TECHNOLOGY ON THE HORIZON

South Dakota Public Utilities Commission
Wireless Conference
"The President's Broadband Vision"

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Overview

- State of the Economy

- The President's Broadband Vision

- New Broadband Technologies and Their Implications

- Programs Supporting Broadband Deployment

- Conclusion

The National Telecommunications and Information Administration (NTIA)

- NTIA, under the leadership of Commerce Secretary Don Evans, serves as the President's principal adviser on telecommunications and information policy matters, but is not the regulator of telecommunications, which is the job of the independent Federal Communications Commission.

- Our second major function is to be the manager of the nation's airwaves, or radio spectrum, by federal government agencies, including the military. We have joint jurisdiction with the FCC over spectrum allocation and use.

- NTIA's goal is to enhance the public interest by promoting quality service, competition, consumer welfare, and economic and social opportunities for all.

Overarching Goal:
Promoting Economic Growth

- Thanks to the President's policies, America's economy is strong:

  - U.S. economy grew at a real GDP rate of 2.8% in the second quarter of 2004; economic growth in second half of 2003 was the fastest in nearly 20 years.

  - The Labor Department reported that the jobless rate in August was the lowest since October 2001, and the jobs gain of 144,000 marked the 12th consecutive month that payrolls grew.

  - There has been a sharp pickup in business spending on capital equipment.

  - Homeownership is presently at its highest level ever – 68.6 % in the first quarter of 2004.

  - Productivity in the non-farm business sector rose an estimated 5.5% in 2003, following a 4.4% gain in 2002 – the first time in the past 50 years that annual productivity gains have exceeded 4% in two consecutive years.

  - In May 2004 the Department of Agriculture forecasted that U.S. agricultural exports would set a new record in 2004, totaling an estimated $61.5 billion.

  - In August 2004 manufacturing activity rose for the 15th month in a row.

  - The Commerce Department reported that construction spending reached an all-time high in July 2004, a broad-based rise with record spending by private builders on residential units and by government on big public works projects in dollar terms.

Economic Growth in South Dakota

South Dakota's economy has been strong:

- South Dakota was ranked first in the nation in income distribution for 2003.

- South Dakota has a civilian labor force of nearly half a million workers. In the Corp. for Enterprise Development's most recent (2003) Development Report Card for States, South Dakota was ranked second in the nation in short-term employment growth.

- South Dakota now has an unemployment rate (3.4%) that is lower than the national average. In 2003 the state had the lowest unemployment rate in the country.

South Dakota Has Strong High-Tech Resources and Usage

- South Dakota has more than 5,000 miles of fiber optics in place with more being put into the ground every day. Relative to population density, this mileage is among the highest in the nation.

- More than 250 communities in South Dakota have broadband access.

- Approximately 6,800 South Dakotans are currently employed in information/telecom related industries.

- In the Corp. for Enterprise Development's most recent (2003) Development Report Card for States, South Dakota ranked ninth in electronic public services to its citizens.

The President's Broadband Vision

Goal

"This country needs a national goal for broadband technology . . . universal, affordable access for broadband technology by 2007."

– President George W. Bush, Albuquerque, NM, March 26, 2004

Government's Role

"The role of government is not to create wealth; the role of our government is to create an environment in which the entrepreneur can flourish, in which minds can expand, in which technologies can reach new frontiers."

– President George W. Bush, Technology Agenda, November, 2002.

