A Blueprint for Big Broadband

Presentation to the Internet2 Spring Meeting

April 23, 2008

Blueprint Paper:

www.educause.edu/ir/library/pdf/EPO0801.pdf

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Preview

The U.S. should adopt a National Broadband Policy, one component of which should be the creation of a new Universal Broadband Fund, funded at $8 Billion per year for 4 years, with a state match, to deploy open and competitive 100 Megabits capacity to all homes and businesses by 2012.

Questions you might ask (and that I hope to answer):

1. Do we really need 100 Megabits to the home?
2. Won't the private sector (i.e. the marketplace) provide the right amount of broadband?
3. What is our national broadband policy?
4. What are other countries doing to promote broadband?
5. How can we afford to subsidize broadband without raising taxes?

Demand: Does the U.S. Need Big Broadband?

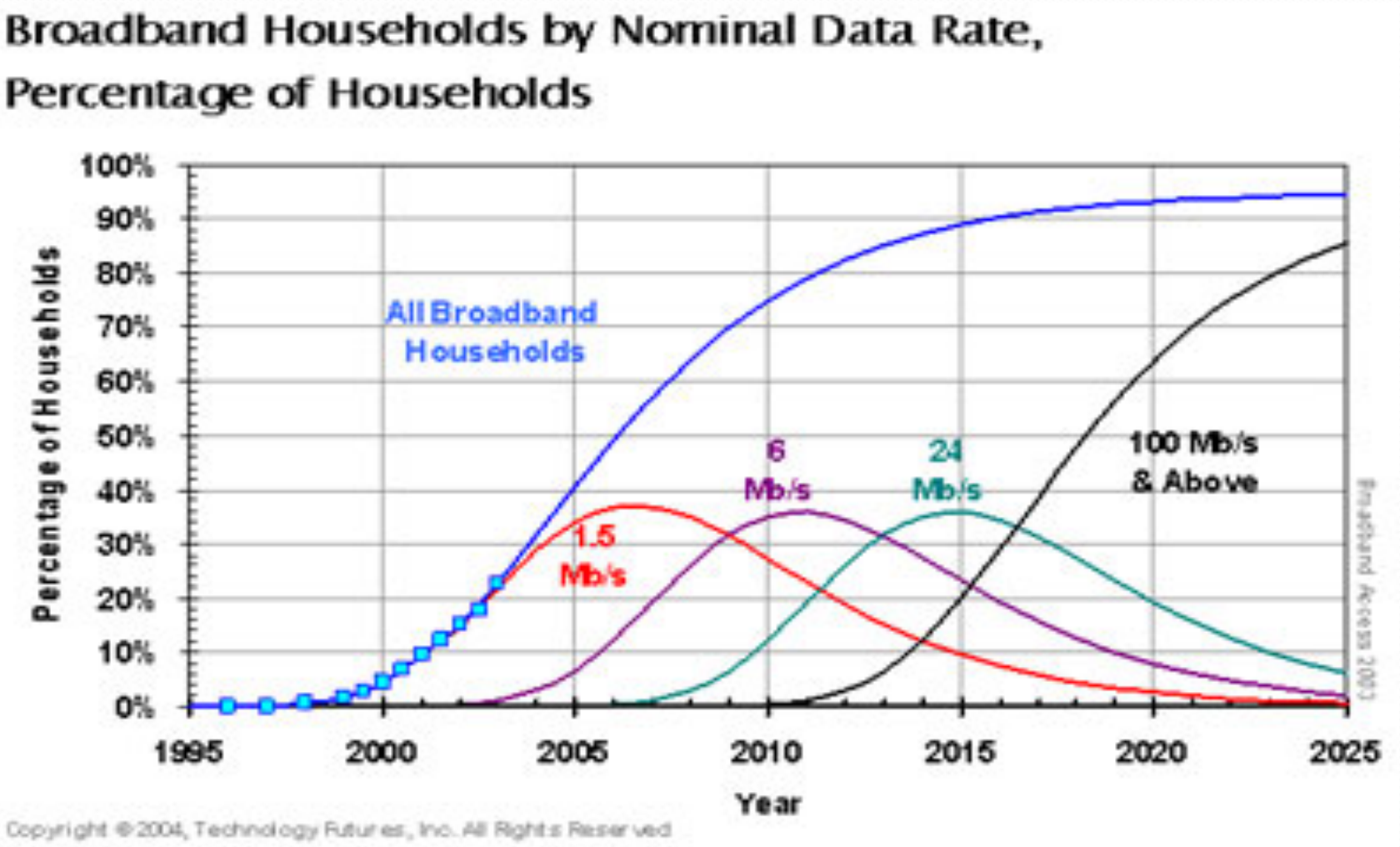
- Tele-medicine
- Tele-work
- High Definition TV
- Videoconferencing
- Class Lectures
- Social Networking
- Legal File Sharing
- Music Lessons
- Scientific Research
- Undersea and Space Exploration
- ???

