The House Select Committee on High Speed Internet in Rural Areas

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Testimony of

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Overview

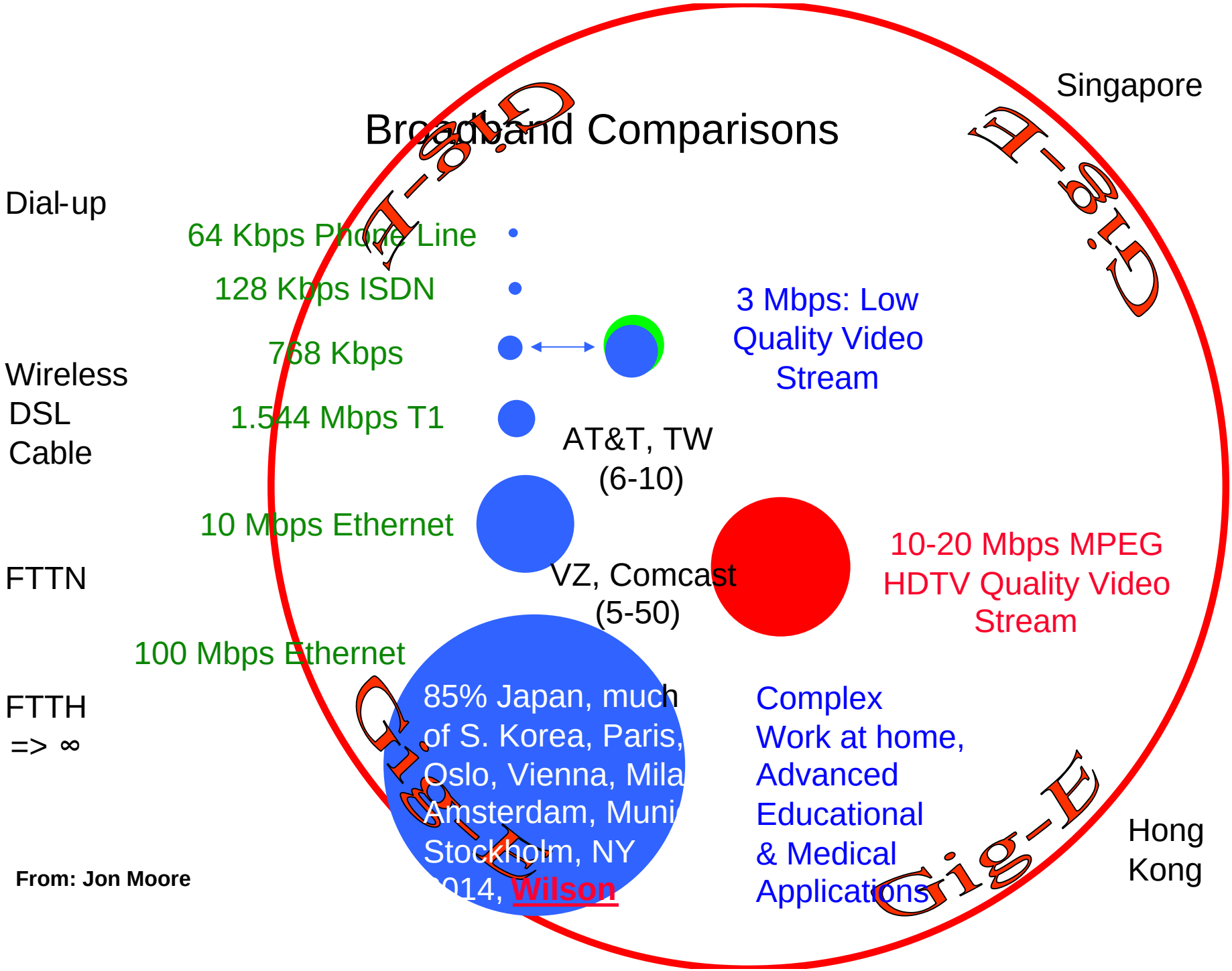
- The Basics
- What's at Stake
- Where the US is Today
- Where the Leading Nations are Heading
- Where the US is Heading
- Where North Carolina is Heading
- Recommendations

