



GOVERNMENTAL SERVICES

Creating a Municipal Broadband Network in Your Community

July 11, 2017

Today's Presenter

Dave Zelenok, PE

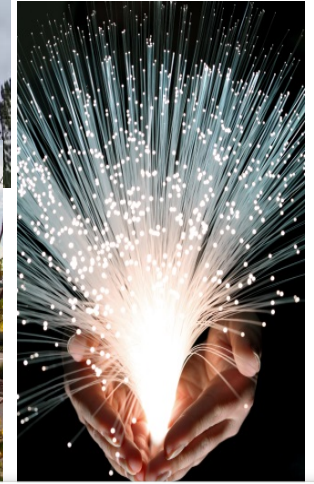
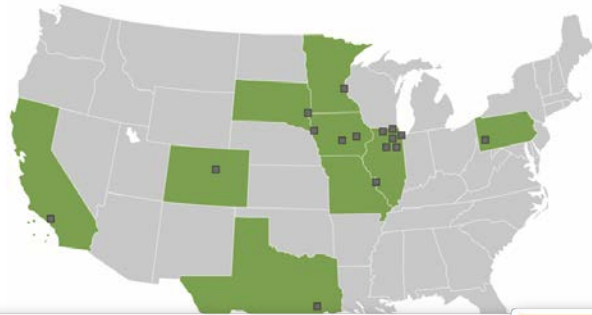
2

- ✓ **Manager Local Government Services, HR Green**
- ✓ **City of Centennial, Colorado**
 - ✓ Interim City Manager/Chief Innovation Officer
 - ✓ Public Works Director
 - ✓ Helped pioneer Centennial's Broadband Exemption
 - ✓ 2nd major Colorado city - 2013 (3 Years: 100 Cities)
- ✓ **City of Colorado Springs**
 - ✓ Director of Public Works and Transportation
 - Installed hundreds of miles of municipal fiber infrastructure