Now, imagine all these uses in one home *simultaneously*!

Several Studies Show Internet Usage Exploding

- Nemertes Research: "The Internet Singularity, Delayed: Why Limits in Internet Capacity Will Stifle Innovation on the Web."
  - "In sum, we believe that the environment necessary for a Moore's-law increase in application utilization exists today.
  - 3 Megs to 384 Megs in 10 years (Moore's Law)
- Jupiter Research: "[A]verage households will need 57–72 Mbps of bandwidth by 2009 and 'tech savvy' households would consume nearly 100 Mbps.

Demand: Technology Futures Predicts Need for 100 Mbps in 4-5 Years.



U.S. Investment in Broadband Is Not Keeping up with Exploding Demand.

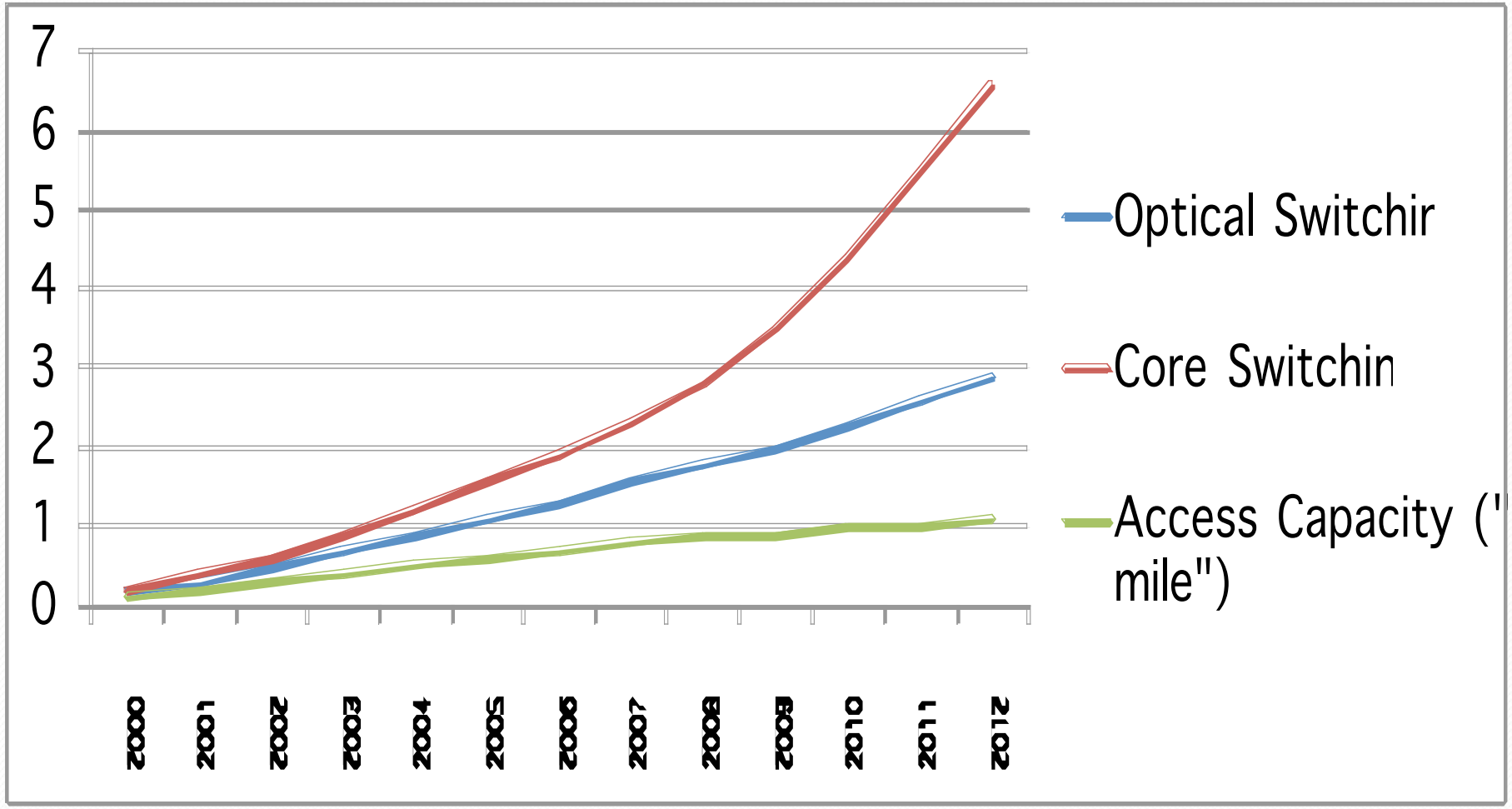
Nemertes Research:

- "[Internet] usage could outstrip network capacity both in North America and worldwide as early as 2010."

