



BROADBAND.GOV
NATIONAL BROADBAND PLAN

Oregon Connections Telecommunications Conference

October 30, 2009

110 days until Plan is due

Congressional mandate

To fulfill statutory obligation to write a plan that will “seek to ensure that all people of the United States have access to broadband capability and shall establish benchmarks for meeting that goal.”

Other Statutory Objectives:

(A) Analyze the most effective and efficient mechanisms for ensuring broadband access by all people of the United States

(B) Provide:

- A detailed strategy for achieving affordability of such service.
- A detailed strategy for maximum utilization of broadband infrastructure and service by the public

(C) Evaluate the state of deployment

- Include an evaluation of progress of projects supported by the grants made pursuant to the Recovery Act

(D) Provide a plan for the use of broadband infrastructure and services in:

- Advancing consumer welfare
- Civic participation
- Public safety and homeland security
- Community development
- Health care delivery
- Energy independence and efficiency
- Education
- Worker training
- Private sector investment
- Entrepreneurial activity
- Job creation and economic growth
- Other national purposes

Broadband in America today: Good news and bad news

Broadband improving performance...

...but also widening gap

Education

- ~65% of teens go online at home to complete Internet-related homework and 71% of teens say the Internet was their primary source for information for completing a recent school project²

- Students without broadband connections lack access to the same level of information as their connected peers

Jobs

- In 2005, 77% of Fortune 500 Companies did not give jobseekers the option of responding offline to positions posted on the corporate careers website¹
- Online training improves efficiency of training by 50%

- Those offline find it increasingly harder to search, train, and apply for jobs

Small Business

- Broadband enables faster acceleration, small business to function like large enterprises

- Many small businesses don't have connectivity sufficient for new opportunities, like cloud computing

Health Care

- 61% of American adults have searched for health information online; of those 60% say the online information affected a decision about treating an illness or condition³

- Finding medical information without online access limits patients' knowledge, choices and care

Economic Development

- Many examples of communities using connectivity to lure new business investment

- Current broadband access in many places insufficient to attract new investment

Consumer Welfare

- Study of car buyers showed that those who use online referral services and get price information online pay less than those who do not⁴

- Consumers who comparison shop in brick and mortar stores pay more for goods & services than those who comparison shop online

¹ See: <http://www.taleo.com/research/articles/talent/don-miss-the-next-strategic-turn-115.html>

² Natalie Carlson, National Survey Finds Kids Give High Marks to High Speed, Hispanic PR Wire (April 2007)

³ Pew Internet & American Life Project, The Social Life of Health Information (June 2009)

⁴ Scott Morton, Fiona M., Zettelmeyer, Florian and Silva-Risso, Jorge M., Internet Car Retailing (February 2001)

Vision: High-performance America

- For individuals: a platform for education, training, and other tools to create the most opportunity, wherever one lives, whatever one's circumstances
- For businesses: a platform that facilitates innovation, lowers costs, and enables access to markets world-wide
- For governments: a platform that empowers efficiency, responsiveness, and continual improvement on par with advanced enterprises

A few highlights of what we've learned so far

Applications

1. Wide variation in requirements from current applications, e.g., ~200 kbps to ~10 Mbps
2. Actual maximum download speed about half of advertised at peak hour for median user

Deployment

1. ~5M homes get less than 786 kbps advertised; universalization cost: ~\$20Bn
2. ~35M homes get less than 10 Mbps; universalization cost: ~\$50Bn
3. One platform capable to meet certain demand scenarios for 50% to 80% of homes
4. Capex and opex drive universalization costs: opex driven by wholesale transport
5. Increasing problems with USF, need reform to fund future network

Adoption

1. Several segments show penetration rates materially below the 63% average
2. Growing social cost: access to jobs, education, government services, information
3. First market research effort focused on non-adopters to design segmented approach

National Purposes

1. Value-creation requires apps, devices, connectivity, processes, and training
2. Health: Broadband enables hosted EHR: 18% savings and higher adoption by doctors
3. Energy: standards and home networking will drive innovation in demand management

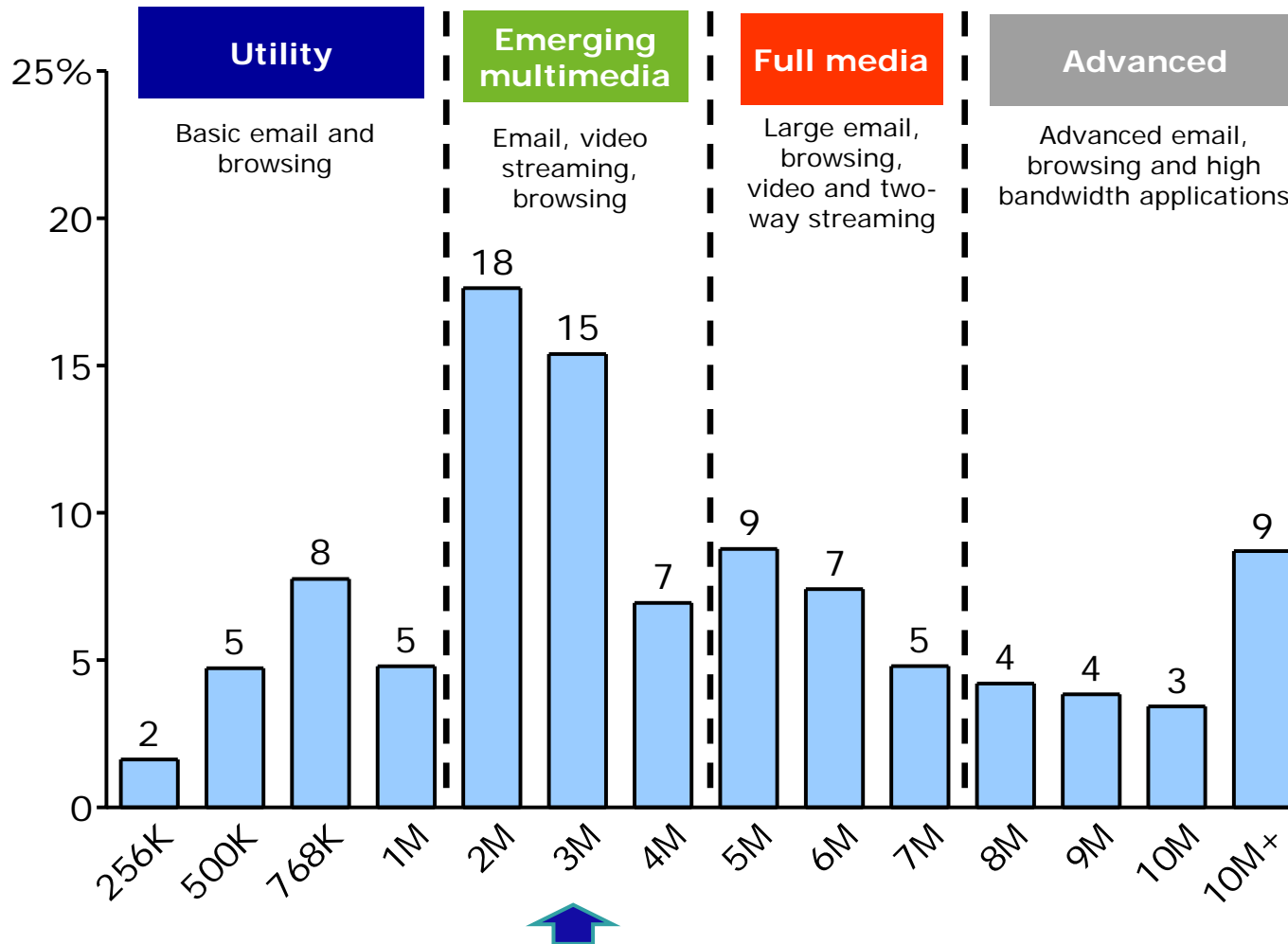
Broadband speed needs vary by application type