Benefits of Broadband

"[B]roadband will not only help industry, it'll help the quality of life of our citizens."
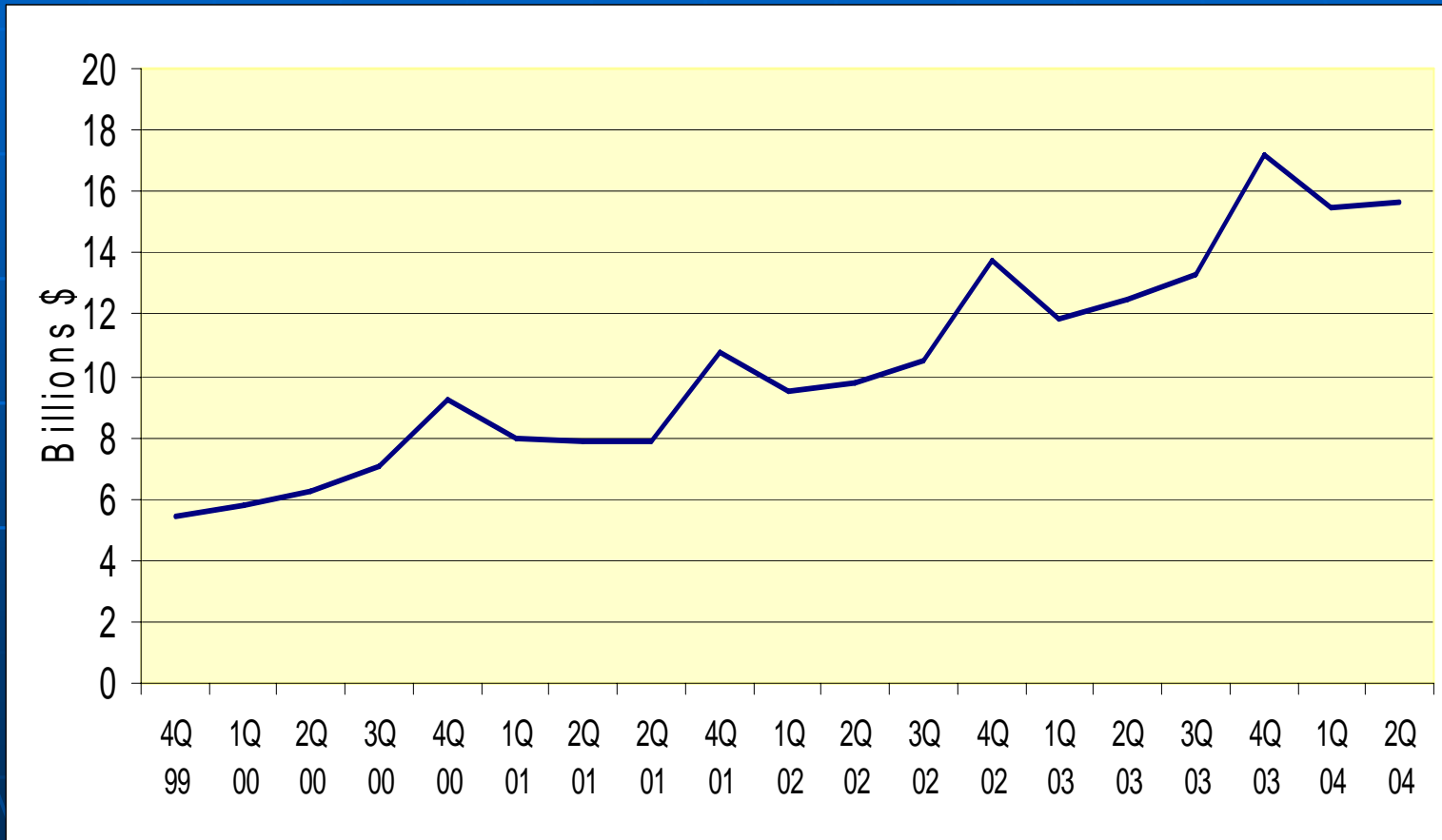— President George W. Bush, US Department of Commerce, June 24, 2004

- Tele-Medicine
- Distance Learning
- Tele-Work
- National Security
- Jobs and Economic Growth

The Growth of E-Commerce in the U.S.

Estimated Quarterly U.S. Retail E-commerce Sales:

4th Quarter 1999 – 2nd Quarter 2004

Creating Economic Conditions For Broadband Deployment

"We ought not to tax access to broadband. If you want something to flourish, don't tax it."

       – President George W. Bush in Baltimore, Maryland on April 27, 2004

- Tax relief has given businesses powerful incentives to invest in broadband technology
    - Accelerated depreciation for capital-intensive equipment
    - Extension of the Internet tax moratorium; support making the moratorium permanent
    - Extension of the research and experimentation tax credit; support making it permanent
    - President's FY 2005 budget requests a record $132 billion for research and development.