Teleography:

- "Internet traffic increased by 75 percent in 2006, while capacity grew by only 47 percent."

Nemertes Research: “North America is behind the rest of the world in terms of access line investment.”



Some Internet Capacity Shortages are Already Here:

- Time Warner Cable: currently holding trials to bill Internet subscribers based on their usage in order to reduce congestion on its network.
- Comcast: has admitted to "delaying" or "blocking" BitTorrent traffic, allegedly to conserve bandwidth.
- Rogers Cable in Canada already puts usage caps on customers.

Cable Modems and DSL: Back to the . . . Past?

"[T]he 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: A Review of Critical Issues, at 6 (Sept. 2002)

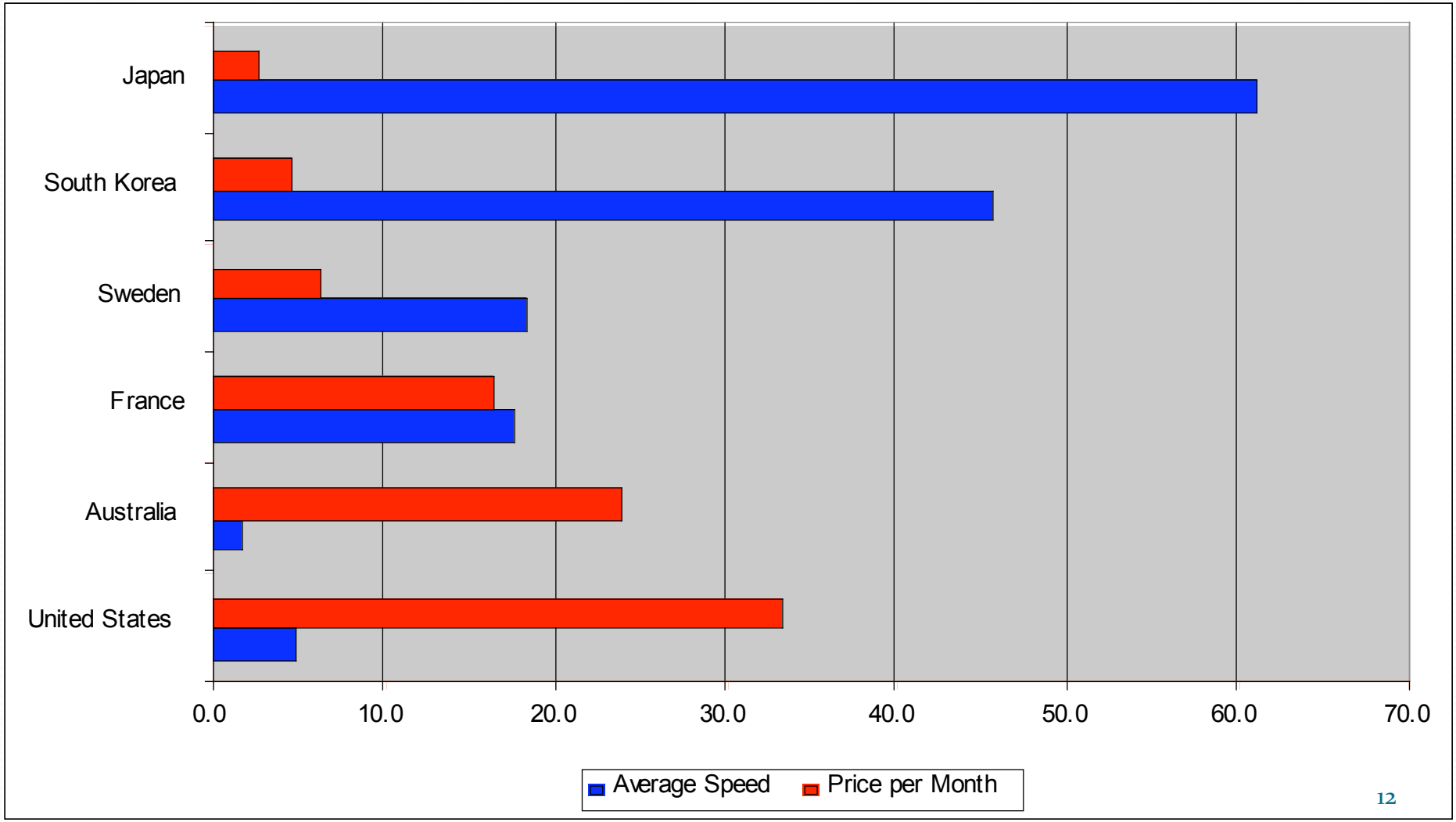
International Comparisons

U.S. rank among 30 OECD Nations:

- 15th in broadband adoption
- 14th in average download speed
- 18th in broadband price per megabit
- Below the OECD average in fiber-connected subscribers per all broadband subscribers.

International Comparison: Speed and Price

(Source: ITIF)



Why is the U.S. Broadband Market Failing?

First, let's take a look at our National Broadband Policy.

U.S. Broadband Attitude:

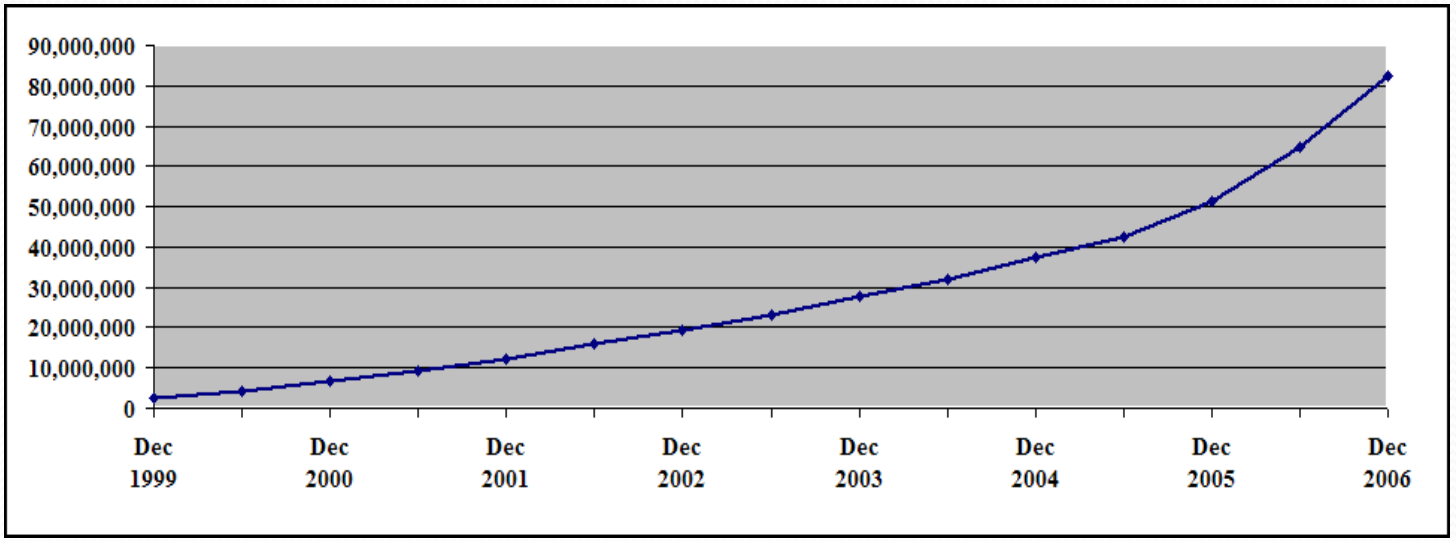
Removing barriers to competition will encourage multiple, facilities-based competitive broadband providers.

Market forces and regulatory oversight will protect the interests of consumers:

- FCC/FTC Oversight
- Antitrust law
- Principles

NTIA's Networked Nation Report (Jan, 2008):
"The results have been striking. The last several years have witnessed substantial growth in the broadband marketplace punctuated by increases in capital investment, innovation, and market entry. Relative to other countries, the United States has experienced superior productivity over the past several years."

Broadband Lines in the U.S.



The U.S. lags behind other nations in broadband performance.

U.S. Broadband International Rank:
broadband subscribers per population

- 1999: 3d
- 2000: 5th
- 2001: 7th
- 2002: 11th
- 2003: 15th
- 2004: 18th
- 2005: 19th
- 2006: 20th

Source: ITU ICT "Eye".