	Content type	Example applications	Actual download speed demands (Mbps)*	
Non real-time	• Basic download (or upload) usage	• Basic email, E-book download • Web-browsing, job search, government website access	0.1-0.3 <i>(Speed impacts down/up time and render)</i>	
	• Large download (or upload) usage	• Advanced web browsing, iTunes • Social Networking, P2P, etc • Medical Records download/ sharing	0.5-5+ <i>(Speed impacts down/up time and render)</i>	
Real-time	• Streamed audio	• PBS, Rhapsody	0.1-0.3	
	• Voice over the Internet (VOIP)	• Skype, Vonage	0.1-0.3	Symm.
	• Basic interaction	• Aleks (Online interactive education) • Pogo online games	0.3-0.5	Symm.
	• Basic streamed video	• Consumer generated education videos	0.3-0.5	
	• Video-conference + VOIP	• Lower definition telemedicine	0.6-1.0	Symm.
	• SD streamed video	• Streamed classroom lectures • Hulu	1-5	
	• IP TV	• IPTV	1-5+	Symm.
	• 2-way advanced video interaction	• Real-time interactive experiences & gaming	2-5+	Symm.
	• Enhanced video teleconferencing	• Video teleconference and TeleLearning • HD Telemedicine (diagnostic imaging)	5-10+	Symm.
• HD streamed video	• Broadcast quality HDTV • HD streamed University lecture	10+		

Sources: FCC analysis, California Broadband Task Force report, Adtran FCC submission, Speedmatters.com report, Technet Broadband Primer, ITIF report March 2009, Discussions with content providers

Applications drive broadband adoption and deployment

Percent of subscribers by ACTUAL top speed received



~50% of U.S. consumers receive less than 3.0 Mbps

Deployment: Estimated current broadband availability

Download speeds (capability) ¹ Mbps	Number of HUs in tracts where each speed tier is available Millions	Number of HUs in tracts where at least this speed tier is available (cumulative) Millions
< .768	3-6 (2-5% of HUs)	N/A
.768-3	1-4 (1-3% of HUs)	121-124 (95-97% of HUs)
3-10	26-29 (20-23% of HUs)	119-122 (93-96% of HUs)
10-100	76-79 (56-59% of HUs)	91-94 (70-72% of HUs)
100+	14-17 (11-13% of HUs)	14-17 (11-13% of HUs)

- Estimates include impact of DOCSIS 3.0 build-out in HFC¹ footprint, but not 4G build-out
- Estimates reflect capability of last-mile and access-network infrastructure, not service offered by providers

Sources: 2009 Form ¹ Near-term capability of access plant, given current upgrade path; capabilities may differ materially from actual delivered speeds

² Hybrid fiber coaxial

477 data; service provider, equipment manufacturer, and trade association filings and publications; analyst reports; OBI analysis

Deployment: Incremental cost to universal availability¹ varies significantly depending on speeds required

Capability at estimated commercial deployment Mbps	Housing units requiring upgrade to reach each tier Millions	Incremental cost to universal availability of these advertised speeds (Best estimate) \$, billions
.768-3	3-6	20
3-10	7-10	35
10-30	33-37	50
100+	111-116	350

Incremental cost will also depend on:

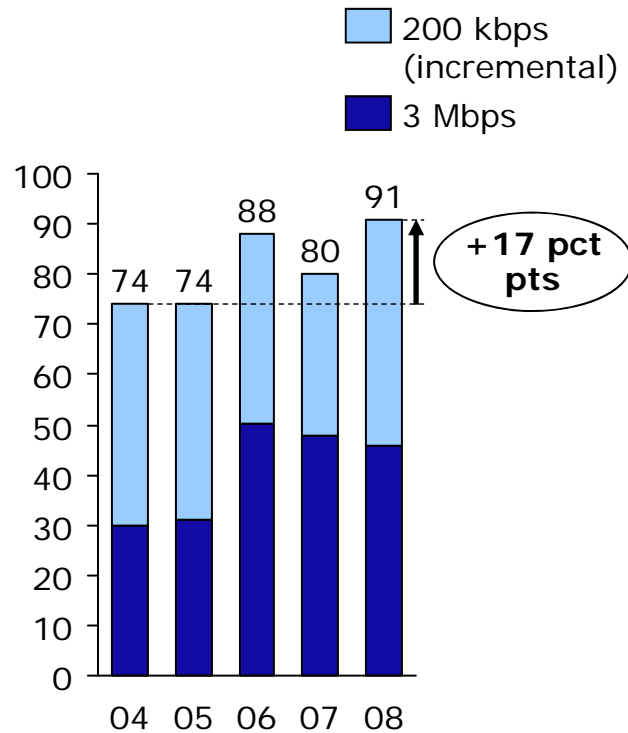
- Costs of upgrading backhaul network
- Required uplink speeds
- Limitations on latency
- Bandwidth usage and over-subscription costs

¹ For one access network. Includes both capex and discounted opex

Deployment: Some USF¹ recipients have made progress in bringing broadband to rural America

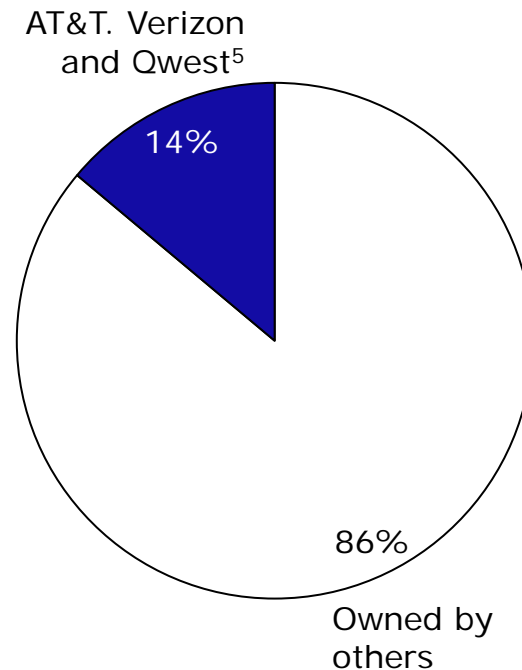
The smallest rural ILECs² are upgrading their plant to bring broadband to rural consumers . . .

Percent share of rural coop telco lines that have been upgraded to offer select speeds of internet access³



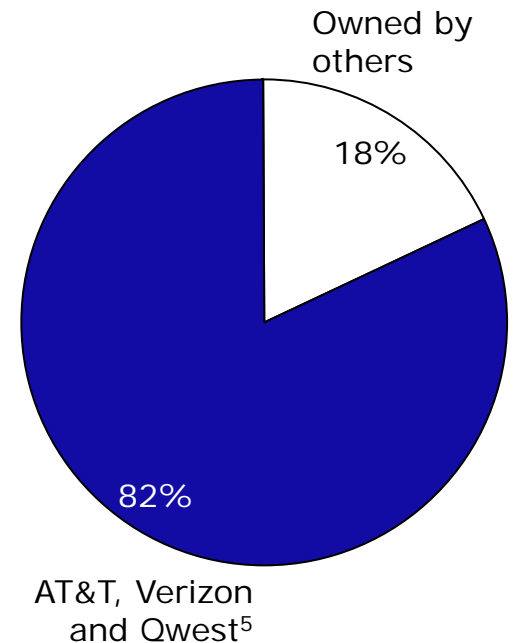
. . . And receive more high-cost support than AT&T, Verizon and Qwest. . .