About HR Green

Established in 1913 400+ Employees



Governmental Services

Transportation

Water Resources

Land Development



Agenda

4

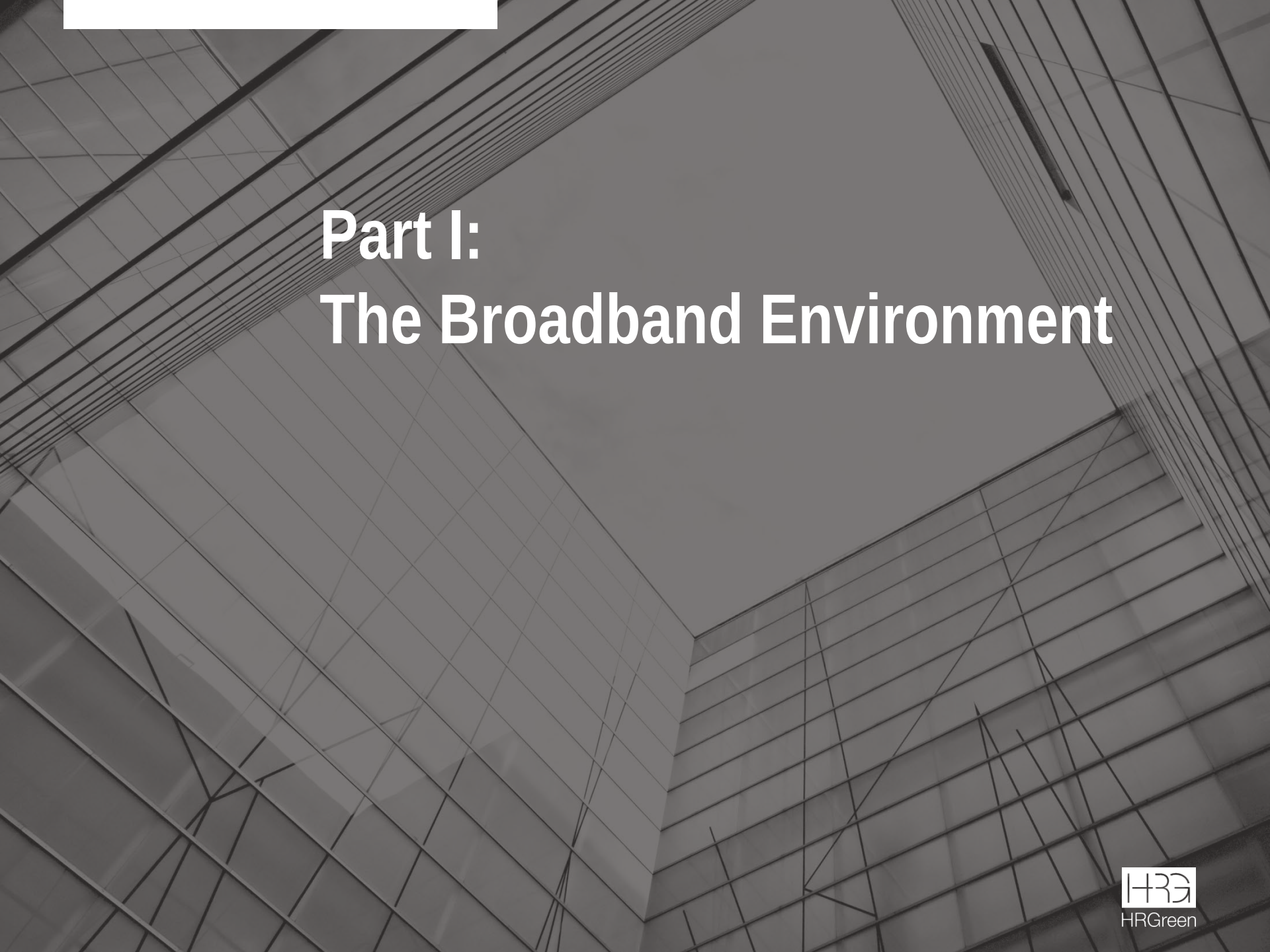
Part I: The Broadband Environment

Part II: Evaluating your Broadband Options

Part III: Next Steps

Q&A



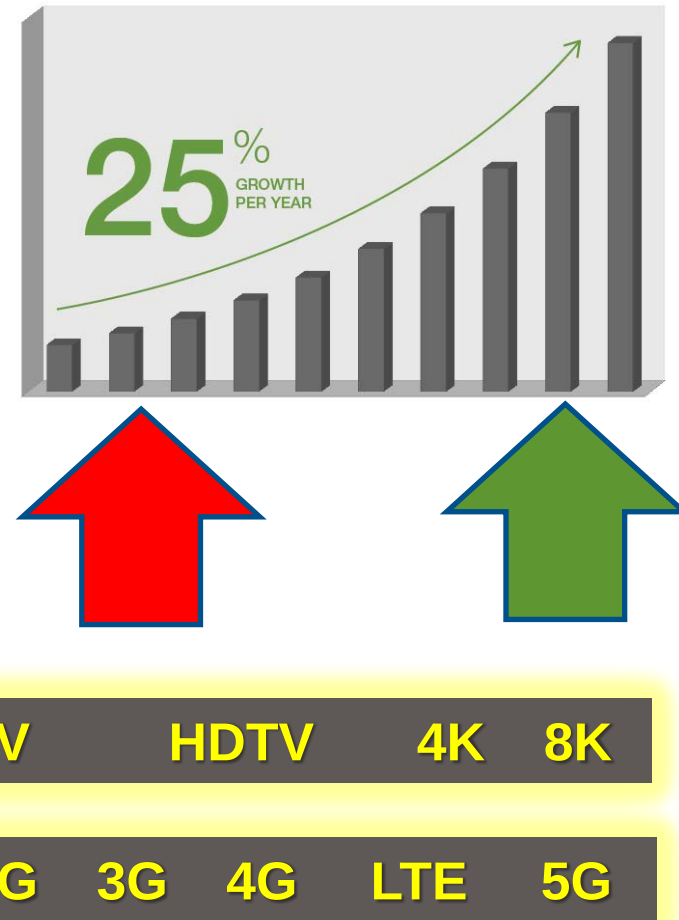
A low-angle, black and white photograph of a modern skyscraper with a glass facade. The building's lines converge towards the top of the frame, creating a sense of height and scale. The sky is visible in the background between the building's sections.

Part I: The Broadband Environment

What Is Driving Broadband Changes?