Telco/Cable View: "Platform Competition is Working"

Most households can get broadband:

- **82% DSL**
- **94% Cable**

50,000 WiFi Hotspots exist nationwide

Broadband over powerline now competing in dozens of locations

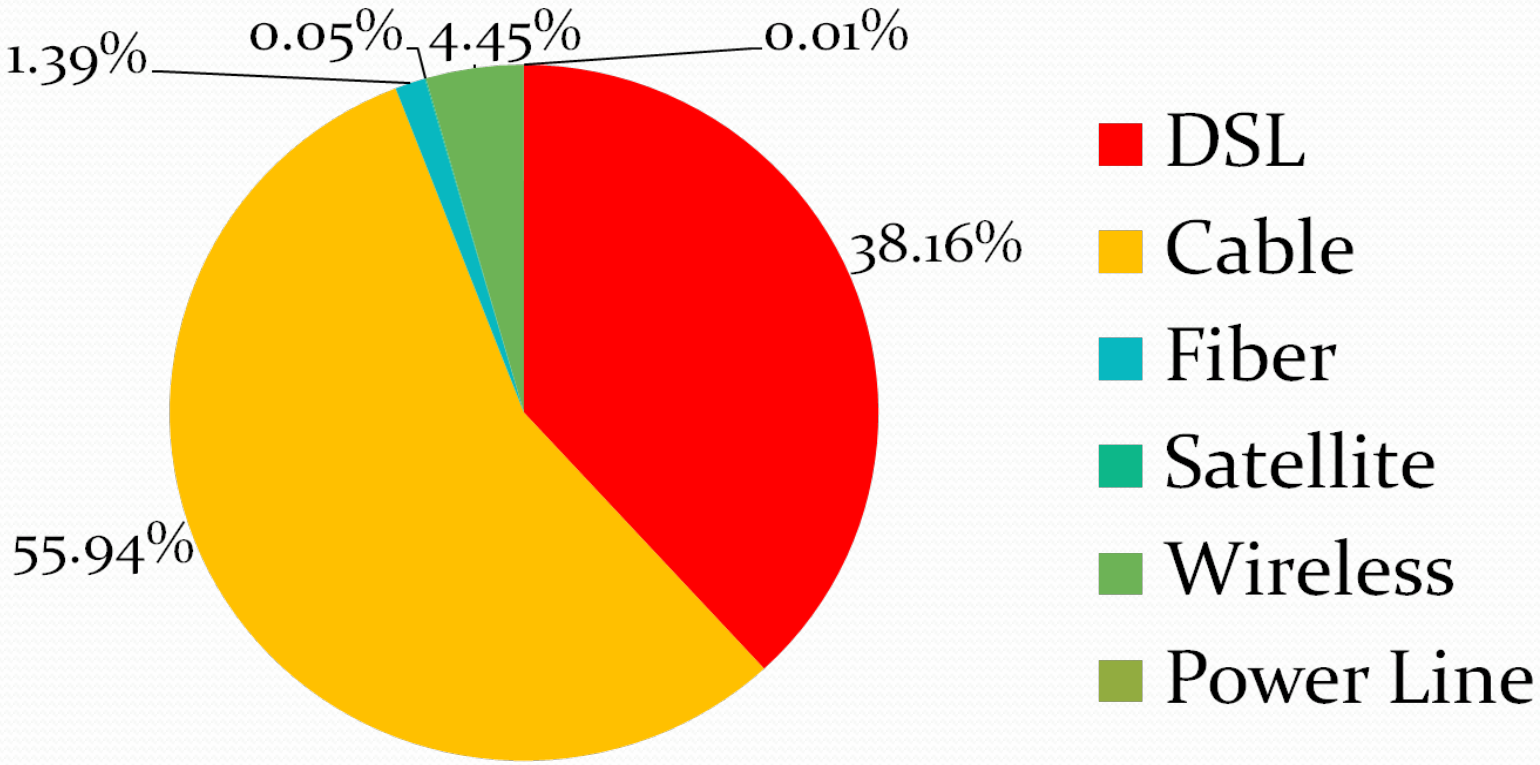
Carriers are improving the high-speed options available to customers:

- **Verizon FiOS 50 Mbps**
- **Cablevision 16 Mbps**

Perhaps that's because they own the market.

Broadband Market Share

(Source: FCC June 2006)



A Market-based Approach Does Not Provide Sufficient Incentives

- Gartner Consulting: "In order for market demand alone to drive ubiquitous deployment of broadband service, providers and investors require strong evidence of demand…. one of the weaknesses of this logic is the view that broadband is an optional service."
- Rob Atkinson, ITIF: "there are significant externalities from high-speed broadband . . . if left to themselves, market forces alone will lead to less investment in broadband than is societally optimal."

U.S. States and Foreign Governments have adopted specific broadband policies that include significant public funding.