Percent share of total USF high-cost support for ILEC lines, 2008⁴



. . . Even though most non-upgraded access lines are owned by those three companies

Percent of total U.S. access lines not upgraded to offer broadband



¹ Universal Service Fund ² Incumbent Local Exchange Carriers

³ Survey data. Assumes that if a higher speed is offered, all lesser included speeds are also offered

⁴ Excludes Competitive Eligible Telecommunications Carrier (CETC) support

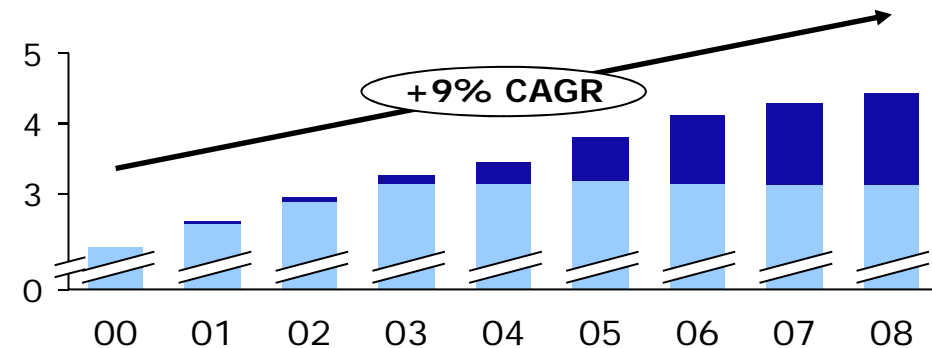
⁵ Includes lines Verizon is proposing to sell to Frontier

Sources: NTCA Broadband/Internet Availability Survey Reports (2004-2008); FCC data; FCC staff estimates

Deployment: In addition, the fund faces systemic, structural problems

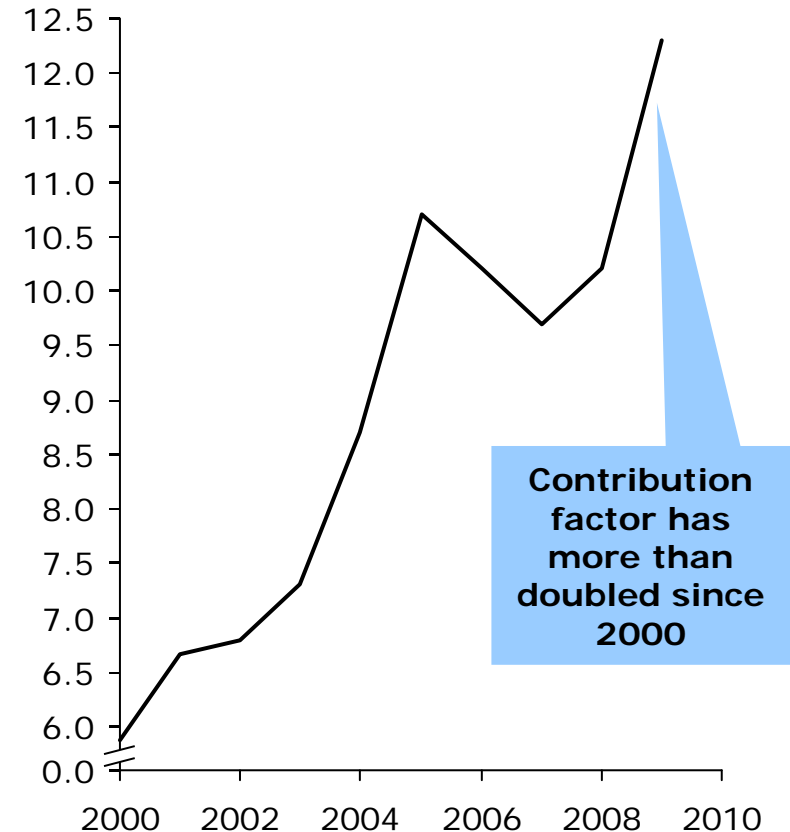
High-cost fund has been rapidly growing . . .

\$, billions



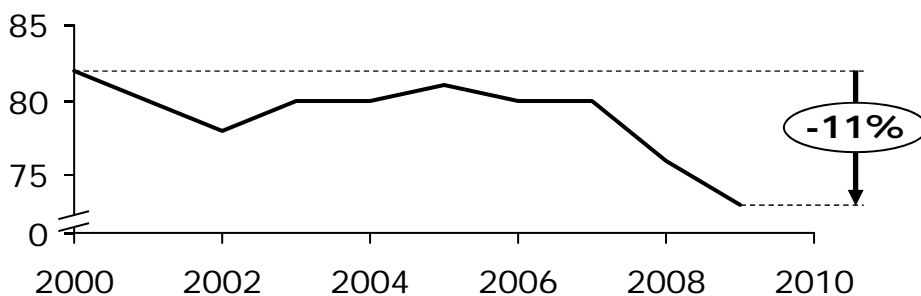
. . . Driving a higher USF contribution factor

Percent



. . . While assessable revenue base declines . . .

\$, billions



As demand for funding grows, and the revenue base subject to assessment shrinks, consumers and businesses will face higher contribution factors in the future

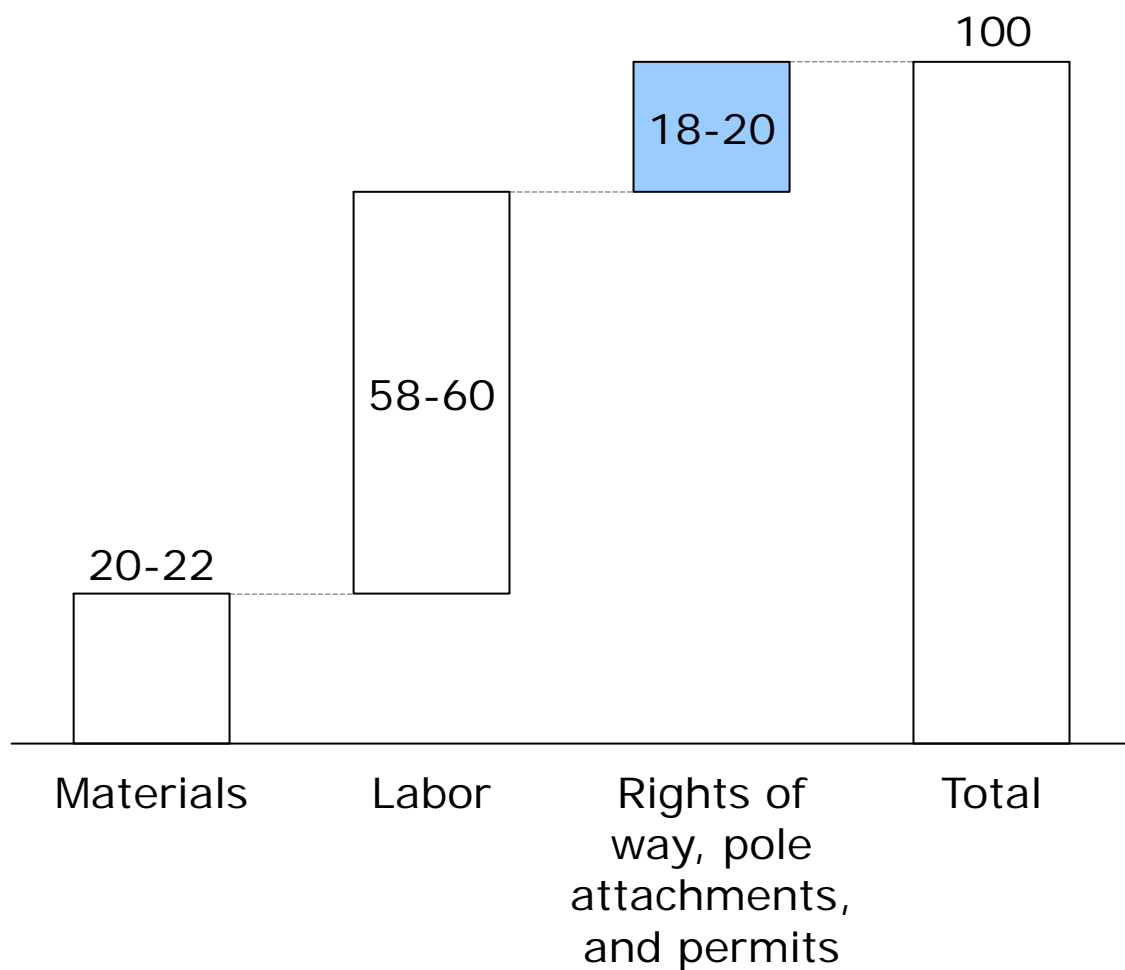
¹ CETC funding was capped on a state-by-state basis in 2008