Removing the Regulatory Underbrush

Improving Access to Rights-of-Way:

> *"[B]roadband providers have trouble getting across federal lands…that's why I signed an order to reduce the regulatory red tape for laying fiber optic cables and putting up transmission towers on federal lands."*

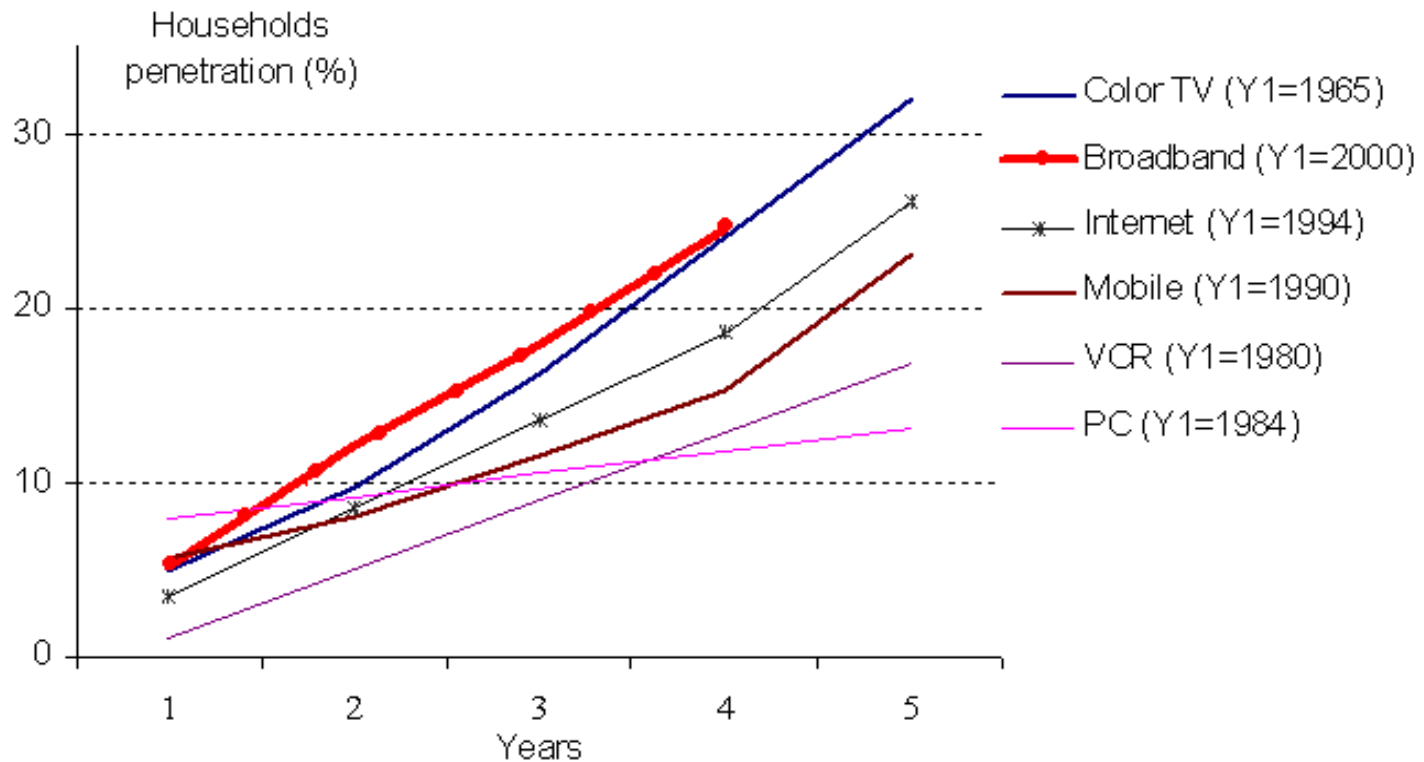– President George W. Bush, U.S. Department of Commerce, June 24, 2004

- A Federal Rights-of-Way Working Group set out recommendations to improve access to rights-of-way management across federal lands to promote the deployment of broadband. The called for improvements in: (1) Information Access and Collection, (2) Timely Processing, (3) Fees and Other Charges, and (4) Compliance.