State Governors: Stepping Up

Some Examples:

- California: grant programs, access to rights-of-way, tax credits, consumer education.
- Georgia: Rural broadband grants (BRIDGE)
- Idaho: Matching grant program and tax credits
- Kentucky: Rural grant and loan program (KIA); mapping (ConnectKentucky)
- Maine: 0.25% fee on intrastate service to fund rural broadband and cellular service (ConnectME)
- Minnesota: public-private partnership (Get Broadband!)

State Governors: Stepping Up

More Examples:

- New York: initiating competitive rural broadband grant program, recently awarded 9 new grants.
- North Carolina: broadband grant program and mapping (E-NC)
- Ohio: extending the reach of the Broadband Ohio Network ("middle mile")
- Vermont: issuing moral obligation bonds
- Virginia: tobacco settlement money used for regional broadband networks.

Other Nations' Broadband Strategies: Some Examples

- Japan government owns 40% of NTT, ordered it to deploy fiber whether or not it shows a profit. Has evolved from "e-Japan" to "u-Japan".
- France: Enforced unbundling rules, now one of the most competitive markets, new entrants beginning to deploy fiber.
- The UK: created a Broadband Fund, also adopted strict unbundling and wholesale/retail separation of BT, now surpasses France.
- Sweden: focus on municipal fiber builds.

Australia

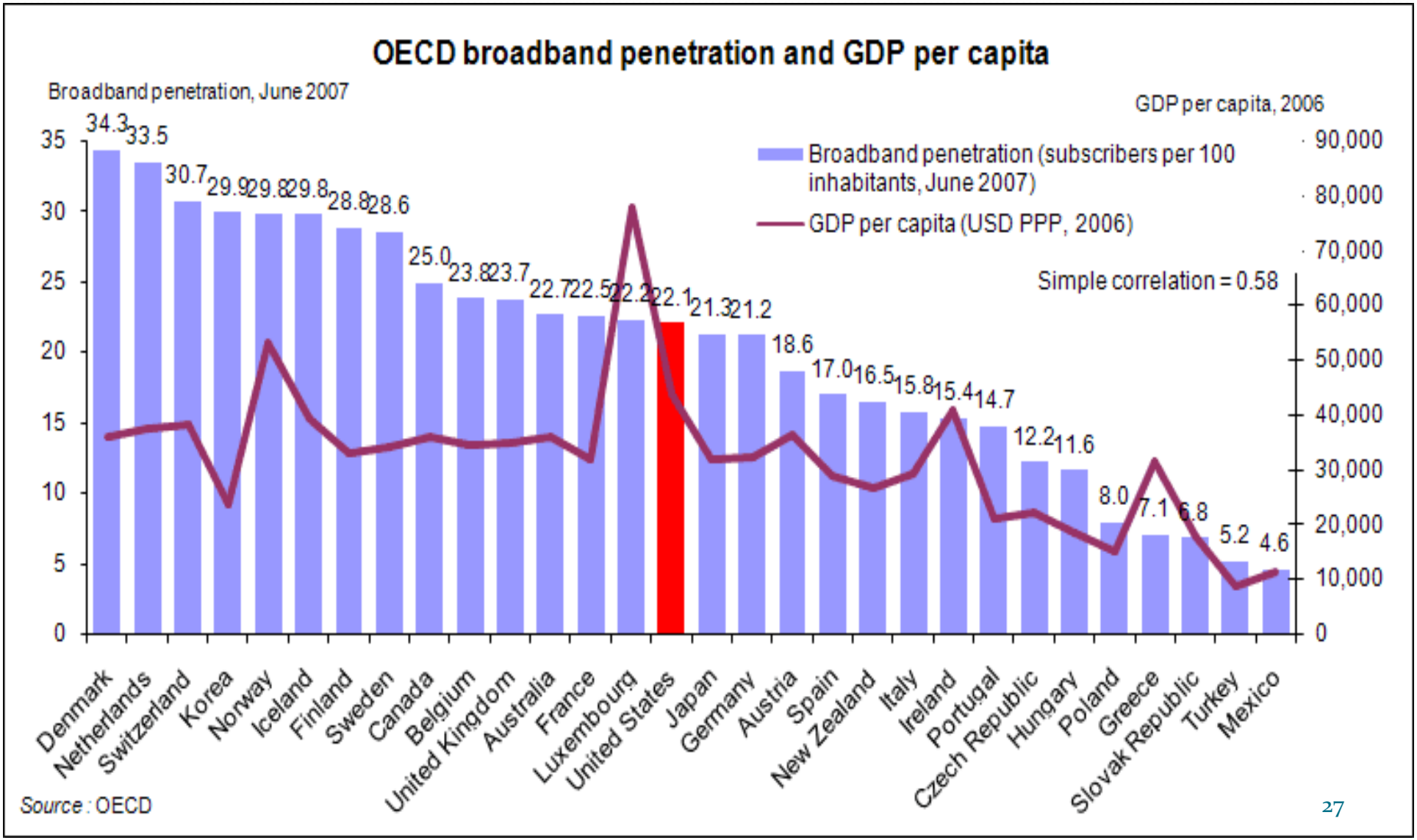
In the first 100 days of 2008, the Rudd Government:

- established a Council of Australian Governments Infrastructure Working Group to set a timetable for reforming the way infrastructure is planned;
- allocated up to $100m to support high-speed fibre-to-the premises broadband connections to Australian schools to deliver download speeds of up to 100 megabits per second.

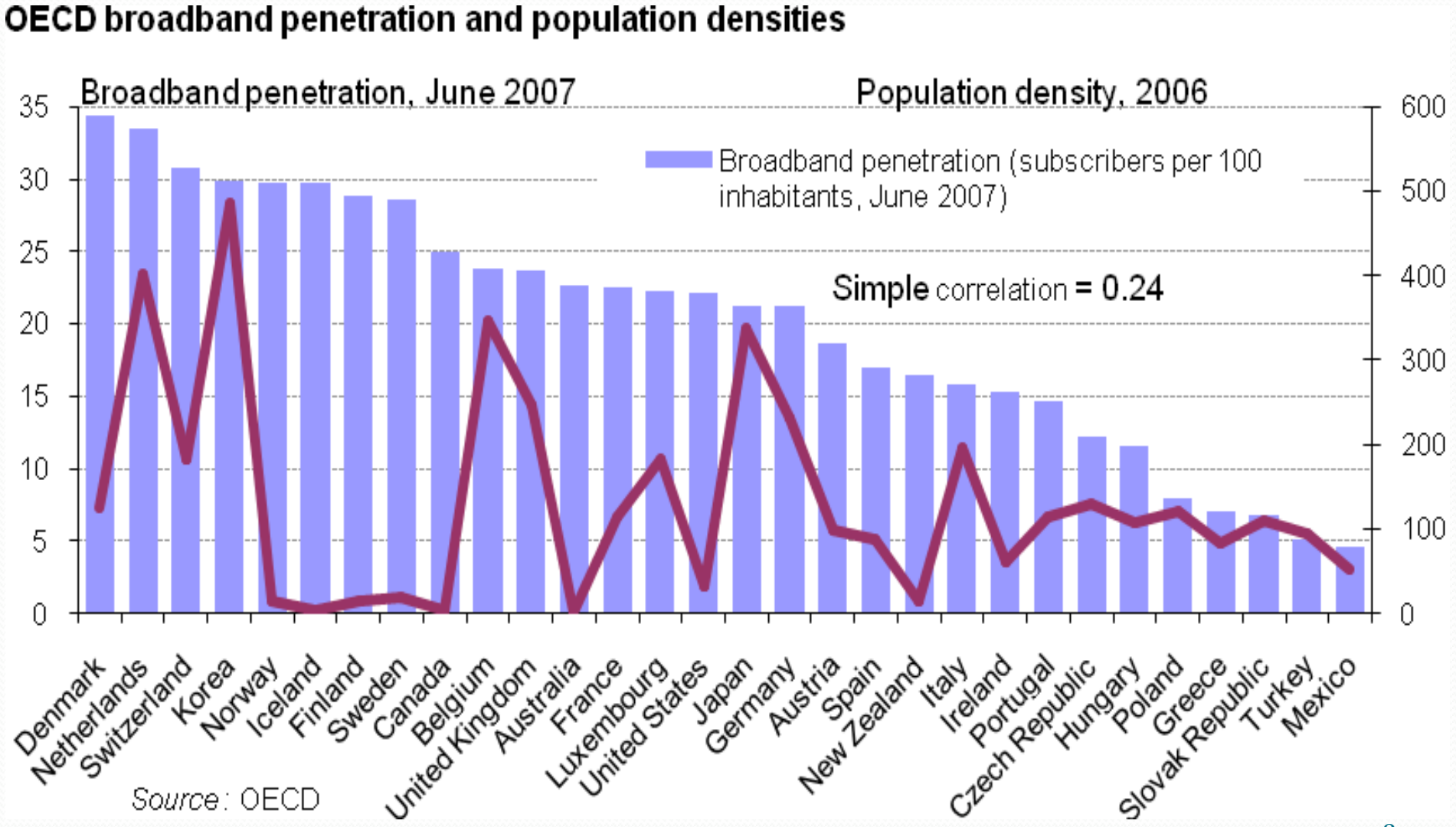
Canada: What Hath Broadband Wrought?