6

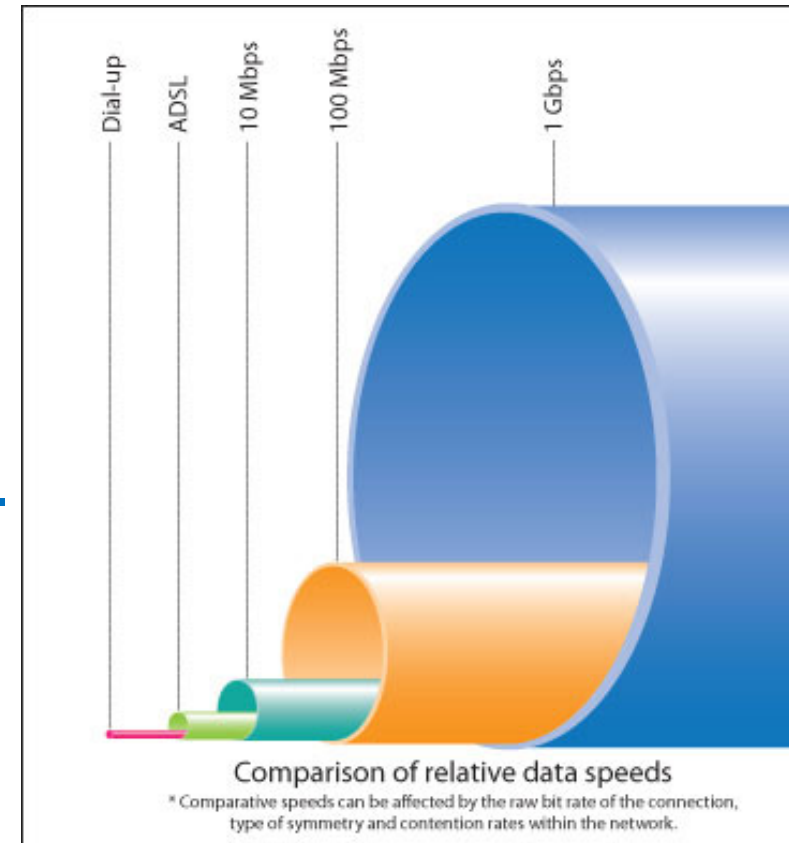
- Demand for bandwidth = 25% annual growth rate
- The technologies are there to support demand
- Incumbents are unwilling to invest in upgrades
- So what's changed since 2010?
 - Enter **GoogleFiber**
 - Broadband now discussed as the 4th Utility



Some Bits & Bytes Background – Broadband

7

- **25 mbps** is current FCC definition
 - Most Americans have < 50 mbps
 - 10% of America unserved
 - In rural America...
 - It's tragic: 39% are unserved
- Even where available, buffering often deliberately induced to deny streaming valuable video content
- Speed Check Site: www.speedtest.net



What can you do with a gig?

8

- **“Cut the cord” – “Content”**
 - 80 mbps+ *streaming* HD – “Buffering”
 - *Soon: 4K TV*
 - *Any **HD** program/language*
- **High Tech Businesses**
- **Entrepreneurs**
- **Economic Development**
- **Property Values**
- **Home sale prices –**
 - Studies: 3% increase in Home Prices (~\$10,000)
 - Cost to install fiber/broadband ~ \$2,000 - \$3,000



Colorado Legal Concerns...

9

- Nearly 20 states restrict local governments from providing broadband
- In Colorado – **SB-152** prohibits local governments from providing cable television service, telecommunications service, or advanced service
 - Example: wi-fi in parks, libraries, public places not permitted
 - Partnerships with private sector: highly restricted
- **Cities can re-establish the right taken away by SB-152**
- ***Exemptions obtained –***
 - **2011:** 1st Major City: **Longmont (Gov't model)**
 - **2013:** 2nd Major City: **Centennial (P3 model)**
 - Nov 2, 2015: ~**13** cities & counties
 - Nov 3, 2015: ~ **60** cities & counties & 3 districts
 - **Today: 100+** Municipalities



Since 2013: Colorado SB-152 Exempt Cities/Counties ~ NOW 100 and growing

Pre-Nov 2015 Exemptions

1. Longmont
2. **Centennial**
3. Boulder
4. Cherry Hills Village
5. Montrose
6. Estes Park
7. Grand Junction
8. Red Cliff
9. Wray
10. Yuma
11. Rio Blanco County
12. Yuma County
13. San Miguel County
14. Glenwood (grandfather'd)
15. Vail (P3's)

Nov 3, 2015 Counties

1. Archuleta
2. Clear Creek
3. Custer
4. Eagle
5. Garfield
6. Gilpen
7. Huerfano
8. Jackson
9. Lake
10. LaPlata
11. Moffat
12. Park
13. Pitkin
14. Routt
15. San Juan
16. Summit
17. Washington

2015 Cities

- | | |
|------------------|-----------------------|
| 1. Alma | 17. Loveland |
| 2. Bayfield | 18. Oak Creek |
| 3. Brighton | 19. Ophir - Ouray |
| 4. Cedaredge | 20. Paonia |
| 5. Craig | 21. Ridgway |
| 6. Crawford | 22. Steamboat Springs |
| 7. Crested Butte | 23. Telluride |
| 8. Delta | 24. Thornton |
| 9. Durango | 25. Winter Park |
| 10. Fairplay | 26. Yampa |
| 11. Fort Collins | + 3 School Districts |
| 12. Fraser | |
| 13. Gunnison | |
| 14. Hayden | |
| 15. Hotchkiss | |
| 16. Ignacio | |

2016-2017 Cities

1. Akron
2. Buena Vista
3. Colorado Springs
4. El Paso County
5. Fruita
6. Mancos
7. Orchard City
8. Pagosa Spgs
9. Silver Cliff
10. Wellington
11. Westcliffe...
12. NOW 100!