- On April 26, 2004, the President signed an executive memorandum directing federal agencies to implement these recommendations.
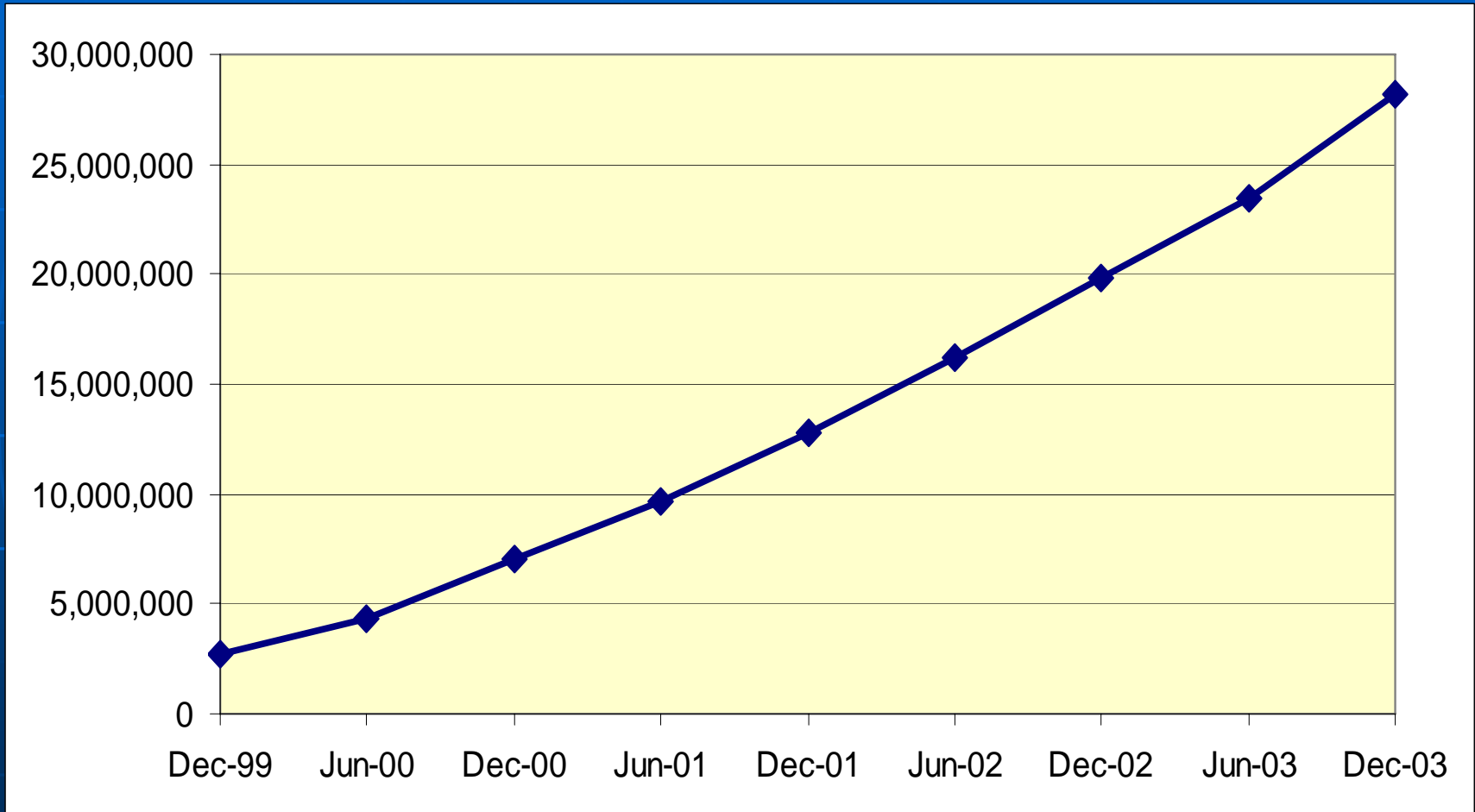
Reducing Legacy Regulation of Broadband Services:

- The Administration supports the FCC's order freeing newly deployed broadband infrastructure from legacy regulation

