



Institute of Social and Economic Research



Extending Rural Broadband: Lessons from North America

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Director

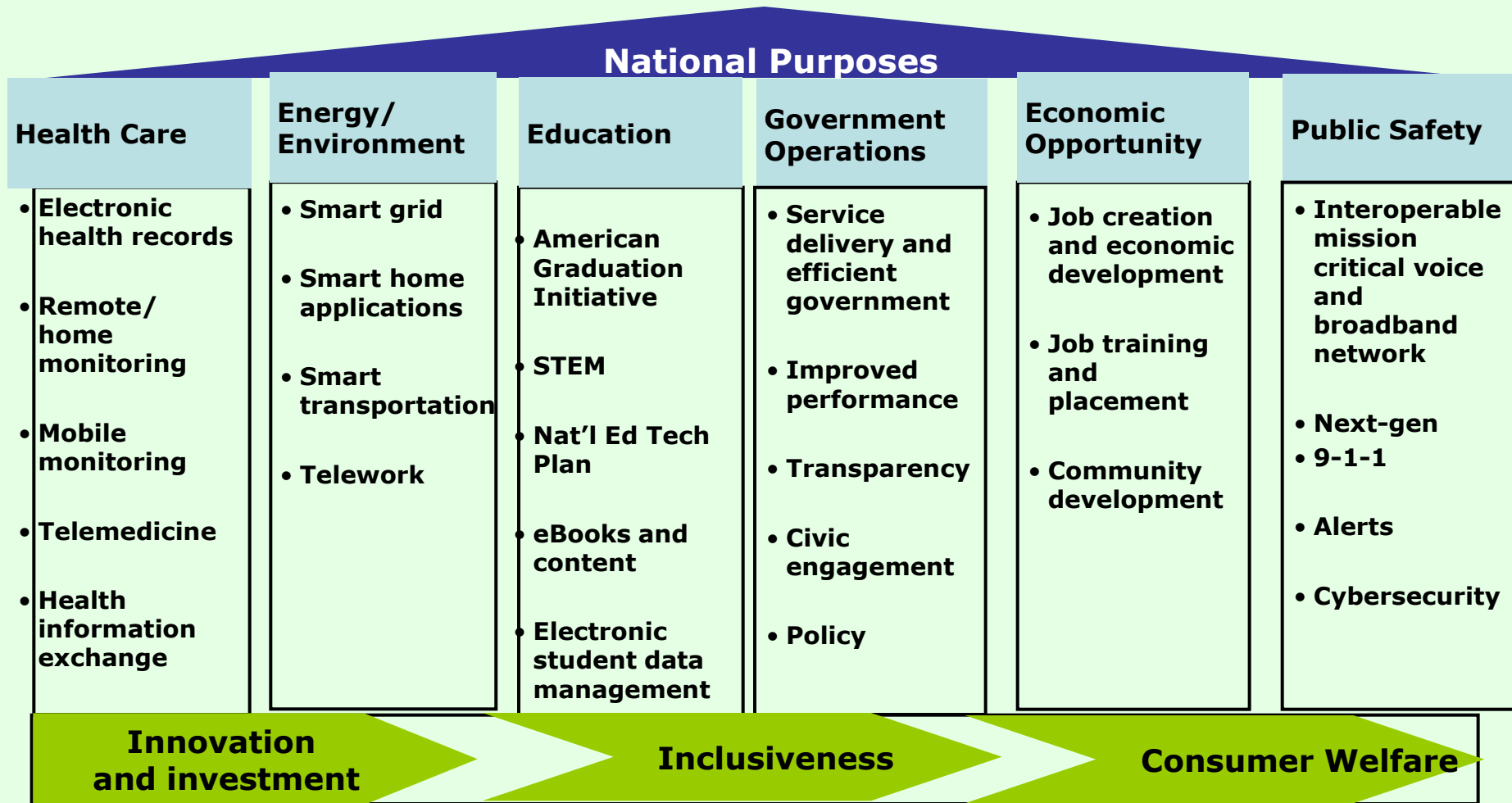
**Institute of Social and Economic Research
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University of Alaska Anchorage