The Basics

- What is “Broadband”?
  - Service allows transmission of info over “Internet” at “high speed”
  - The “Internet” is a global “network of networks” of all kinds that use standardized rules called “Internet Protocol” (IP)
  - IP uses “digital” information” – “binary digits” (bits) of 1s and 0s
  - 8 “bits” = 1 “byte” e.g., 01101111
  - 1000 bits = 1 kilobit; 1 million bits = 1 Megabit; 1 trillion bits = Gigabit, etc.
  - Info carrying capacity = “data speed” = “bandwidth capacity” = kilobits/sec (kbps), megabits/sec (Mbps), gigabit/sec (Gbps) …

More Basics

- "Convergence" -- many technologies can now carry phone, video, data, and other digital information
  - Telephone systems –
    - Dial-up v. T1 v. DSL v. FTTN (ADSL2+)
  - Cable systems –
    - Cable Modem Service v. DOCSIS 3.0
  - Fiber to the Home/Business = Fiber to the User (FTTU)
  - Wireless
    - WiFi, WiMax, 3.650 GHz, etc.
  - Others: Satellite, BPL, etc.


Broadband Comparisons
Singapore
Gig-E
Gig-E
Gig-E
Gig-E
Hong Kong
Dial-up
64 Kbps Phone Line
128 Kbps ISDN
768 Kbps
Wireless
DSL
Cable
1.544 Mbps T1
3 Mbps: Low Quality Video Stream
AT&T, TW (6-10)
10 Mbps Ethernet
FTTN
VZ, Comcast (5-50)
10-20 Mbps MPEG HDTV Quality Video Stream
100 Mbps Ethernet
FTTH
=> ∞
85% Japan, much of S. Korea, Paris, Oslo, Vienna, Mila Amsterdam, Muni Stockholm, NY 014, Wilson
Complex Work at home, Advanced Educational & Medical Applications
From: Jon Moore

What's at Stake: America's Global Competitiveness and Quality of Life

- What we do at work, at home, and at play will increasingly be done through broadband, at much faster speeds than today
- World economy is growing interconnected and "flat"
- We are going to lose most of our traditional manufacturing jobs to China, India, Brazil, Mexico, and other low-cost nations
- Our best hope is to prepare our communities and population ASAP for high-tech, info-based jobs
- A critical need: prompt and affordable access to advanced communications networks

Vast Multiple Benefits of Broadband

- Robust economic development
- Lifelong education
- Public safety and homeland security
- Affordable modern healthcare
- Environmental sustainability
- Telework ($4+plus oil prices)
- Urban revitalization
- Cost-effective government services
- Entertainment and cultural enrichment
- Senior citizens, disabled individuals, young people

  …
- Quality of life

Key Drivers

- Explosive growth of video – e.g. YouTube alone, over 100 million downloads and over 65 million uploads every day

"In three years' time, 20 typical households will generate more traffic than the entire Internet today. … We are going to be butting up against the physical capacity of the Internet by 2010."

-- Jim Cicconi, VP AT&T

"High-definition video is the Humvee of broadband, guzzling five times as much capacity as regular video. Once high definition video takes off, band-width consumption, now at a record high, could blow into the stratosphere."

-- Phillipe Morin, VP Nortel

More Key Drivers

"The Net Generation" -- 100 million Americans born after 1977

- Computer and gadget literate
- Grew up with Internet
- Multi-cultural, international
- Used to multi-tasking (homework + TV + music + "chatting" w/20 friends)
- Ethic of openness, collaboration, sharing
- High level of web-based interaction (e.g. MySpace, Facebook, Flickr, YouTube, Linkedin, etc.)
- Love to combine, remix media (e.g., Anime + music)
- Use Internet more than TV, particularly for news

Still More Key Drivers

- Current and new broadband-enabled uses are all expanding at the same time, becoming increasingly bandwidth-rich
- Ground-shifting global developments => e.g., $4/gallon gasoline (and climbing) breaking family budgets, lowering suburban property values, creating new urgency for telework
- Shift in corporate thinking, from rigid command-and-control to increasing “Web 2.0” collaboration
- Bottom line: Need for LOTS more bandwidth capacity

It is important to note here that the current generation of broadband technologies *(cable and DSL)* may prove *woefully insufficient* to carry many of the advanced applications driving future demand. *Today's broadband will be tomorrow's traffic jam*, and the need for speed will persist as new applications and services gobble up existing bandwidth.