Virtually no opposition since 2013

Community Fiber – You ARE already partly “pre-positioned”

13

- Plenty of **existing public fiber**
 - SCADA - Utility Control Systems
 - Intelligent Transportation Systems
 - AMR/AMI - Utility / Automatic Meter Reading
 - Street Lights
 - Schools, hospitals, public safety
- Benefit
 - Focus on building infrastructure
 - Low cost entry point - “piggybacking”
- How
 - Develop “Fiber Friendly Policies”
 - Innovative Permitting, IGA’s and P3’s
 - Grant & Other funding sources
- Risks
 - Not community “broadband” service
 - Slow path



Repurposing Your Digital Infrastructure

14

- Do you own pipes in the ground?
- Do you control how they are placed?
- NEW – Room in **Electrical Conduit** for **fiber optics**!
- Important to understand:
 - Complex **inter-relationships**
 - **Revenue** opportunities
 - How the commercial “fiber game” is really **played**
 - What’s really **valuable**, what’s **not**



Colorado Street Lighting

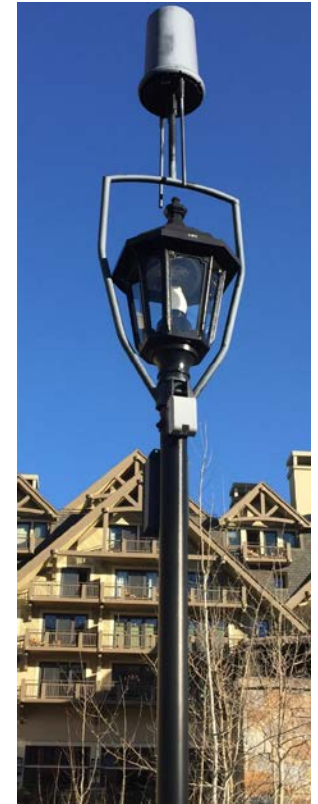
Costs

- \$20/month typical per light
- Power < \$4/month (100 watt HPS)
- \$16/month – “PROFIT” (maintenance, etc.)
- LED’s – reduce power expenses by 50%+
- ***BUT* - Power is often < 20% of total expenses**

Colorado cities now municipalizing lighting

- Paying separately for energy
- Up-front capital & conversion costs
- Littleton one of four cities exploring alternatives

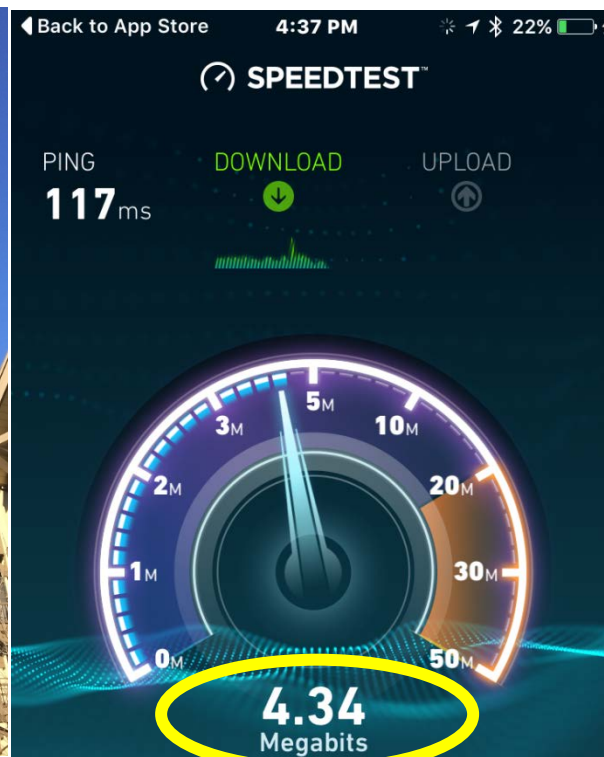
R.O.I. ~ 5-7 years



Millions in cost savings possible

Better yet, Re-purpose street light systems: Traffic signals, utilities and public broadband!