UNIVERSITY *of* ALASKA ANCHORAGE

Broadband: Toward a “Digital Economy”



Broadband in Rural/Remote North America: Creating New Business Opportunities

- **Reach**
 - New markets, new audiences
- **Market Information**
 - Getting price information
 - Getting competitive bids
 - New sources of supplies
- **Outsourcing/Insourcing**
 - Doing work for distant clients
 - Call centers, data entry, translation
- **Funds transfer**
 - Online banking, investing
 - Merchant payment systems
 - Remittance transfers
- **Microfinance**
 - Connecting lenders with small businesses and entrepreneurs





K.I.H.S.

Keewaytinook Internet High School



Distance Education: Remote NW Ontario

Cree and Ojibway villages:

High school completion
for students in native
communities using Broadband

Sustainable model: contracts to
provide connectivity and
technical support for education,
health care, other public services

Broadband Access: Models and Criteria

- **Household access** (US, Canada)
- **Personal access**
 - Using mobile phones, PDAs, laptops, netbooks, e-pads, etc.
- **Institutional access:**
 - government agencies, health care, etc. (US)
- **Public access**
 - Single national model (e.g. post offices);
 - Variety of public access models (telecenters, cybercafés, other shops, post offices, NGOs, etc.);
 - Schools and libraries; (US)
 - Other institutions, such as community centers (Canada)
- **Geographic access**
 - Within specified distance of access point
- **Other criteria**
 - Administrative function, population, etc. (US: Alaska)

Beyond Infrastructure: What makes Broadband Accessible?

- *Availability*
 - Coverage (wireless)
 - Houses passed (fiber, coax, copper)
- *Affordability*
 - Price for commonly used services: now **Broadband**
 - Price as percentage of disposable income
- *Bandwidth*
 - Sufficient for Internet access and multimedia services
- *Quality of Service*
 - Reliability
 - Latency (delay)
 - Jitter

Broadband Availability and Adoption: Canada and U.S.

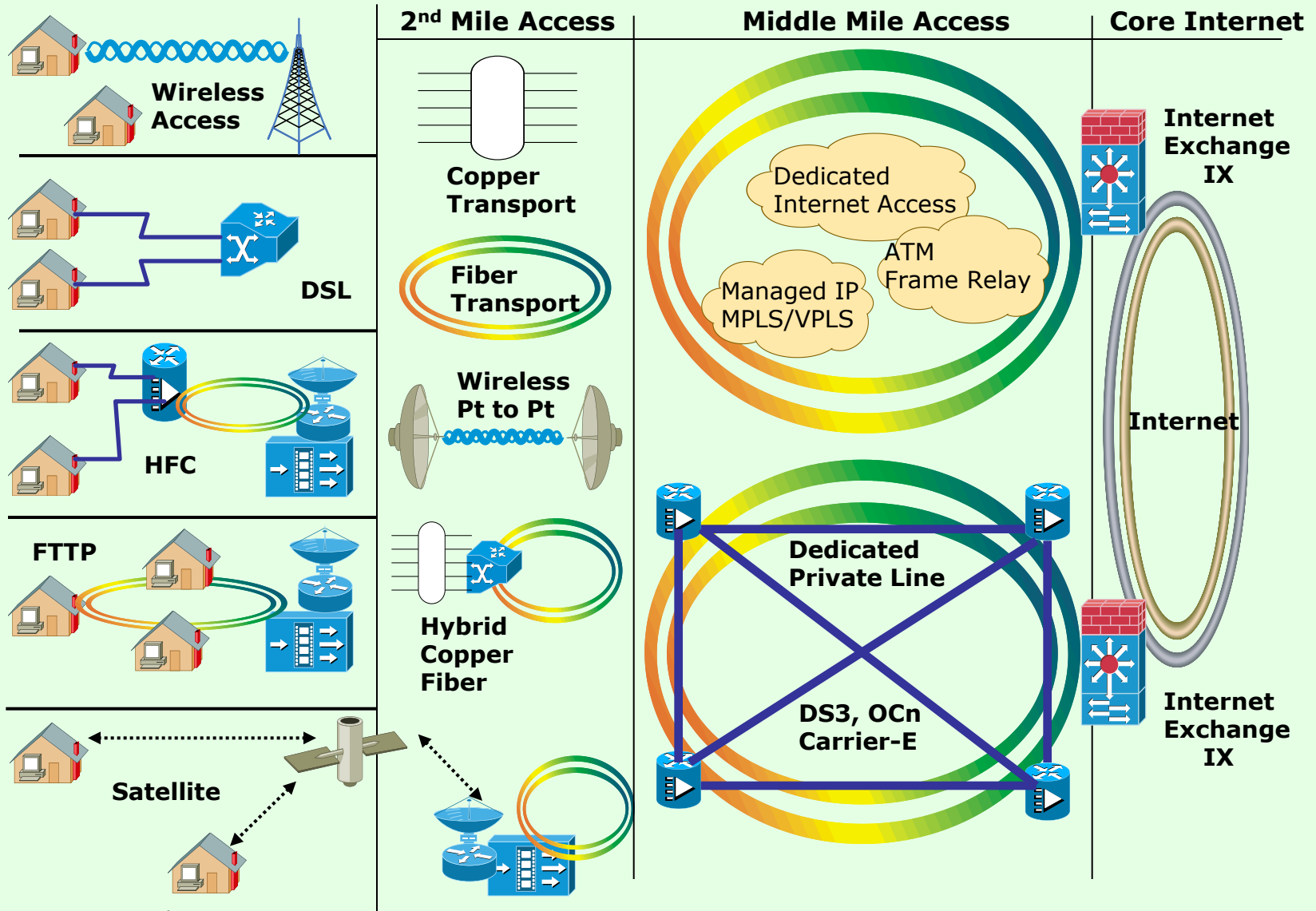
Canada:

- **Canada ranks 10th in broadband penetration among OECD countries**
- **Broadband available to 94% of households**
- **69% of Canadian households subscribe to high speed (>128 kbps); 52% of hh subscribe to broadband (>1.5 mbps)**
- **22% of rural households don't have access**
- **Satellites have national coverage**

United States:

- **US ranks 15th in broadband penetration among OECD countries**
- **Broadband (speed??) available to 94% of households**
- **63% of households with access subscribe**
- **Only 37% of rural households subscribe**
- **Satellites have national coverage**

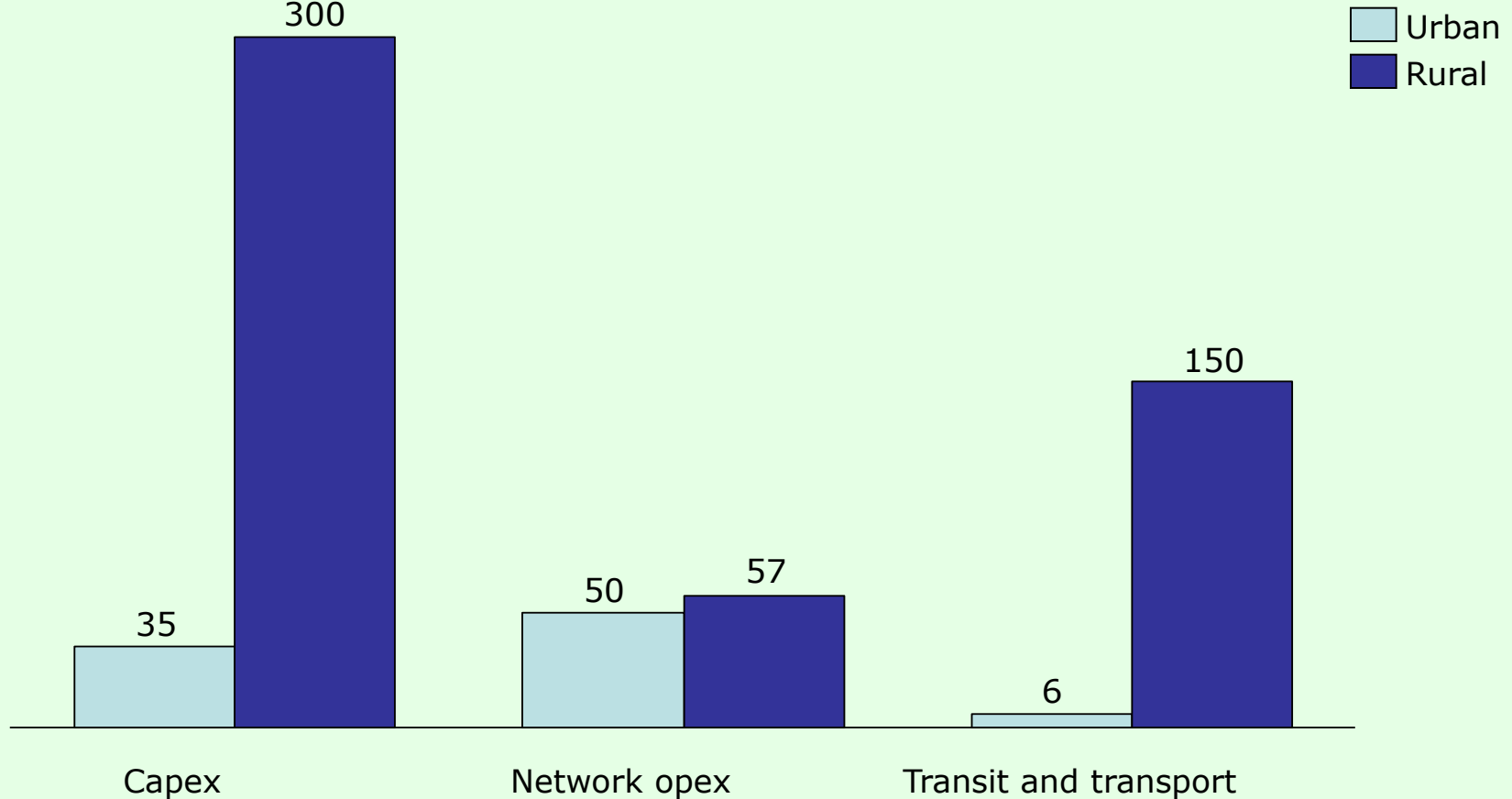
Complex Technology Ecosystems: Gaps in Availability and Sustainability



Rural Areas: Higher Capital and Operating Costs (U.S. estimates)

Estimated annual cost/subscriber to provide wireline service¹

Dollars



¹ Does not include costs already incurred (e.g., spectrum, prior plant build-out). Assumptions made with regard to penetration rate, upgrade path, cost of equipment, maintenance, operations, urban/rural mix, length of fiber run, and discount rate

Broadband Support Models

- **Infrastructure Investment**
 - Stimulus funds
 - U.S.
 - Canada
 - Other Infrastructure investment funds
 - U.S. Rural Utilities Service
 - EU: EC rural telecom Investments
 - World Bank, other development banks
 - Public/private partnerships
 - Australia, NZ
- **Sustainability Subsidies**
 - Universal service funds
 - Other operational support

U.S. Stimulus Programs

- Total \$7.2 billion
- **NTIA (Dept. of Commerce):**
 - \$4.7 billion for BTOP (Broadband Telecom Opportunities Program)
 - Includes \$350 million for broadband data and mapping
 - Grants for infrastructure, public computer centers (<\$250 million), and sustainable broadband adoption (>\$350 million)
 - Require at least 20% matching
- **Rural Utilities Service (RUS), Dept of Agriculture:**
 - \$2.5 billion for rural infrastructure projects (BIP)
 - Grant/loan program
- **Other Stimulus initiatives involving ICTs:**
 - Electronic health record systems, other health IT
 - Energy: Smart Grids
 - Department of Education
 - Public safety and security