- Adopted a national broadband plan in 2001
- Decided to treat broadband as infrastructure
- Funded 3 separate national programs:
  - National Satellite Initiative
  - Strategic Infrastructure Fund
  - Broadband for Rural and Northern Development (BRAND)
- Canada has been at or near the top of all countries in broadband since 2001.
- Canada has a more rural area and smaller economy per capita than the U.S.

Countries with smaller GDP per capita than the U.S. have better BB Penetration.



Countries with more rural population than the U.S. have better BB Penetration.



Federal Government Funding of "Last Mile" BB is a Necessity

The marketplace will not provide sufficient investment in broadband facilities because the costs of deploying broadband are greater than the microeconomic returns to the companies.

There are significant "macroeconomic" benefits to the public of broadband infrastructure (health care, tele-work, education, etc.) that the private sector does not value.

The deregulatory policies of the last 10 years have not worked; U.S. is falling further behind other nations.

"The Coming Exaflood," Brett Swanson, Wall St. Journal, Jan. 20, 2007

- "Without **many tens of billions of dollars worth of new fiber optic networks**, thousands of new business plans in communications, medicine, education, security, remote sensing, computing, the military and every mundane task that could soon move to the Internet will be frustrated. All the innovations on the edge will die."

Existing Broadband Programs are Inadequate

- The Existing Universal Service Fund is not designed for broadband deployment.
  - Broadband funding will compete with other USF Dollars.
  - The amount of money being discussed ($300 M) is much too small – will take over 300 years to wire all homes (assuming $1000 cost per home).
- The Rural Utility Service (RUS) loan program does not address "uneconomic" rural areas.
  - Most funding is provided through loans that must be re-paid; but economics of rural areas make it impossible to earn enough to repay the loan.
  - Most applications are denied.

Key Recommendation

Create a brand new

Universal Broadband Fund (UBF) to subsidize the construction of local broadband connections to every home and business.

How Much Funding is Necessary?

- Building last mile facilities to every home will cost about $97 Billion.
  - Estimate based on $1000 per home x 97M homes (excluding the 18M homes covered by Verizon FiOS)
- Tripartite Match:
  - Federal Government = 1/3 ($33 Billion)
  - State governments – 1/3 ($33 Billion)
  - Network Builder/Owner = 1/3 ($33 Billion)
- Over 4 years, Federal government should appropriate $8 billion per year.

How would the funding be distributed?

- Federal funding administered by the Department of Commerce.
- Federal funds distributed to each state after the state raises its 1/3 share of the funding.
- The state then awards the fed/state grant money to the network builder/owner on a market-by-market basis.
- The network builder/owner can be private sector (telephone company, cable company) or public entity (e.g. municipality)
- Network builder must deploy minimum of 100 Mbps, scalable to 1 Gbps to every home and business.

2006 Federal Budget Outlays

TOTAL FEDERAL BUDGET OUTLAYS – 2006	$2,660 B
Transportation	$ 70.2 B (2.6%)
Health	$ 63.9 B (2.4 %)
Community Development	$ 54.5 B (2.0%)
Science, Space and Technology	$ 23.6 B (0.9%)
TOTAL FEDERAL DEFICIT – 2006	$ 248.2 B (9.3%)
Proposed Federal Spending on Big Broadband	$ 8.0 B (0.3%)

Source: publicagenda.org, quoting from U.S. Budget

If the U.S. can spend $70 Billion/year on transportation, it can spend $8 Billion on Broadband infrastructure.

Public Funding Means Public Obligations: Open and Affordable

A Big Broadband connection is only as useful if it takes you where you want to go . . .

- Network operators should not block, degrade, or discriminate against any traffic.
- A clear, enforceable rule will provide certainty to the industry and stimulate investment at the edge of the network.

- Policy-makers should consider requiring network owners to provide wholesale capacity to multiple retail competitors.
- Broadband rates should be affordable.

Conclusion: America Needs a National Broadband Policy with Federal Funding

- The U.S. is falling behind other nations and our own consumers' needs for big broadband.
- We cannot simply play catch-up; we must look ahead ("skate where the puck is going to be")
- A four-year broadband investment program can solve our broadband needs for decades because fiber capacity is scalable upwards
- A nationwide investment in broadband will more than pay for itself in greater economic growth, improved education, health care and tax revenue