Source: FCC data

Deployment: The cost of obtaining pole attachments and rights of way may have a significant impact on fiber deployment

Estimated total cost of an aerial fiber build

Percent



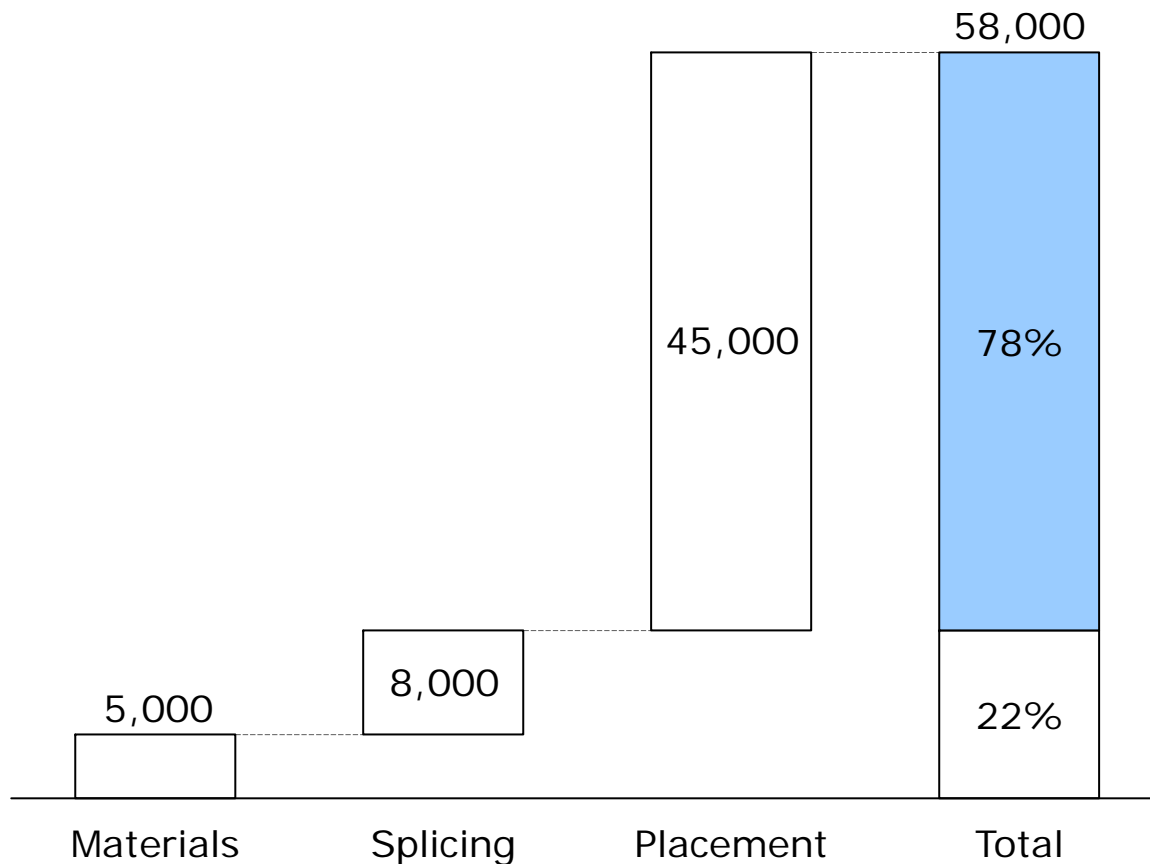
- Make-ready charges can average \$4-6,000/mile
- Make-ready delays of up to 18-24 months can also raise cost of fiber deployment
- Rights of way fees are highly variable and can exceed hundreds of dollars per year per foot

Deployment: Placing fiber in an open trench can yield efficiency gains when underground/aerial options are not readily available

Estimated total cost of a fiber build¹

Dollars; percent

Cost avoidable by joint trenching



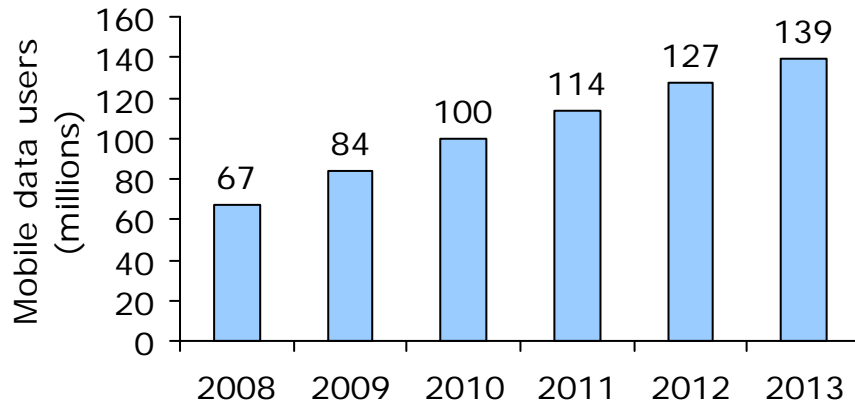
- **Joint trenching can often save >50% of the total cost of a fiber build**
- These savings are lessened if:
 - Conduit or aerial placement is available
 - Fiber size increases
- A trench fee may replace some placement expense