Rate of Broadband's Diffusion is Strong

United States: Diffusion of consumer goods and communications services
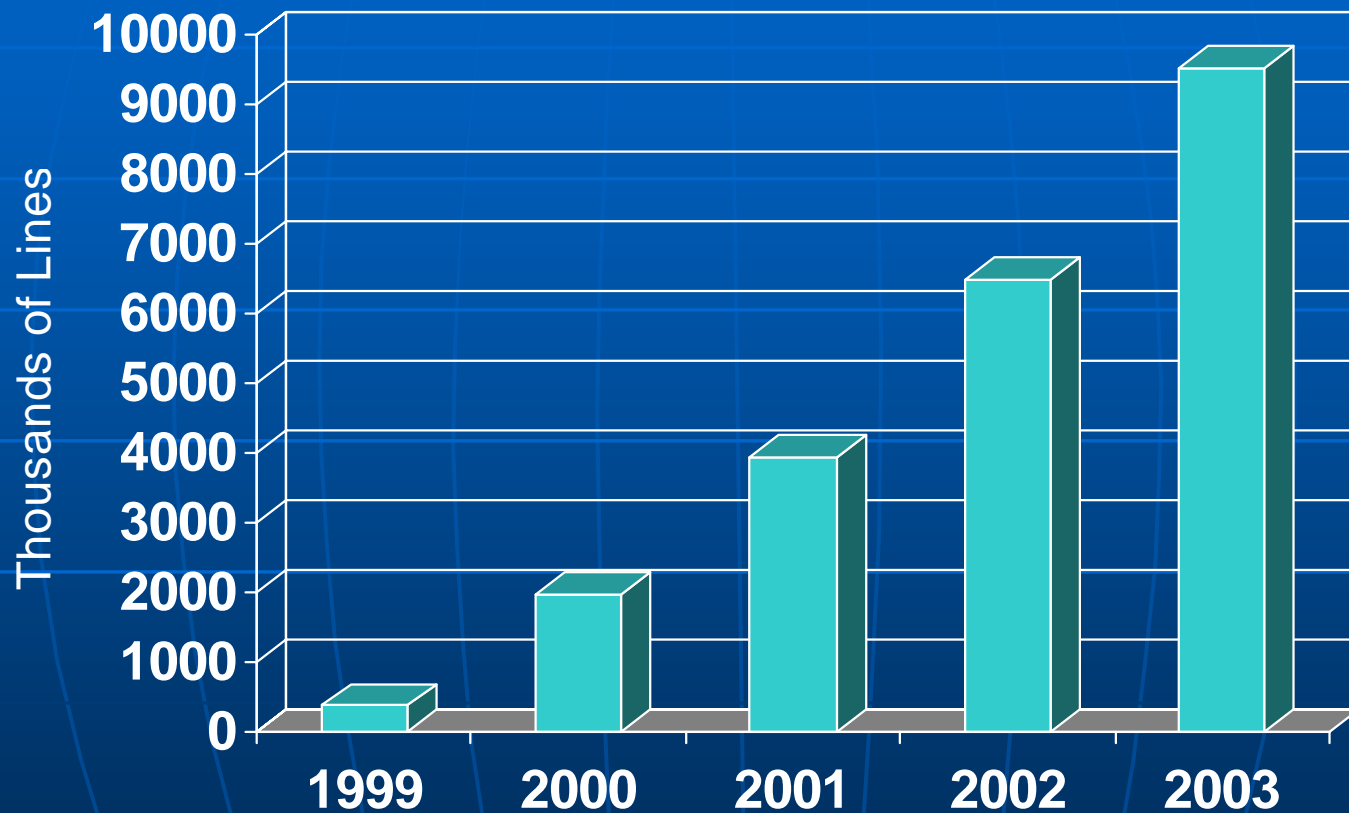(5 % onwards)

Households penetration (%)

- Color TV (Y1=1965)
- Broadband (Y1=2000)
- Internet (Y1=1994)
- Mobile (Y1=1990)
- VCR (Y1=1980)
- PC (Y1=1984)

Years

Source: OECD, 2003

Total High Speed Lines in the U.S.