VAIL: Street lighting & FREE WiFi



Part II: Evaluating your Broadband Options

The Broadband Roadmap

18

 Albert Einstein once said that if he was given **an hour to solve a problem**, he'd spend the first **55 minutes thinking** about it and **5 minutes** coming up with **solutions** 

Envision

Plan

Design

Build

Operate



Avoid an expensive initial feasibility study, instead:
Envision & Implement!

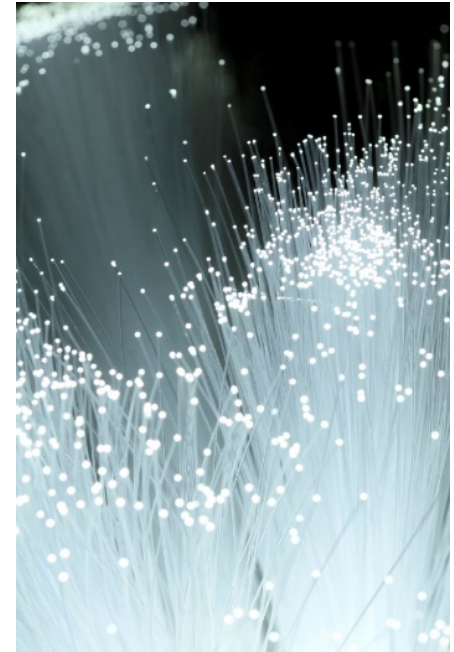
Primary “Types” of Broadband Services:

19

3 Service “Models” explored today

1. **Regional/Cooperative Network**
(Multiple agencies/communities)
2. **Community Fiber Network**
(Utilities, Streets, Facilities)
3. **Community Broadband Service**
(Retail service to home & business)

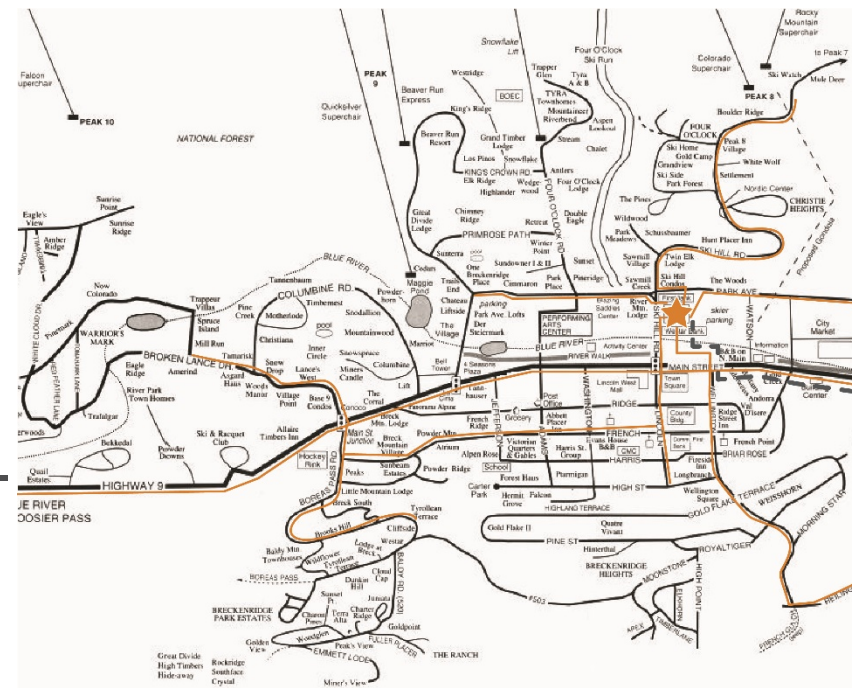
Each option has unique benefits and risks



Regional/Cooperative Network

20

- What
 - Regional buildout focused on “**Aggregating**” - reducing cost of services
- Benefit
 - Significant ongoing savings
 - Can make “community fiber” or
 - A “broadband build” feasible
- How
 - **Intergovernmental Agreements (IGAs)** – LPS, CHV, Library, etc
- Risks
 - Complexity of multiple partners
 - Ongoing management of resources



Sharing Existing & Low-cost New Fiber

21

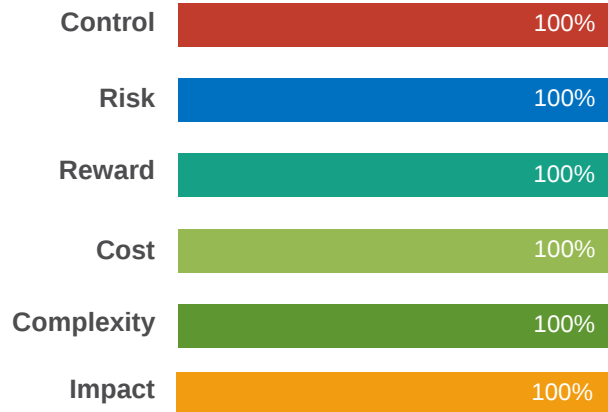
- Integrate Public Works, Public Safety and community needs
- Advance broader community goals
- Reduce: cost & duplicate fiber
- High Priority:
Develop new “fiber friendly” policies
- Goal: “Smart City”