¹ 10,000 foot build; assumes 48-fiber strand

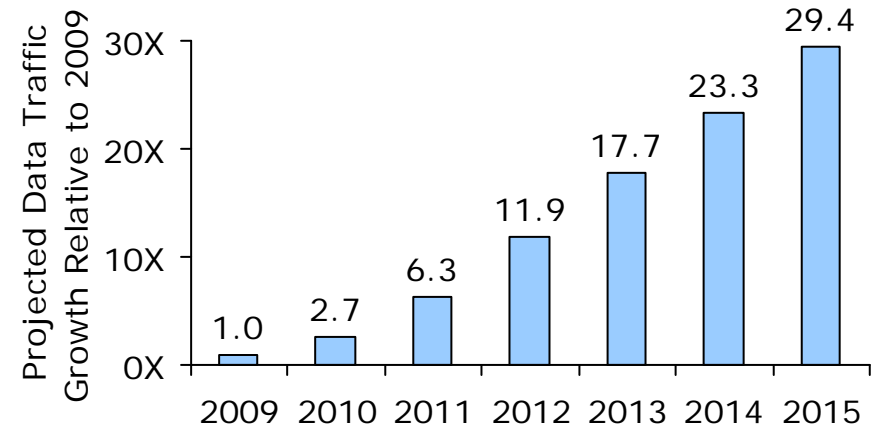
Source: OBI analysis

Deployment: Analysts project rapid growth in mobile broadband

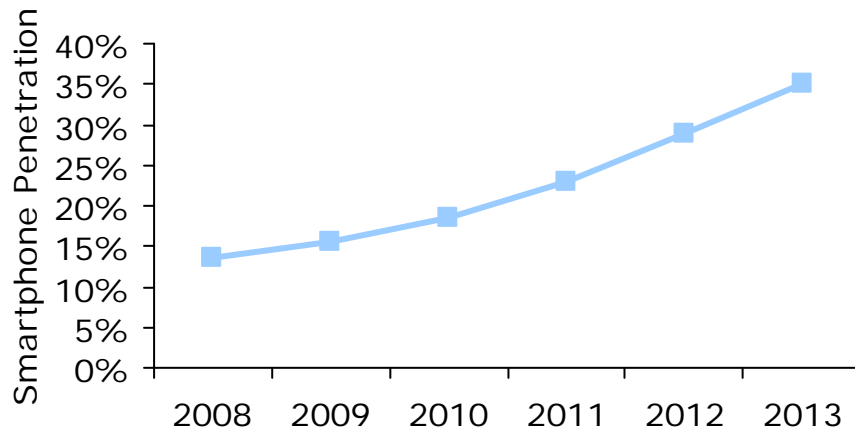
Forrester Research



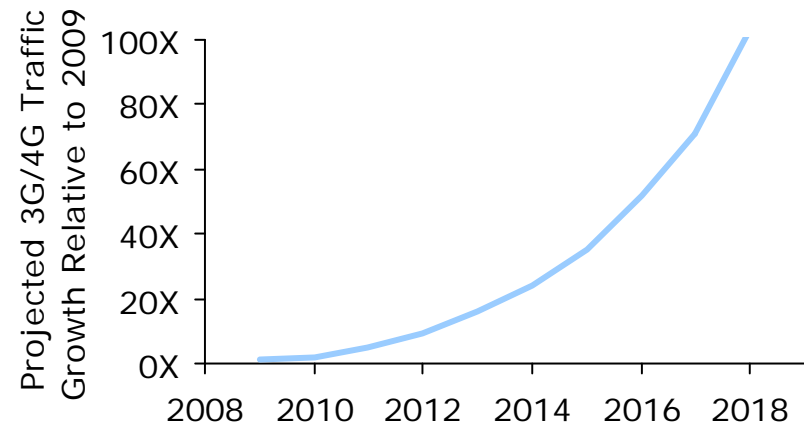
Yankee Group



Gartner



Rysavy

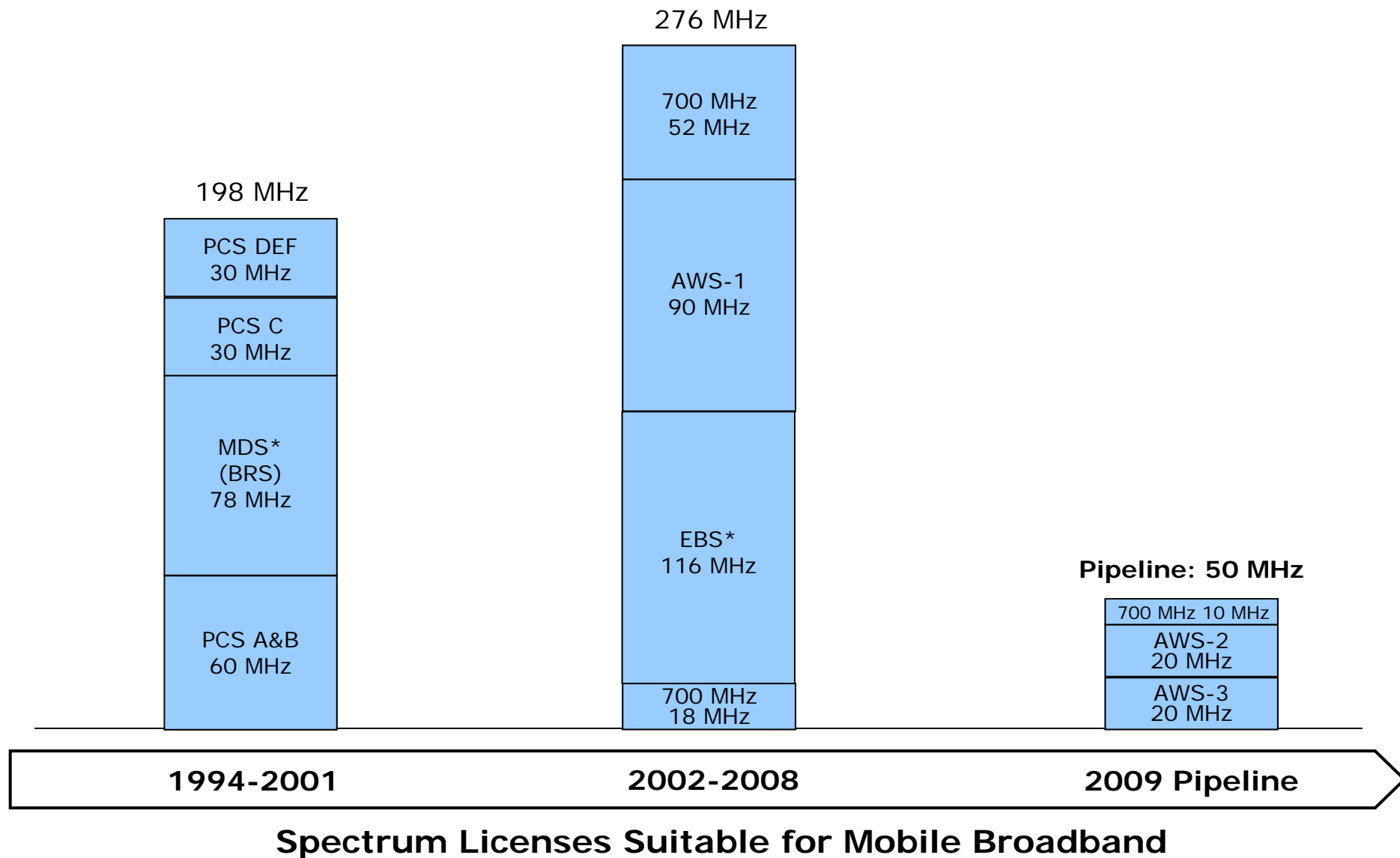


Deployment: Spectrum Reallocation Is A Multi-Year Process

Band	First Step	Available for Use	Approximate Lag Time
Cellular (AMPS)	1970	1981	11 years
PCS	1989	1995	6 years
700 MHz	1996	2009	13 years
AWS-1	2000	2006*	6 years