Canadian Infrastructure Programs

- **Stimulus: “Connecting Rural Canadians”**
 - Extend “essential infrastructure” in remote and rural areas
 - Implemented by Industry Canada
 - Preceded by mapping project
 - C\$225 million available
 - Requires 50% match (except First Nations)
 - Requires 5 year sustainability plan
- **Other Federal Projects**
 - BRAND: \$105m: 2002-2004, extended to 2007
 - FedNor (Northern Ontario)
 - First Nations Infrastructure Fund
- **Provinces:**
 - Federal/provincial partnerships: Eastern Ontario
 - Public/private partnerships:
 - Alberta, New Brunswick, Nova Scotia, PEI
- **Cities, Municipalities: Community wireless**

Comparison of US and Canadian Stimulus Programs

- **Canada:**
 - exclusively rural
 - exclusively infrastructure
 - Grants only
 - Can fund public sector entities: provinces and territories
 - Mapping before grant RFP
- **US:**
 - Includes some applications, community computer centers, training etc.
 - Grants and loans (from RUS for infrastructure)
 - Funds for other programs using ICTs:
 - Health records and IT, energy, education, etc.
 - Mapping part of stimulus initiative
- **Both:**
 - Focus on short-term job creation
 - Require matching funds (20% US; 50% Canada)
 - Little or no funding for evaluation (NTIA announced RFP in July 2010)

FCC's National Broadband Plan:

Released March 2010

Goals:

- **Speed: “100x100”:** At least 100 million U.S. homes should have affordable access to actual download speeds of at least 100 Mbps and actual upload speeds of at least 50 Mbps.
- **Access and Skills:** Every American should have affordable access to robust broadband service, and the means and skills to subscribe if they so choose.
- **Anchor Institutions:** Every community should have affordable access to at least 1 Gbps broadband service to anchor institutions such as schools, hospitals and government buildings.
- **Mobile Innovation:** The United States should lead the world in mobile innovation, with the fastest and most extensive wireless networks of any nation.
- **Public Safety:** To ensure the safety of Americans, every first responder should have access to a nationwide public safety wireless network.
- **Energy Management:** To ensure that America leads in the clean energy economy, every American should be able to use broadband to track and manage their real-time energy consumption.

Steps to Achieve U.S. Broadband Plan: Universal Service Goals

- **Connect America Fund**
 - Affordable broadband and voice with at least 4 mbps down and 1 mbps upload speed
- **Mobility Fund**
 - National 3G coverage; support for 4G
- **Retain and improve E-Rate Program**
- **Reform High Cost Fund: Including adding broadband**
- **Update Low Income Funds to include broadband**

FCC began process through NOIs and NPRMs in April 2010

Universal Service Support 1998-2009: \$65.7 billion

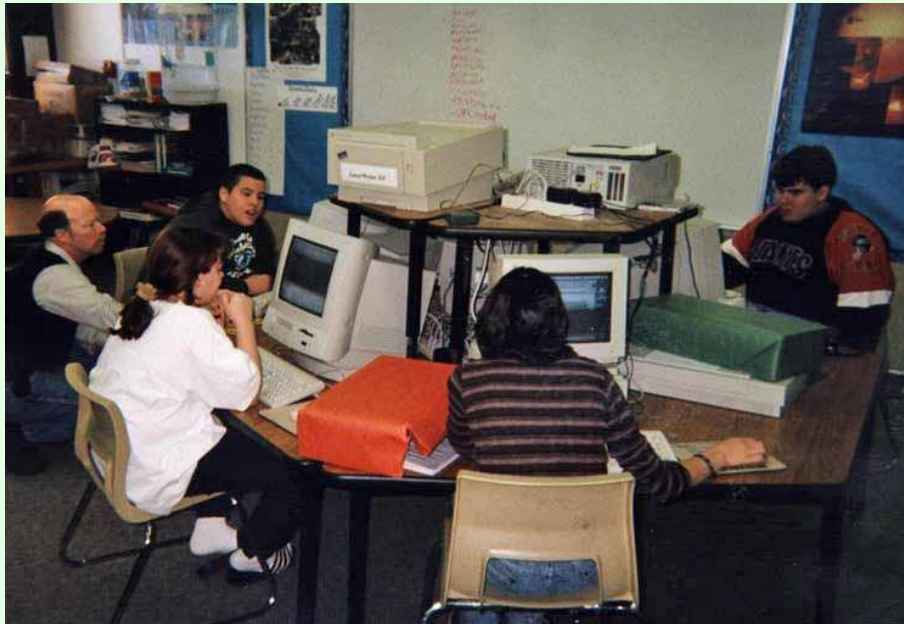
High Cost:	\$39 billion
E-Rate:	\$17.9 billion
Lifeline/LinkUp	\$8.5 billion
Rural Healthcare	\$287 million

