Incumbent upgrade
- Partnerships
  - Model 1: Private risk & investment
  - Model 2: Public risk & private execution
  - Model 3: Shared risk, investment
Municipal & Cooperative Model

- Risk, reward, and control all at maximum
- Established strategies
- Electric utility confers huge benefits
- Example case studies
  - Ninestar, IN
  - Chattanooga, TN
  - Longmont, CO
Framework for Understanding Options
Balance risk, benefit, and control

- Municipal & Cooperative broadband
- **Incumbent upgrade**
- Partnerships
  - Model 1: Private risk & investment
  - Model 2: Public risk & private execution
  - Model 3: Shared risk, investment
Largely catalyzed by prospect of competition (100% overlap with Google Fiber builds)

Easy upgrade path for some cable operators—will deliver solid speed and good competition for FTTP

Telco upgrade path typically more challenging, requires significant investment
Framework for Understanding Options
Balance risk, benefit, and control
- Municipal & Cooperative broadband
- Incumbent upgrade
- Partnerships
  - Model 1: Private risk & investment
  - Model 2: Public risk & private execution
  - Model 3: Shared risk, investment
Model 1: Private risk, public facilitation

- City facilitates private investment
  - Leading private entity is Google Fiber
  - Strong interest by smaller companies
- Reduced risk, no control, potential benefit
- Facilitation can expand to tax benefits, other economic development incentives
- Beware entities seeking benefits without offering investment
Framework for Understanding Options
Balance risk, benefit, and control
▶ Municipal & Cooperative broadband
▶ Incumbent upgrade
▶ Partnerships
▶ Model 1: Private risk & investment
▶ Model 2: Public risk & private execution
▶ Model 3: Shared risk, investment
Model 2: Public risk with private execution

▶ Variation on traditional municipal ownership
  ▶ All risk, benefit, and full control
▶ Emerging innovation makes use of the traditional P3 structure used in Europe and increasingly in US
  ▶ Leverages private sector strengths
▶ First time applied to broadband in US
▶ Guaranteed revenue stream to private partner
  ▶ Financial risk
  ▶ Political risk
Model 2 Case Study: Utopia

- Macquarie Capital team—very viable partner team
- Midst of complex process with range of Utopia member communities
- Turn-key private financing, deployment, operations, and revenue-sharing
- Guaranteed public funding in the form of a utility fee to all residents
  - In some communities, will not be a politically viable model (this has been true with some in Utah)
  - In others, can be strong model for buildout
Framework for Understanding Options
Balance risk, benefit, and control
► Municipal & Cooperative broadband
► Incumbent upgrade
► Partnerships
► Model 1: Private risk & investment
► Model 2: Public risk & private execution
► Model 3: Shared risk, investment
Model 3: Shared Risk

- Extraordinary opportunity for innovation
- Plays to strengths of both parties
- From the standpoint of a locality, risk is shared but 100% of public benefit realized
  - Public benefit does not show up on financial statements
  - Private partner gets financial benefit
Model 3 case study: Westminster MD

City near DC, Baltimore

City will own fiber only; lease to partner to operate on open access basis

Ting Internet selected as partner
Partnership Summary

- Collaboration can enable scale
  - Buying coops analogous to the G&T
- Partner with your counterparts and peers
  - Other cooperatives, including telephone
  - Municipals
A Few Cautions

- Be skeptical of rosy projections
- Be sure that risk as well as revenue are shared
- Be aware of dependencies and control
- Avoid snake oil (remember BPL?)
Seeking Understanding of Priorities & Goals

- Balance reward, risk, and control
- Potential priorities include:
  - Ubiquity
  - Consumer choice/competition
  - Community competitiveness
  - Control over infrastructure
  - Control over pricing
  - Residential sector
  - Small business sector
  - High tech sector
Fiber Deployment - Potential Phases

- **Create Backbone**
- Connect Distribution Substations (SCADA, VoIP, Video Monitoring)
- Connect Transmission Substations (SCADA, Tie-Point Metering, Video Monitoring)
- Connect Electric Utility Facilities (Network Operations and dispatch)
- Create Foundation for Electric Distribution Operations
Fiber Deployment - Potential Phases

1. Create Backbone
   - Connect Distribution Substations (SCADA, VoIP, Video Monitoring)
   - Connect Transmission Substations (SCADA, Tie-Point Metering, Video Monitoring)

2. Connect Electric Utility Facilities (Network Operations and dispatch)

3. Provide Distribution Automation Support
   - Distributed Generation
   - Industrial Consumers
   - Reclosers
   - Motor Operated Switches

4. Create Foundation for Electric Distribution Operations

5. Expand Backbone to serve distribution assets and distributed generation -
Fiber Deployment - Potential Phases

Create Backbone

- Connect Distribution Substations (SCADA, VoIP, Video Monitoring)
- Connect Electric Utility Facilities (Network Operations and dispatch)

Connect Community Anchor Institutions

- Medical (Hospitals and Clinics)
- Private Schools
- Public Schools
- Connect institutions and public facilities

Provide Distribution Automation Support

- Industrial Consumers
- Motor Operated Switches

Create Foundation for Electric Distribution Operations

Connect institutions and public facilities

Expand Backbone to serve distribution assets and distributed generation -
Fiber Deployment - Potential Phases

Create Backbone
- Connect Distribution Substations (SCADA, VoIP, Video Monitoring)
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- Connect Electric Utility Facilities (Network Operations and dispatch)

Connect Backbone
- Connect Community Anchor Institutions
- Create Foundation for Electric Distribution Operations

Provide Distribution Automation Support
- Support Wireless (Mobile and Broadband)
- Wireless ISP's
- Cellular Providers
- Medical (Hospitals and Clinics)
- Private Schools
- Public Schools
- Connect institutions and public facilities
- Industrial Consumers
- Reclosers
- Motor Operated Switches
- Distributed Generation

Expand Backbone to serve distribution assets and distributed generation -
Fiber Deployment - Potential Phases

Create Backbone
  - Connect Distribution Substations (SCADA, VoIP, Video Monitoring)
  - Connect Transmission Substations (SCADA, Tie-Point Metering, Video Monitoring)
  - Connect Electric Utility Facilities (Network Operations and dispatch)

Deploy FTTP
  - Office Complexes
  - Consumers
    - Multiple Dwelling Units

Connect Wireless Towers
  - Wireless ISP’s
    - Cellular Providers
  - Medical (Hospitals and Clinics)
  - Private Schools
  - Public Schools
  - Connect institutions and public facilities

Provide Distribution Automation Support
  - Industrial Consumers
  - Motor Operated Switches
  - Reclosers

Distributed Generation
  - Expand Backbone to serve distribution assets and distributed generation -

FTTP for delivery of broadband services

Connect institutions and anchor institutions
  - Office Complexes
  - Consumers
  - Multiple Dwelling Units

Support Wireless (Mobile and Broadband)
  - Cellular Providers
  - Medical (Hospitals and Clinics)
  - Private Schools
  - Public Schools
  - Connect institutions and public facilities
Thank you!

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