* Incumbent relocation is ongoing

Deployment: The spectrum pipeline is drying up

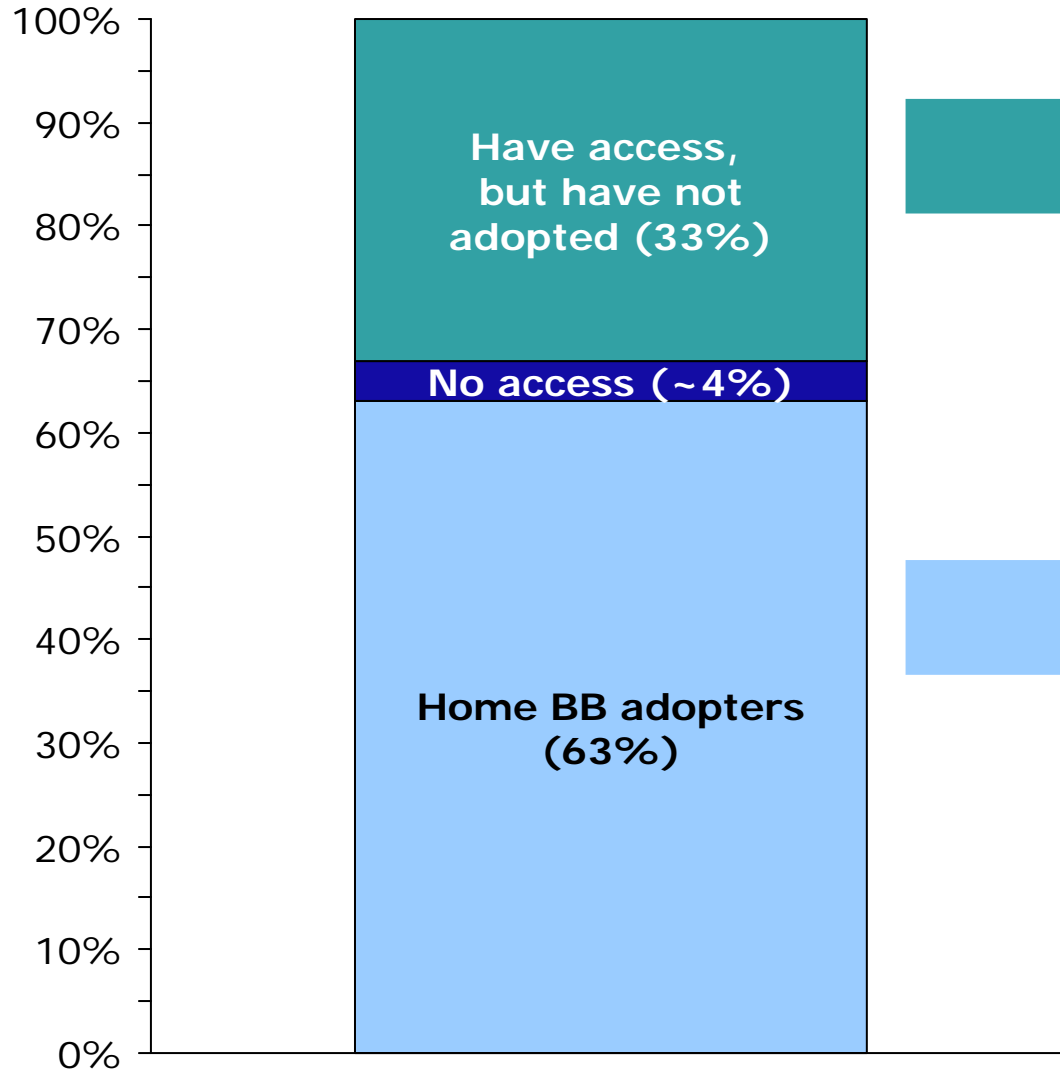


* In 2004 MDS/ITFS was rebanded to create the EBS/BRS band

Adoption: One-third of Americans with broadband available are non-adopters

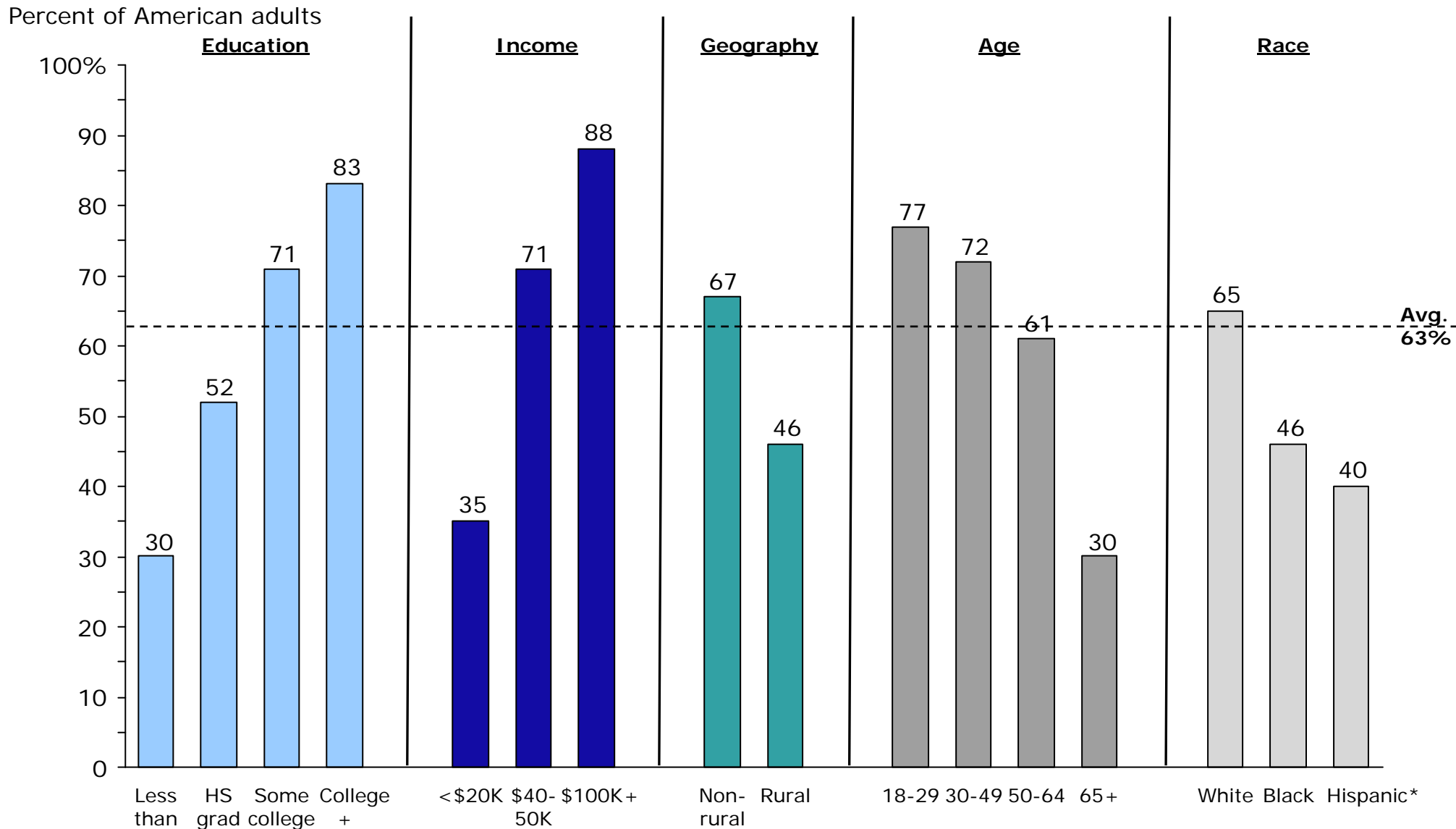
Reasons for non-adoption

Percent of U.S. households



- Limited data on barriers that non-adopters face
- Transitioning non-adopters to broadband is different than technology transitions of the past
- Overall adoption will grow naturally over time

Adoption: Adoption levels vary significantly across demographic groups



*Hispanics includes both English and Spanish speaking Hispanics; 63% based on survey of English-only respondents