U.S. Department of Commerce
Understanding Broadband Demand
(September 2002)

Where We Are Today

Broadband lines as percent of Population: US 1st in 1990s ↓ 4th in 2001 ↓↓ 10th in 2004 ↓↓↓ 15-24th now

Ave. Advertised ↓ Speed (US 14th): US: 8.9 Mbps Japan: 93.7 Mbps

Ave. Monthly Price (US 21th): US: $ 53.06 Finland $ 31.18

Ave. Price/Mbps (US 11th): US: $12.60 Japan $3.09

Ave. Price/Mbps Fastest (U.S. 18th): US: $2.83 Japan $0.13

Growth new subscribers (U.S. 15th): US: 4.21% Ireland 6.60%

Composite (ITIF): Penetration + Price + Speed: US 15th

Where the Leading Asian Nations Are Heading

- Japan
  - Fastest, cheapest broadband in the world today
  - Competition today at 1 Gbps, 10 Gbps by 2010
  - FTTH: 36% adoption, 85% availability today, 90% availability by 2010
  - “u-Japan” by 2010 – 2 meanings
- South Korea – right behind Japan
- China -- #1 in broadband users; ADSL to FTTH
- Hong Kong – already at 1 Gbps
- Singapore – 1Gbps to 50% by 2012, 100% by 2015
- Taiwan – rapidly heading to 100 Mbps

Where the Leading European Nations Are Heading

- European Union – Now exceeds US in broadband lines
- Sweden
  - Near 100% availability of broadband
  - Key to success so far: Huge investments in municipal networks, national backbone, tax incentives to employers to spur distribution of computers
  - FTTH: currently #1 in Europe at 7.1%; about to explode with TeliaSonera committing to FTTH
- France
  - Nat'l gov't offers 70% grants municipal networks; *plus* low interest loans available from government pension funds
  - Intense competition among three providers => can get 100 Mbps + phone + video in Paris for ~ $45/month
  - France spurring fiber rollout by opening wiring in apartments

More European Nations

- Netherlands
  - Several major city-wide FTTH projects under way, led primarily by municipalities, including Amsterdam
- Norway
  - The national utility company developing FTTH project for more than 2 million households
- Italy
  - Planning a massive € 6.5 billion modernization with goal of providing 65% of Italian households up to 100 Mbit/s by 2012
- United Kingdom
  - British Telecom's structurally-separated access provider, Openreach, has just completed its first FTTH project

Where US is Heading

- Verizon “FiOS”
  - FTTU (BPON => GPON) : Capacity 100 Mbps +
  - Goal: pass 18 million homes by 2010 (NYC by 2014)
  - Today: suburban donuts in parts of 16 states
  - Expensive higher tiers
- AT&T “U-Verse”
  - FTTN (ADSL2+) = Maximum ideal Mbps: 20-24 down/1-3 up
  - AT&T must allocate bandwidth, limits BB to 6-10 Mbps
  - Today: parts of 22 states
  - Goal: Pass 30 Million homes by 2010

Where the US is Heading (2)

- Qwest
  - FTTN (ADSL2+) = Capacity 20-24 Mbps down / 1-3 Mbps up
  - “Titanium Connect” -- 12 Mbps down / 768 up @ $46.99
  - “Quantum Connect” -- 20 Mbps down / 768 up @ $99.99
  - FTTN Today: negligible
  - Goal: 23 major cities in 10 states
- Comcast
  - “DOCSIS 3.0” = Max. Capacity 160 Mbps down / 120 Mbps up – BUT capacity must be shared; in US, 250-2000 homes/node
  - Today: Twin Cities 50 Mbps down / 5 Mbps up @ $149.50
  - Goal : “up to” 20% territory by 2008-09; 100% by 2010

Where the US is Heading (3)

- Other major cable companies, including Time Warner, in no hurry to deploy DOCSIS 3.0
  - If not competing against Verizon or another FTTH provider, little incentive to invest in DOCSIS 3.0
  - Risk of cannibalizing cableco revenue from TV and content
  - Cableco's don't benefit from socially beneficial uses – just more headaches, congestion for them
- *Wall Street Journal*: "For consumers not served by Comcast or Verizon, speeds [of 50 Mbps or more] may be a long time off."