Source: FCC, 2004

Cable Modem Subscriptions Have Also Experienced Significant Growth

Source: NCTA
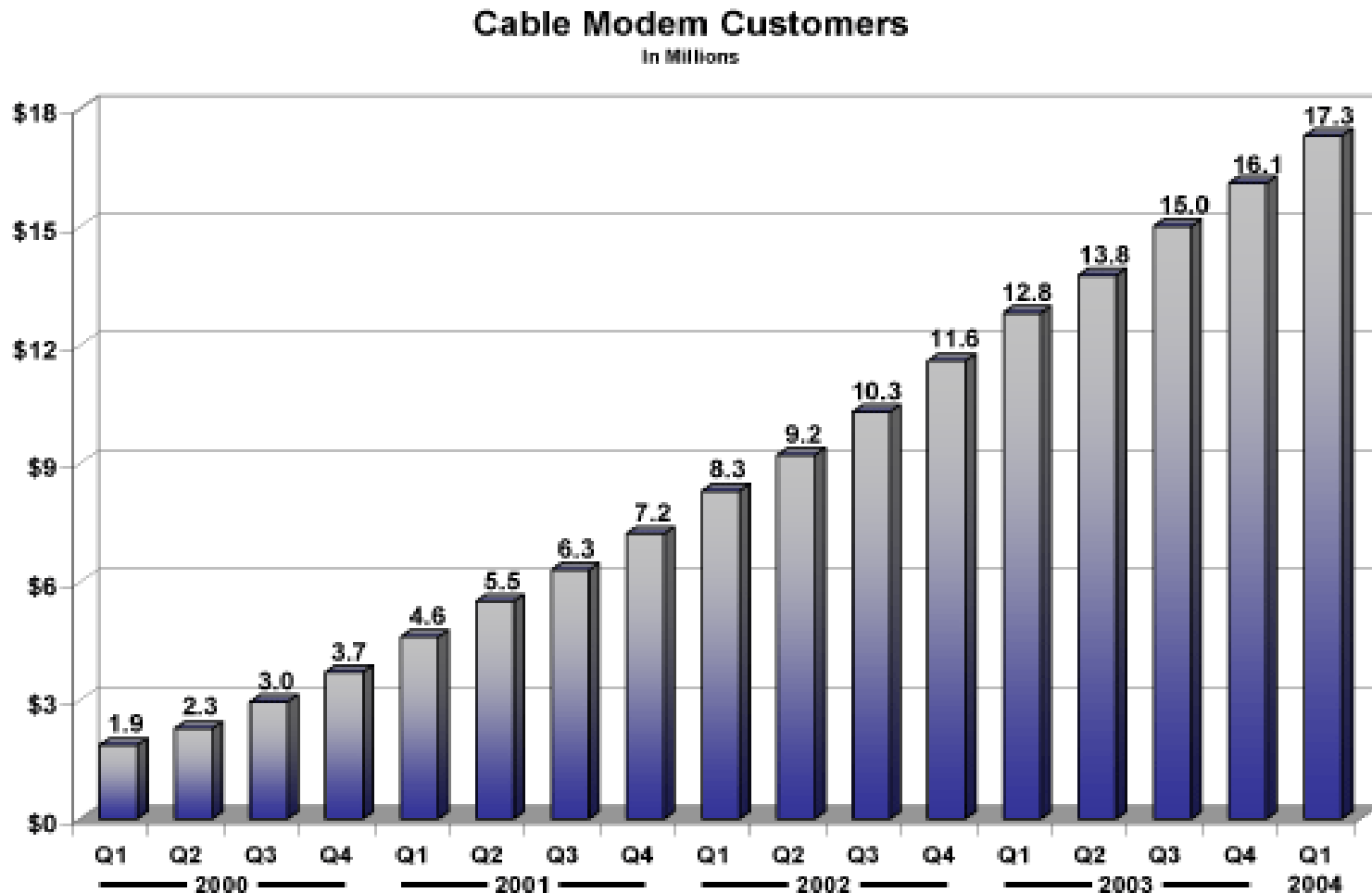
Wireless Broadband and New Technologies

"The other promising new broadband technology is wireless. The spectrum that allows for wireless technology is a limited resource . . . [a]nd a wise use of that spectrum is to help our economy grow, and help with the quality of life of our people."