Subsidizing the User: The US E-Rate

- **\$2.25 billion per year for schools and libraries**
- **Up to \$400 million per year for rural health care**
- **Discount based on:**
 - **Economic need**
 - **Rurality**
- **Discounts range from 20% to 90% for poorest schools/libraries**
- **Subsidy goes to the school (or library): the **user****
 - **Not directly to the provider**
 - **Schools post requirements on website for **competitive bids****
 - **Service may be provided by any telecom provider, including satellite, wireless as well as local telco**
- **Includes funding for LANs in the schools**
 - **Goal: Access to the **classroom**, not just the schoolhouse door or the principal's office**
- **Since 1997, about \$21.1 billion has been allocated for schools and libraries**



**Internet Access for
Alaska Schools:
Supported by the E-Rate
(\$25.5m in 2009)**



Telemedicine in Alaska

AFHCAN Telehealth System:

250 sites; 70 member organizations

- Village clinics: Native health aides
- Public Health clinics
- Regional hospitals
- Military installations, Coast Guard, Veterans Administration

Covers more than 212,000 beneficiaries

- About 40% of Alaska population
- Majority are in Alaska native villages

- Supported by USF Rural Health Care Program

Alaska receives
the largest amount of
any State: \$29m in 2009



Key Elements of the U.S. Universal Service Fund Approach to Extending Access

- **Operational support (mostly opex rather than capex)**
- **Support institutional vs. individual access**
 - **Schools, libraries, rural health services**
- **Targeted subsidies**
- **Subsidies to end user, not directly to provider**
- **Competitive bids to provide services and equipment**
- **Incentives to extend infrastructure**
 - **Schools/libraries as anchor tenants**
 - **Health networks to extend broadband**
- **Support for sustainability**

Policy Dilemmas: Strategy before Policy

- **Canada:**
 - **Broadband Taskforce: 2001**
 - Recommended universal broadband access by 2004
 - Definition of broadband: 1.5 mbps symmetrical
 - Estimated cost: \$2.75 to \$4.57 billion
 - **Telecom Policy Review Panel: 2006**
 - Rely on market forces to “maximum extent feasible”
 - Use regulation and other government measures where market forces unlikely to achieve telecom policy objectives...
 - Implementation???
- **U.S.: Policy leapfrog?**
 - No national vision/goals since Gore’s NII until --
 - National Broadband Plan mandated in Recovery Act
 - Announced March 16, 2010
 - Implementation begun through FCC Notice process
 - Detailed maps and data not available to guide Stimulus funding

Policy Dilemmas:

Relationship of Regulation to Policy

- **Regulatory decisions become policy**
 - Policy changes happen slowly
 - Policy may be driven by political priorities
- **U.S.:**
 - **FCC: de facto mandate: includes policy**
 - **NTIA mandate more limited than Industry Canada**
 - **White House: depends on priorities of each administration**
 - **Courts: much more involved than in Canada**
- **Canada:**
 - **Industry Canada responsible for policy but...**
 - **CRTC Consultation concerning Basic Service: 2010**
 - **Should basic be updated from voice and dial-up Internet to include broadband?**
 - **Decision could change Canadian broadband policies**

Policy Dilemma: Broadband Competition (or lack of)

- **US and Canada:**
 - Largely duopolies: telco and cableco
- **Canada:**
 - Incumbent telcos (TSPs) have 40% of Internet access revenues
 - Incumbent cablecos (cable BDUs) have 48% of Internet access revenues
 - Top 5 ISPs captured 76% of Internet access revenues in 2008
 - Primarily facilities-based competition
 - Little use of unbundling
 - (Berkman report: Canadian “regulatory hesitation”)