Where the US is Heading (4)

- Independents and coops – about 400 FTTH systems
- Municipalities – about 44 FTTH systems
  - Paved the way for private sector
  - High take rates
  - Contribute to community well-being in many ways, particularly economic development
- Wireless technologies – WiFi, WiMAX, 3650 MHz, etc.
- Other technologies – satellite, BPL, etc.

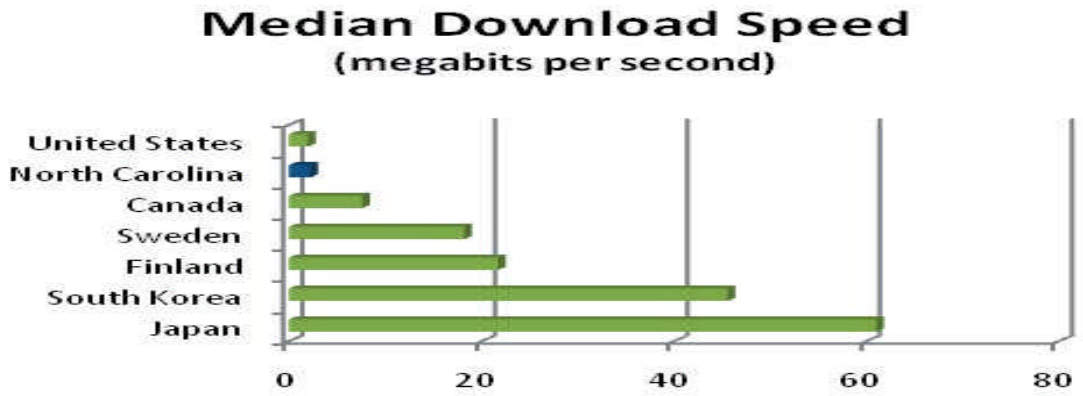
North Carolina

- 11th "high-speed" lines NC: 2.9 mm CA: 14.4 mm (FCC: 6/30/07)
- 15th in fiber lines NC: 5683 CA: 194,514 (FCC: 6/30/07)
- 16.46% households no access even to 200 kbps (eNC: 12/31/06)
- 21 counties < 70%, 4 counties < 50% (eNC: 12/31/06)
  (now only 17 counties below 70%)
- 67% rural counties have access to cable modems v. 82% urban counties (eNC: 12/31/06)
- Independents, coops build out 98-100%; majors stop at 80%
- Two coops developing FTTH in portions of service areas @ 80 Mbps
- Wilson and Salisbury developing city-wide FTTH networks

North Carolina Internet Speed Test

Location	Median Download Speed (megabits per second)
Japan	61.00
South Korea	45.60
Finland	21.70
Sweden	18.20
Canada	7.60
North Carolina	**2.23**
United States	**1.97**

International data from the Information Technology and Innovation Foundation. U.S. data from speedmatters.org test results. Most test participants had DSL or cable modem connections.



Source: Communications Workers of America

North Carolina in ITIF 2007 New Economy Index

- "New Economy" = "a global, entrepreneurial and knowledge-based economy in which the keys to success lie in the extent to which knowledge, technology, and innovation are imbedded in products and services"
- ITIF rates states on 26 indicators in 5 categories "that best capture what is new about the New Economy."
- North Carolina's rankings:
  - Knowledge Jobs – 31st
  - Globalization –17th
  - Economic Dynamism – 27th
  - Transition to a Digital Economy – 36th
  - Innovation Capacity – 21st
  - Overall rank – 26th
- Why so low? Outside high-tech areas, "old economy"

Recommendations

1. Think big, adopt high goals, act aggressively –
   By 2012, NC in top 5 states in adoption and bandwidth usage
2. Participate in development of a national broadband strategy
3. Conduct new round of inquiry to gather info, develop policies, recommendations to General Assembly
4. Continue connectivity programs for next year, with adjustments – RFI, stress cost-effective tech options, competition, collaboration
5. Obtain authority to compel production of data, allow confidentiality
6. Encourage cooperation by incumbents
7. Encourage community broadband initiatives
8. Create Wiki