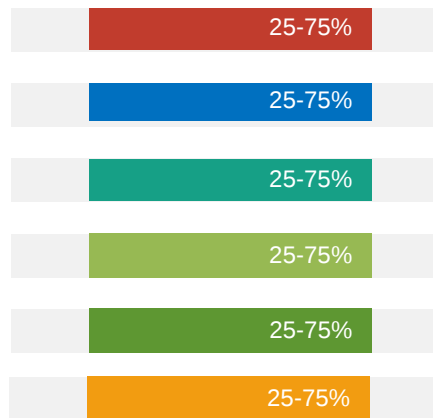
Ownership Models – Public to Private Spectrum

22

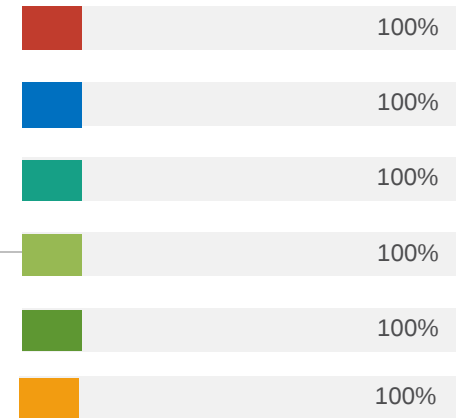
Public Sector



Public/Private Partnership (P3)



Cooperative – (Private)



Creating a Municipal Broadband Network in Your Community

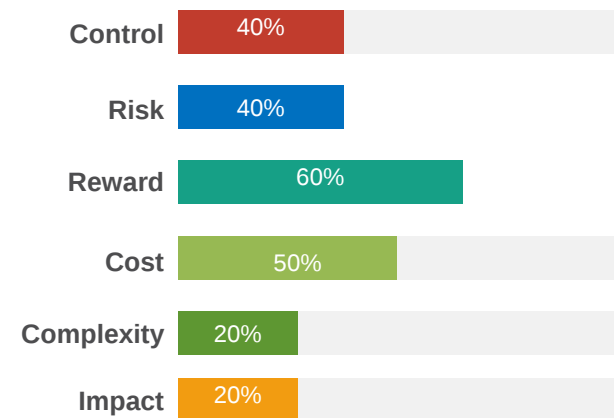




Open Access – Centennial: Public Backbone

23

- “Open Access”
- Now spending \$5.7MM installing municipal fiber backbone in conduit to be broadband ready.
- Expands existing Community Fiber infrastructure
- Enables carriers to more easily offer end-user services
- **TING** is exploring leasing city fiber to end users



Ultra-Low Cost Conduit: Case Study

24

Public Works Initiative Begins: 2010 - City pays CDOT to upgrade Arapahoe Rd.