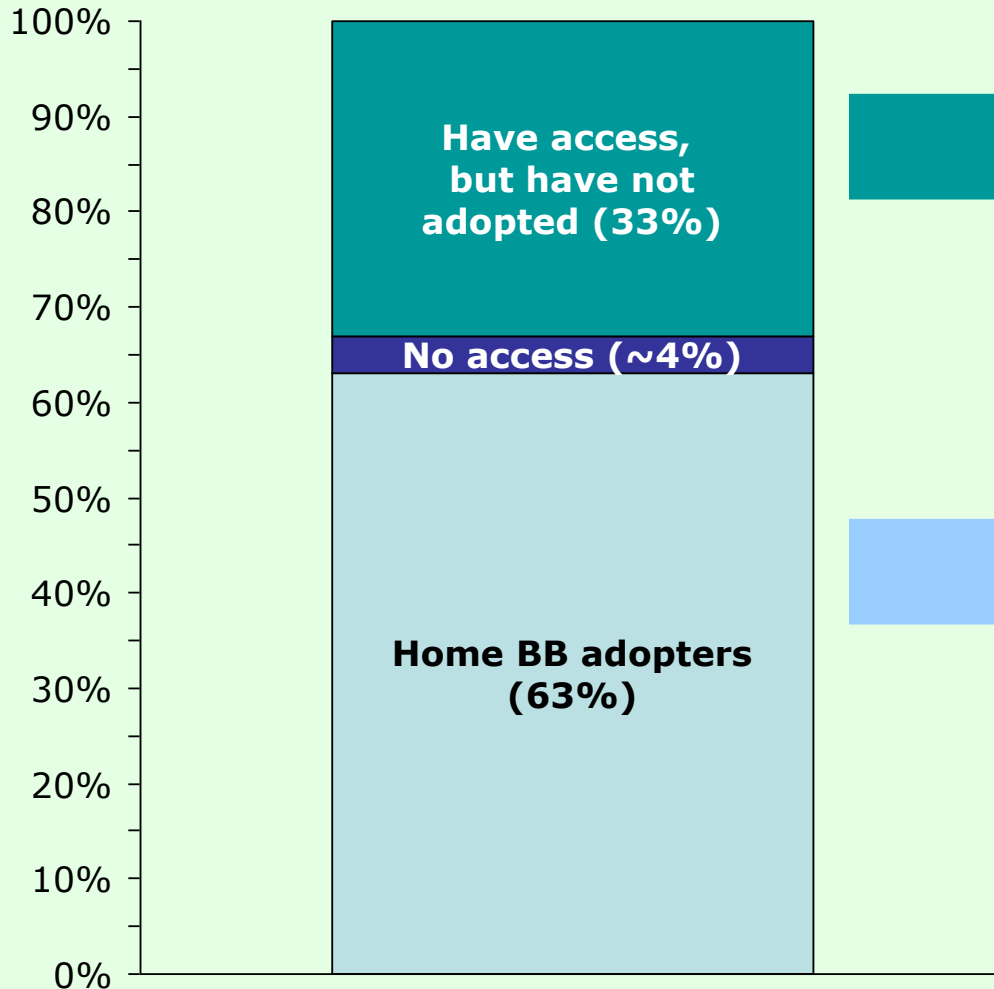
Connectivity: *Necessary but Not Sufficient*

- **Access:**
 - Availability
 - Affordability *plus*
- **Context:**
 - Social, economic, cultural
 - Need other infrastructure: transportation, power supply, etc.
 - Other services: local banking, funds transfer
- **Content:**
 - Local languages
 - Relevance to rural conditions
- **Capacity:**
 - Skills to use and manage information facilities
 - Training
 - “Infomediaries”: the information broker
 - Librarian, extension agent, mentor

From Access to Adoption:

In **US** and **Canada** barriers to adoption are not well understood

Percent of U.S. households

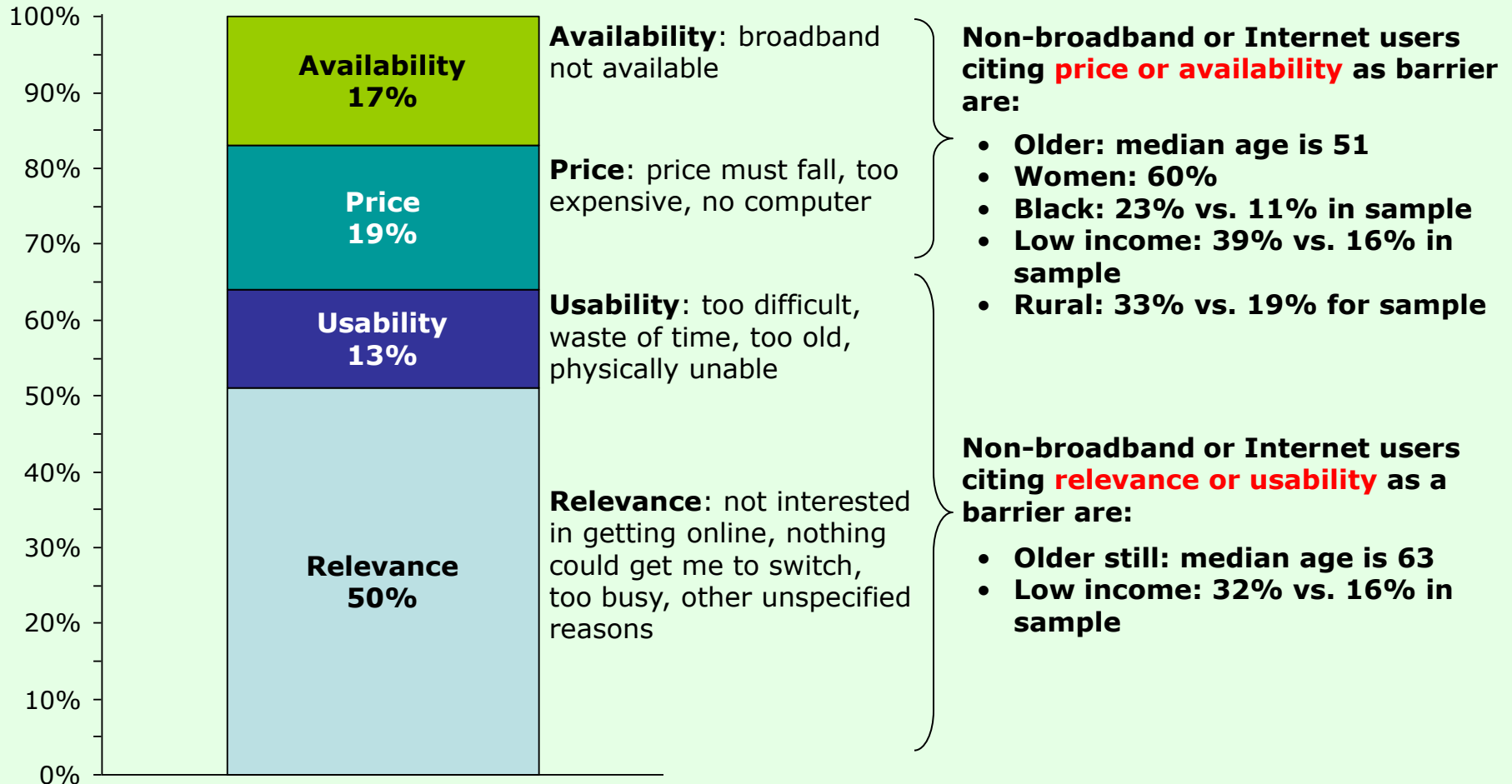


- Limited data on barriers that non-adopters face

US: Among non-adopters, lack of relevance cited as main reason for not having broadband at home

Broadband adoption levels

Percent of dial-up or non-Internet users



Beyond Infrastructure

- **What do we know about broadband impact?**
 - Among consumers
 - For business and organizations?
 - For overall productivity?
 - For diversifying national economies?
- **Need to collect and update national data**
 - Identify indicators
 - Include indicators in census, other data collection
 - Create and update broadband maps
- **From Access to Adoption**
 - Understand non-adopters
 - Develop training, applications



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Thank You



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