Source: Pew Internet & American Life Project, Home Broadband Adoption, June 2009

The challenge and opportunity for government: Broadband enables key policies

National Priorities

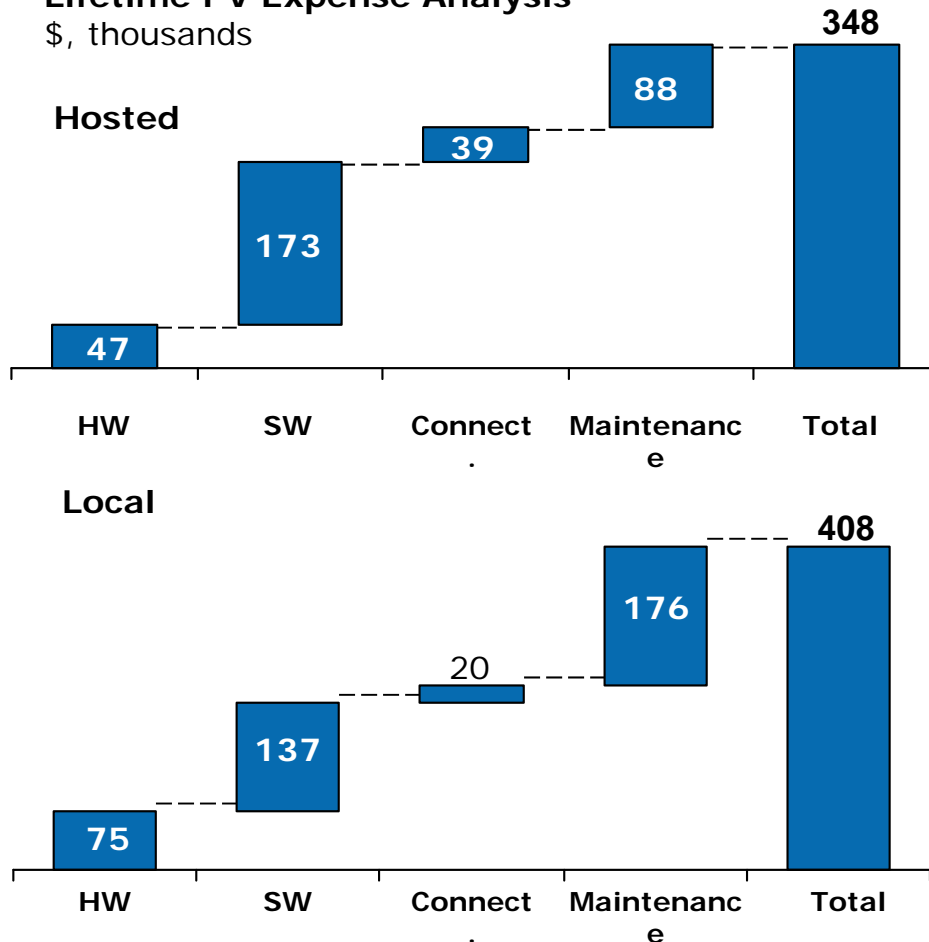
Health Care	Energy/ Environment	Education	Government Operations	Economic Opportunity	Public Safety
<ul style="list-style-type: none"> • Electronic health records • Remote/home monitoring • Mobile monitoring • Telemedicine • Health information exchange 	<ul style="list-style-type: none"> • Smart grid • Smart home applications • Smart transportation • Telework 	<ul style="list-style-type: none"> • American Graduation Initiative • STEM • Nat'l Ed Tech Plan • eBooks and content • Electronic student data management 	<ul style="list-style-type: none"> • Service delivery and efficient government • Improved performance • Transparency • Civic engagement • Policy 	<ul style="list-style-type: none"> • Job creation and economic development • Job training and placement • Community development 	<ul style="list-style-type: none"> • Interoperable mission critical voice and broadband network • Next-gen 9-1-1 • Alerts • Cybersecurity
High-speed connectivity			Universal access	Ubiquitous adoption	

Broadband may deliver strong incremental value to health care

Hosted EHR economics ~ 18% cheaper...

2 providers, New York City DHHM estimates
Lifetime PV Expense Analysis¹

\$, thousands



... with clear incremental value

- Less tech expertise required: No need to own, operate, or update server
- Real-time change in reimbursement code & software capability updates
- Scalable offerings: volume and functionality can expand with the practice
- Hosted data more secure than local servers

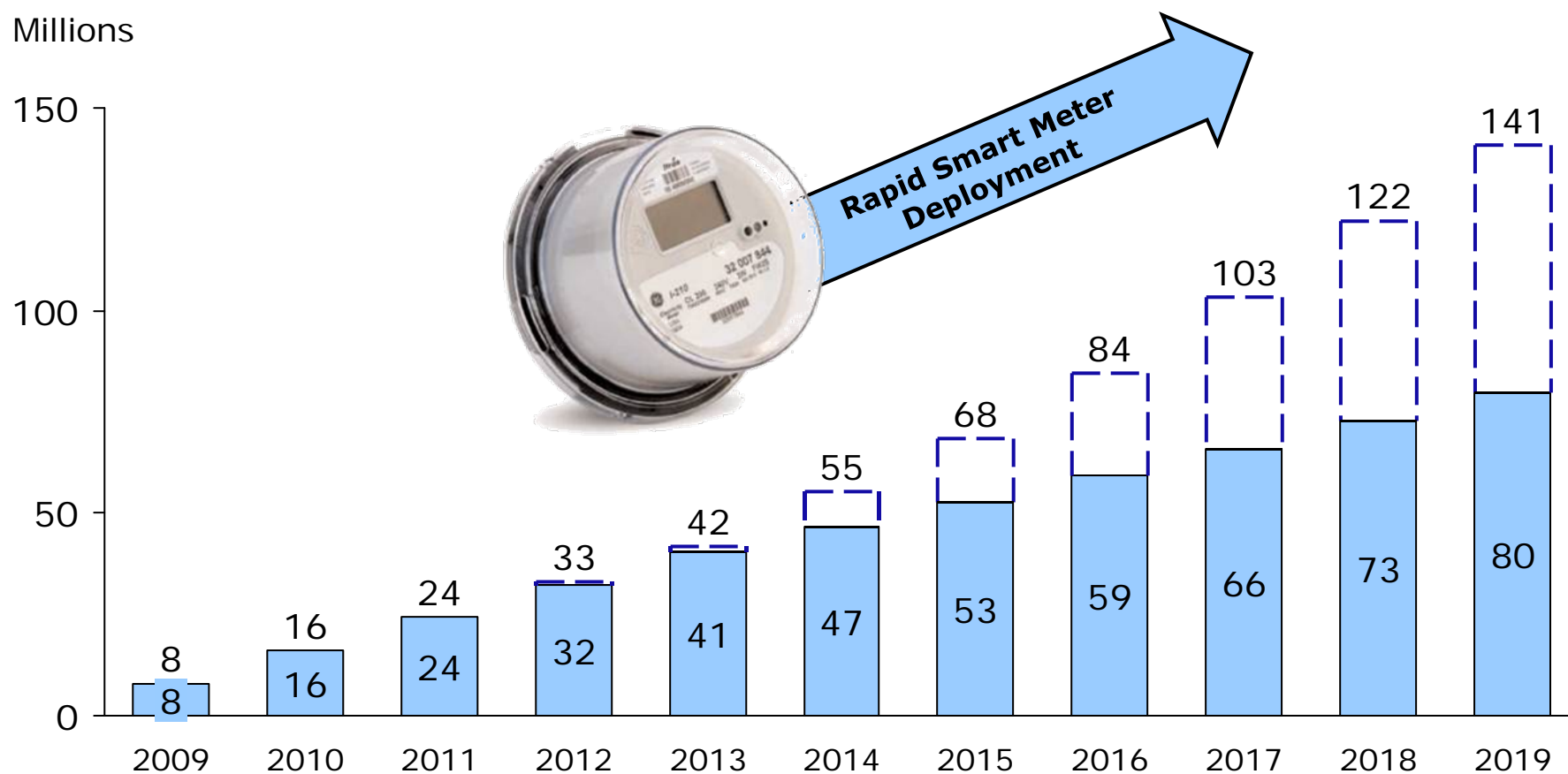
¹ Assumes 7% discount rate; re-purchase (or significantly upgrade) hardware every 3 years; no price changes
Source: New York City Department of Health and Mental Hygiene

Smart meter deployment is increasing rapidly

- Deployment of smart meters is accelerating quickly, laying the groundwork for several consumer-oriented smart grid applications

AMI meters, 2009-2019 (projected)

