Seeking understanding of priorities and goals

- Balance reward, risk, and control
- Potential priorities include:
  - Ubiquity/universal service
  - Consumer choice/competition
  - Community competitiveness
  - Control over infrastructure
  - Control over pricing
  - Control over long-term
  - Residential sector
  - Small business sector
  - High-tech sector
### Minimum Time Required for Downloading and Uploading a 5 GB File

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Download Time</th>
<th>Upload Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>3G Wireless</td>
<td>&gt;2.4 Days</td>
<td>&gt;10 Hours</td>
</tr>
<tr>
<td>T1</td>
<td>&gt;9.4 Hours</td>
<td>&gt;9.4 Hours</td>
</tr>
<tr>
<td>4G Wireless</td>
<td>&gt;7.5 Hours</td>
<td>&gt;75 Minutes</td>
</tr>
<tr>
<td>DSL (ADSL2+)</td>
<td>&gt;19.7 Hours</td>
<td>&gt;1.7 Hours</td>
</tr>
<tr>
<td>Cable Modem (Docsis 3.0)</td>
<td>&gt;90 Minutes</td>
<td>&gt;9 Minutes</td>
</tr>
<tr>
<td>DS3</td>
<td>&gt;19 Minutes</td>
<td>&gt;19 Minutes</td>
</tr>
<tr>
<td>Fiber (100 Mbps)</td>
<td>&gt;9 Minutes</td>
<td>&gt;9 Minutes</td>
</tr>
<tr>
<td>Fiber (1 Gbps)</td>
<td>&gt;53 Seconds</td>
<td>&gt;53 Seconds</td>
</tr>
<tr>
<td>Fiber (10 Gbps)</td>
<td>&gt;5 Seconds</td>
<td>&gt;5 Seconds</td>
</tr>
</tbody>
</table>
Framework for Options

Balance risk, benefit, control

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

- Municipal broadband
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Municipal Model

- Maximum risk, reward, control
- Established strategies
- Electric utility confers huge benefits
- Key case studies
  - Wilson, NC
  - Lafayette, LA
  - Chattanooga, TN
  - Longmont, CO
Framework for Options

Balance risk, benefit, control

- Municipal broadband

- **Incumbent upgrade**

- Partnerships
  - Model 1: Private risk & investment
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  - Model 3: Shared risk, investment
Incumbent Upgrade

- Largely catalyzed by prospect of competition (100% overlap with Google Fiber builds)
  - Kudos to localities
- Easy upgrade path for cable companies—can deliver solid speed and good competition for FTTP
- Telco upgrade path more challenging, requires significant investment
Framework for Options

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- Municipal 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
Model 1 strategy: grow your assets

Access to Key Assets

✓ Lease public assets such as fiber, conduit, and real estate
  - Lease middle-mile fiber
  - Lease fiber in hard-to-reach areas
  - Increase existing fiber capacity if insufficient fiber exists

✓ Facilitate underground construction
  - Develop a “dig-once” policy
  - Maintain future-proof conduit specifications
  - Enable all parties to take advantage of “dig-once”
  - Place conduit banks in congested areas

✓ Facilitate aerial construction through access to utility poles
  - Facilitate make-ready process to streamline pole access
  - Eliminate the need for make-ready

✓ Facilitate in-building access for wireline infrastructure
  - Ensure availability of conduit from street to building
  - Ensure installation of in-building pathways and cabling
Model 1 strategy: make data available

**Information Access**

- Make data available wherever possible
  - Make GIS data sets available

- Document and publish data regarding available conduit, fiber, and other assets
  - Document your fiber assets
  - Document your conduit assets
Model 1 strategy: maximize process

Process Efficiency

- Build broadband into planning and staffing of all relevant agencies
- Streamline and publicize procedures and timeframes for permitting and inspections
- Allow network operators to contract pre-approved third-party inspectors to speed processes and reduce local burdens
Model 1 case study: NCNGN Raleigh/Durham region

- Offer of existing city fiber
- Attention to processes
- Regional collaboration
- RFP led to agreements with AT&T
- Google also building in some of these communities
Model 1 case study: Mesa AZ

- Concern about impact of fiber construction on ROW, city costs
- Long-term strategy to build assets
- Focus on four target economic development areas
- Apple silicon manufacturing lab
Model 1 case study: Holly Springs, NC

- Town built robust rings for internal services
- Engineered to enable FTTP in future
- Highly efficient processes, alignment
- Fiber lease agreement with Ting Internet
  - Ting will lease public fiber for backbone
  - Ting will build to homes & businesses
Model 1 case study:
Howard County, MD;
Arlington County, VA;
Pleasant Prairie WI

- Deploy fiber strategically, with focus on key economic development targets
- Connect to Internet peering point (could be local meet point)
- Locality to build & own, lease to private partners on open access basis
- Pricing designed to attract ISPs and non-traditional users such as building owners
Framework for Options

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- 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
- 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
Model 2 case study: Lake Oswego, OR

- Symmetrical Networks team
- City Council recently approved negotiation of contract for P3
- Private financing and deployment
- Public service provision (in this case) through potential partnership with local ISP
- Key to financing is effective public guarantee of the debt

Financial projections suggest low risk, but the risk falls nonetheless to the City
Model 2 case study: Frontier in CT

- Frontier has made preliminary proposals to a range of CT localities
  - Very promising development
- Private financing and deployment
  - 15 year financial commitment by Town
- Minimum level of service to all addresses, with opportunity to buy advanced services
- Key will be detail regarding enforceable commitments
  - Build out of fiber
- Note: upfront risk is minimized but no potential financial upside
Framework for Options
Balance risk, benefit, control

- Municipal broadband
- Incumbent upgrade

Partnerships
- Model 1: Private risk & investment
- Model 2: Public risk & private execution
- **Model 3: Shared risk**
Model 3: Shared Risk

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

- Underserved rural areas (bandwidth caps)
- Fiber construction strategy for key anchors
- Public/private wireless to key target areas
- Public risk contained
Model 3 case study: Urbana/Champaign, IL

- Private access to cities’ fiber in return for **binding** commitments, meeting 3 key goals:
  1. Fiber at gigabit speeds
  2. Open access - ongoing commitment to wholesale service
  3. No cherry-picking

- Partner w/ strong customer service, local presence, but....

- Right of first refusal in event of sale
Model 3 case study: Westminster

- City will own fiber only; lease to partner to operate on open access basis
- Ting Internet selected as partner
- Ting shares financing risk; City shares market risk
Model 3 case study: Santa Cruz, CA

- City Council authorized exclusive negotiations with local company Cruzio.
- Council voted in December to authorize negotiations based on business model in which:
  - City will finance, build, and own fiber and other outside plant assets.
  - Cruzio will light and operate network and offer services.
Model 3 case study: Huntsville, AL

- City developed plan for gigabit networking and partnership a year ago
- Announcement February 22 that Google Fiber will lease fiber to be deployed by Huntsville Utilities
- But--the economics for a public utility may not be replicable for a city without an electric utility
A Few Cautions

- Be skeptical of rosy projections
- Be sure that risk as well as opportunity are shared
- Be aware of dependencies and control
- Avoid silicon snake oil:
  - Technology snake oil: remember BPL?
  - Business snake oil: unrealistic business plans that ask for no risk (or pretends there is no risk)
  - Unrealistic revenue assumptions