Centennial Initiates Fiber Friendly Program

City of Centennial
IGA Conduit and Fiber

Arapahoe Road

Conduit and Fiber

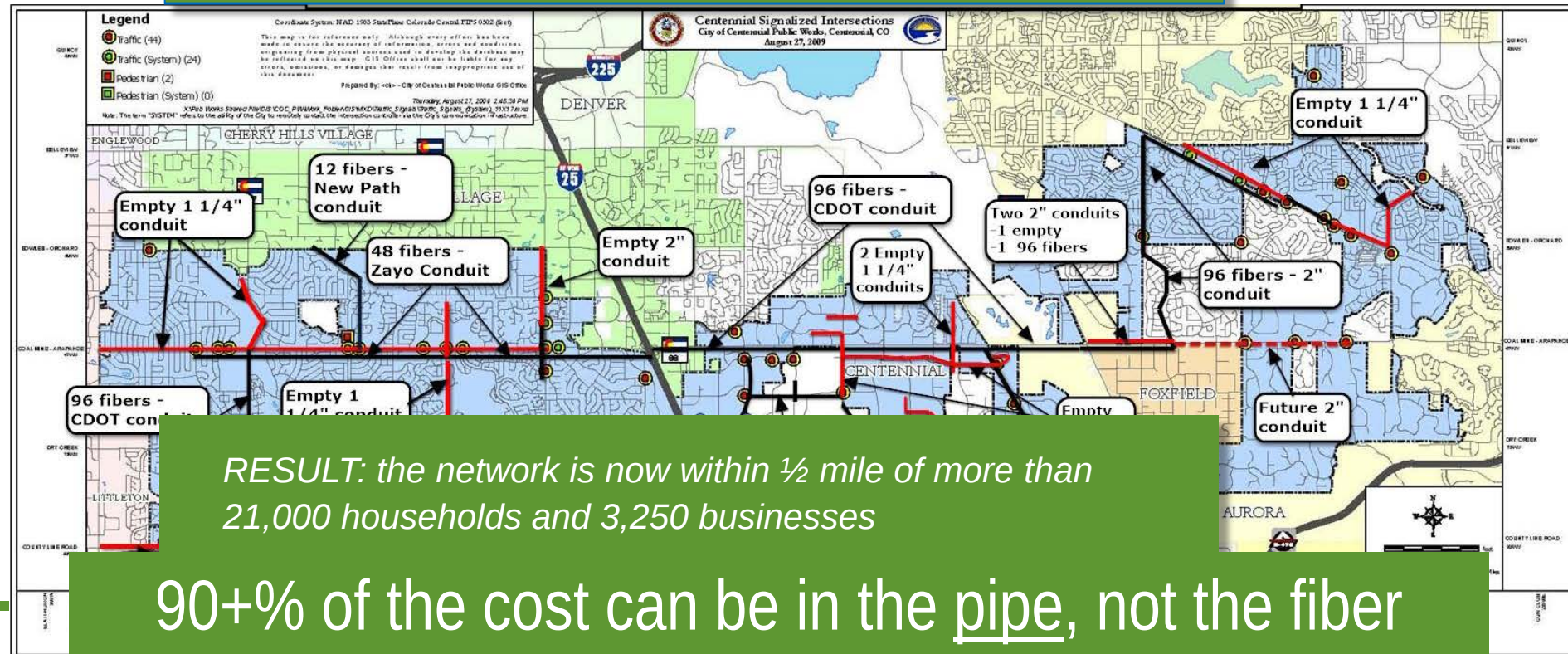
48

Fiber Count

Centennial Fiber Optic Map – 4 years later

(This Could Be Littleton)

- From 3 miles to 60+ miles
- Conduit **cost** ~ \$600,000 (Only - \$2/foot)
- Conduit **value** ~ \$10,000,000+
- Created a 60 mile “Fiber to the Node” – *FTTN - Network*



How Centennial did it...

Pro-Fiber Policies

- Public-Private/Partnerships
- Joint- Build
- Piggyback
- Dig-once policies
- Reduced open trenching
- Co-locations
- Incentives, fee reductions, individual agreements
- US DOT/CDOT grants

Results:

- ✓ Fewer street cutting permits
- ✓ Reduced potholes
- ✓ Less Construction and Traffic Congestion
- ✓ Sharing of infrastructure – “P3’s”
- ✓ Private Sector Investment – very robust
- ✓ Incumbents continue to improve service
- ✓ **MINIMAL CITY COST!**



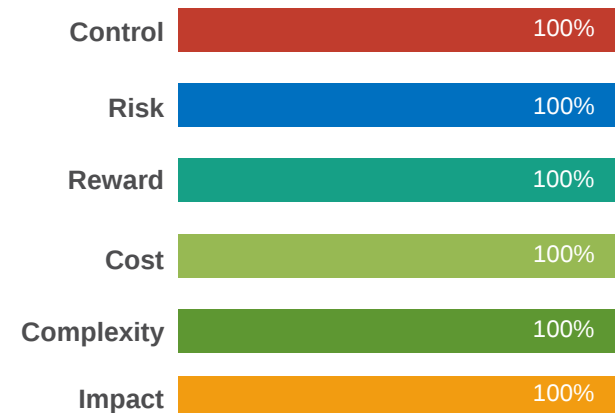
Littleton: 5-10 miles/year, <\$80K, Value ~\$1M+



Retail Service - Longmont

City of Longmont, CO

- Existing public electric utility
- Funded by electric revenue bonding
- Take rates as high as 40-90% since buildout began
 - “Charter Memberships” for \$50 lifetime for 1GB service
- Significantly outperforming financial pro-forma models



Longmont Today...



- 1st major & “fastest city” in USA
- Initially struggled
- Fastest in USA [per Ookla], **ubiquitous 1,000 Mbps**
- Nov 2013: **\$40M** bond issue
- 10,000+ customers growing to 18,000 [**~\$12M per year**]
- Retail Cost – 1 “gig” (1,000 mbps) = \$50/month
- Speed 30x Increase

RESULT: 4,000+ Jobs – Digital Globe Inc.