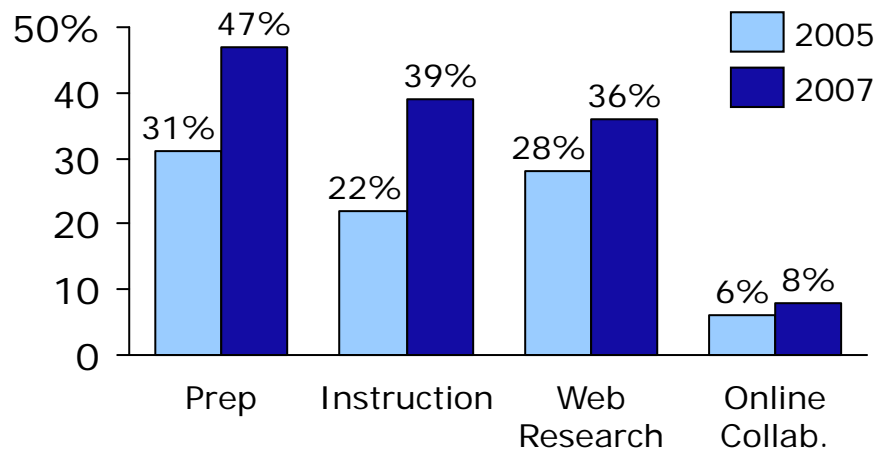
Millions



Classroom usage is driving the need for improved connectivity

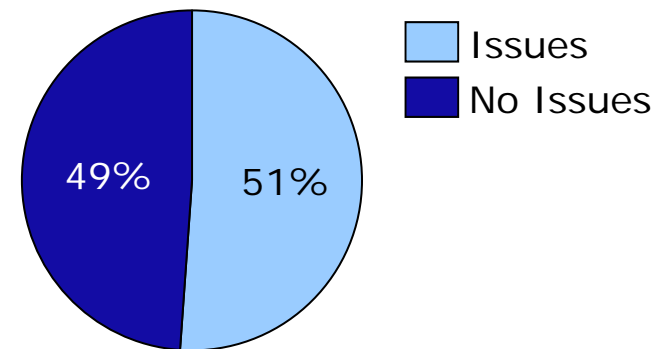
Thanks to E-Rate, 94% of instructional rooms are online, and teachers are increasingly using the Internet...

Teachers using technology for educational tasks
Percent

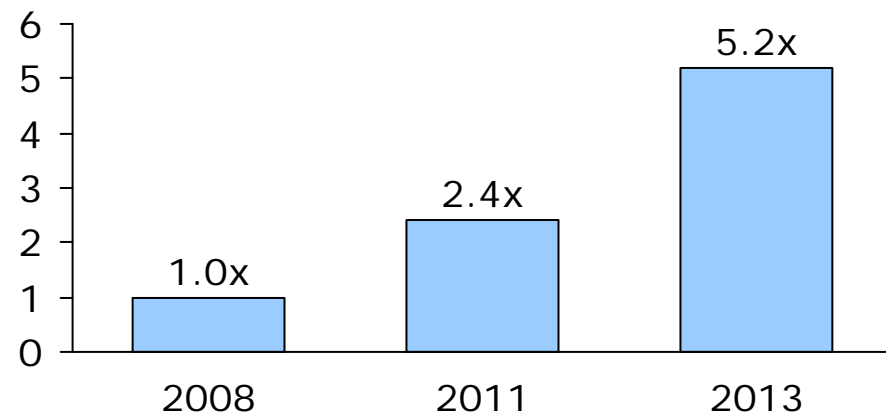


... But there is a need for improved connectivity given current and projected usage

Teachers reporting slow Internet issues
Percent



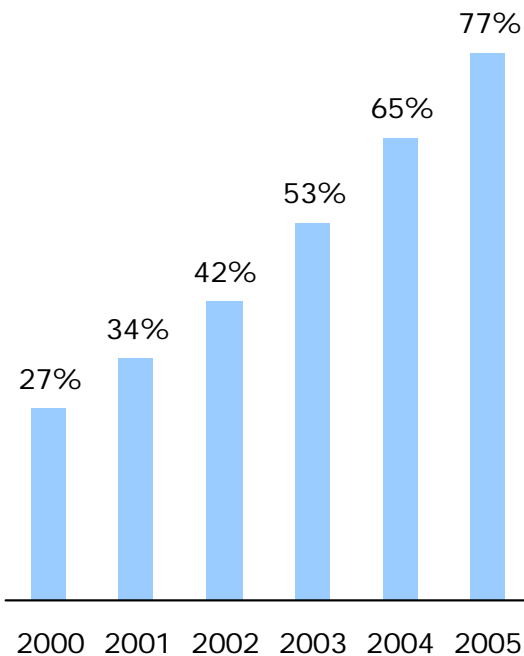
Educational Bandwidth Usage Projection, indexed to 2008



The nature of work is changing rapidly in the digital age

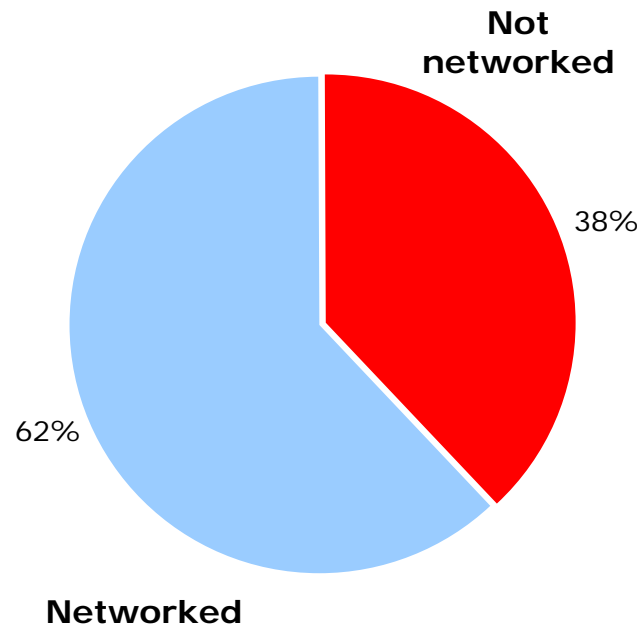
Key American firms moving hiring processes online...

Fortune 500 companies with online job postings and applications only¹
Percent



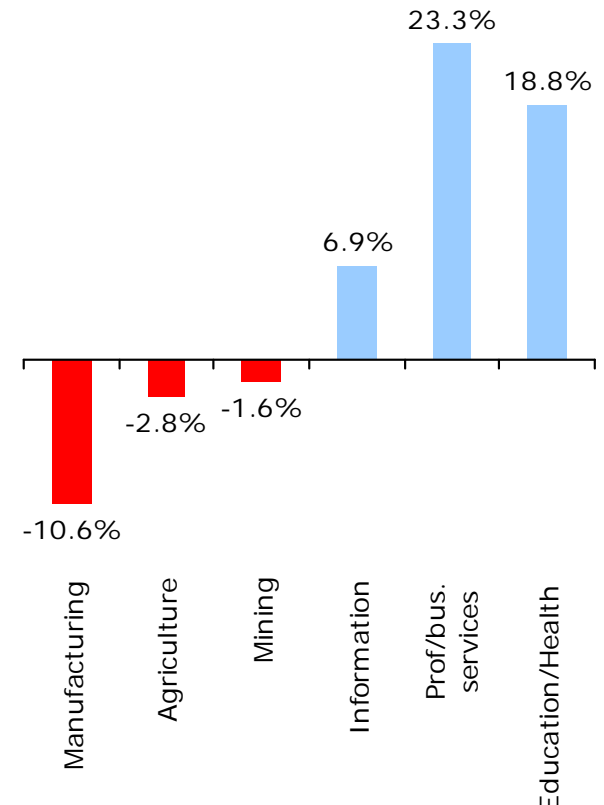
...while requiring "networked workers"...

2008 Percentage of employed using Internet as part of work²
Percent



...in more professional and service-oriented jobs

Projection of future areas of job growth/loss, 2006-16³
Percent change



Timeline

Month	Action
November FCC Meeting	Report on Analysis of Key Gaps
December FCC Meeting	Report on Policy Framework
January FCC Meeting	Report on Opportunities to Drive National Purposes
February 17, 2009	Plan due to Congress



Blair Levin