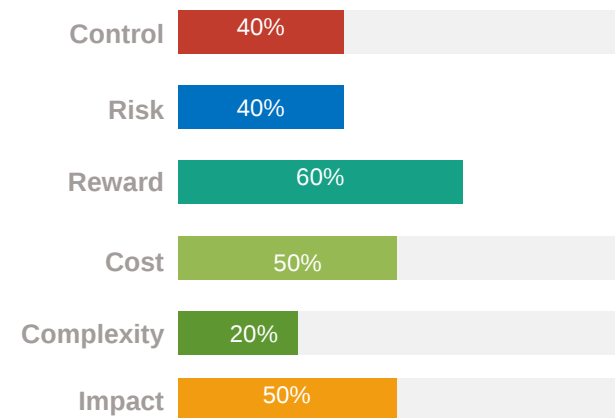


Community Fiber – Steamboat Springs

29

Steamboat Springs, CO

- Committed \$1.5MM to create 9-mile municipal fiber backbone
- 7 Anchor Institutions involved
- Built to facilitate future community broadband expansion



Financing Alternatives



30

Grants & Programs

- FCC
- Dept. of Agriculture
 - Rural Utilities Service
- Dept. of Commerce
- Housing & Urban Development
- DOLA
- **DRCOG: TSSIP**

Bonding & Financing

- General Obligation Bonds
 - Often requires a vote
- Revenue Bonds
 - Requires existing revenue streams (generally a utility)
- Special District Assessments
- Bank Debt
- Private Financing
 - Symmetrical Networks
 - Google Fiber



Envision

31



Part III:

Begin with the end in mind...

Your Feasibility Study will say:

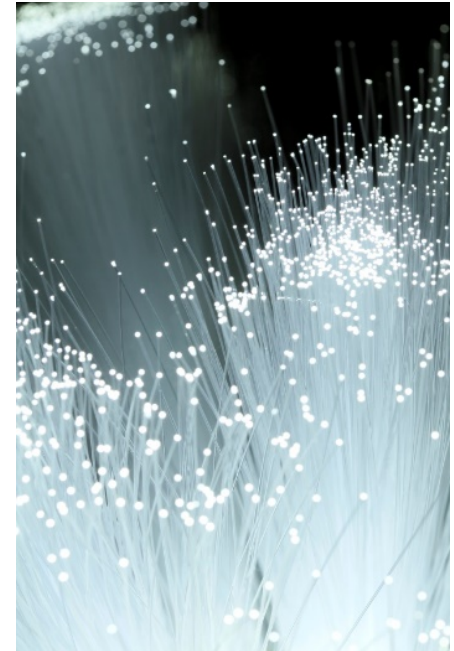
32

Your community will want:

- Better broadband (Goal: 1,000 mbps)
- A choice of competing carriers
- Streaming HD content
- At half price
- ...Right Now

Your city will likely find:

- Financial feasibility > ~ 28% “Take Rate”
- You have more access to fiber than you thought
- You have powers you never knew
- You can easily create millions in new fiber
- It's hard / You'll need experience to put it all together



*Chances are: it IS ALL feasible. But – you'll need a **vision**...*

Key Takeaways

33

- Integrate public works, public safety and community needs
- Reduce: cost and duplicate fiber
- Recapitalize street lights
- Integrate / interconnect traffic signals, street lights, utilities, and anchor institutions – “**SMART CITIES**”
- Re-purpose assets (e.g., abandoned pipe as conduit, etc.)
- High Priority: Implement new “fiber friendly” policies
- Consider SB-152 EXEMPTION – 100/100 since ‘09



The Way Ahead

34



Identify all fiber-related **assets**:

- GIS layers, records, conduits, strands, agreements, splice points, vaults, etc.
- Look for **extra capacity** – even **abandoned infrastructure**

Estimate excess capacity and capabilities

Explore telecom cost reductions by **interconnecting city facilities**

Develop partnering agreements - other governments, **LPS, Library**

Explore street cut & pavement degradation fee exemptions

Create strategic plan & agree on courses of action

Key Attributes of a Successful Broadband Deployment cont.

35

- **Involve:** Economic Development advocates
- **Seek:** All funding opportunities & generating revenue immediately
- **Create:** Sustainable, Dynamic Municipal-Centric Fiber Program
- **Consider SB-152 EXEMPTION –**
 - 100/100 since '09



RESULT:

Improved Service at Lowest Cost,
Customized to Your Needs





Questions

Contact me for More Information

Dave Zelenok, PE

Local Government Services Manager

Phone: 719.491.1547

Email: dzelenok@hrgreen.com



THANK YOU!