- President George W. Bush, U.S. Department of Commerce, June 24, 2004

The Administration has made more radio spectrum available for wireless broadband technologies:

- Advanced Wireless Services ("3G")

- Ultra-wideband

- 5 GHz Spectrum

- 70/80/90 GHz

Advanced Wireless Services ("3G")

- Third generation (3G) is an ITU specification for high-speed wireless communications. This worldwide wireless connection is compatible with GSM, TDMA, and CDMA. Carriers worldwide are now in the process of deploying 3G network infrastructure across urban, suburban and highly trafficked rural areas.

- Next-generation 3G cellular services will create broad-range coverage of data across wide geographic areas, providing the greatest mobility for voice communications and Internet connectivity. The 3G service will enable highly mobile users with laptops and other wireless data device to bridge the gap between higher bandwidth WiMax hot zones and Wi-Fi hot spots.

- New devices optimized for 3G communications are beginning to reach the marketplace. Such devices include cell phones that can also provide interactive video conferencing, as well as PDAs that can provide full-playback DVD services.

Ultra-Wideband (UWB)

- The primary standard involving UWB is the high data rate wireless Personal Area Network (PAN) or IEEE 802.15.3 that could reach data rates of 480 Mbps at 1 meter, or 110 Mbps at up to 10 meters.

- Proposals for the 802.15.3 Physical and Media Access Control standards have been made by Motorola and the Multiband OFDM Alliance (MBOA) which includes 120 companies such as Intel and Texas Instruments.

- Freescale Semiconductor (Motorola Inc.) has detailed the current and next generation UWB product family roadmap at the Wireless Connectivity (WiCon) World Expo in Amsterdam on June 7, 2004. Over the next year, Freescale plans to deliver three advanced UWB product families, including the industry's first 1 Gbps UWB solution.

- The WiMedia Alliance has announced its endorsement of the MBOA UWB standards for use with the WiMedia Convergence Platform.

- There is a wide range of perspectives on the future market size and growth potential of UWB technology. Some see 274 million chipsets by 2007, while others see only 24 million by this time. A recent report by Parks Associates predicts that there will be 150 million UWB devices by 2008.

Wi-Fi

- IEEE 802.11 or Wi-Fi operates in the 2.4 GHz or 5 GHz frequency range and offers a maximum data throughput of 108 Mbps with ranges that vary from 50 meters for low-gain antennas up to 8 kilometers for high-gain antennas.

- Currently the Wi-Fi Alliance has over 200 member companies from around the world, and has over 1250 products have received Wi-Fi certification since certification began in March of 2000.

- Wi-Fi packages sold 12 million units in 2003 and are on pace to double this year. An estimated 99 million people will have Wi-Fi enabled technology by 2006.

- Developing strong Fee-for-Service model (Airports, Hotels, etc.).

- The spectrum made available for Wi-Fi usage at 5 GHz is a model for sharing between industry and government.

Wi-Fi Hot Spots

- There are over 20,000 hotspots in the United States. (Intel's Hotspot Finder)

- City-wide hot spots:
  - Spokane, WA
  - Cerritos, CA
  - Chaska, MN
  - Athens, GA
  - Oklahoma City, OK

- Some Communities developing major free hot spots:
  - Long Beach, CA
  - San Jose, CA
  - Washington, DC
  - New York, NY
  - Austin, TX
  - Las Vegas, NV

Wi-Fi Telephony

- Until recently, the utility of Wi-Fi phones was limited to businesses and colleges that had set up Wi-Fi in a building or on a college campus.

- As Wi-Fi "hot zones" continue to proliferate, Wi-Fi phones may grow to become a viable alternative to both wireline and traditional wireless telephony.

- ABI Research predicts the Wi-Fi voice market may be as much as $20 million by 2009.

70/80/90 GHz Website

- NTIA has been moving ahead with plans to establish a web-based mechanism to facilitate real-time coordination of federal and non-federal operations in these frequency ranges.

- This new system will allow non-federal users to use a website to determine whether they have any potential conflict with federal users.

- NTIA will soon have its mechanism operational. This mechanism has been under test by staff and the perspective non-federal database managers since June. The FCC has selected the database managers, and these organizations are developing their databases and the mechanism used to "shake hands" with NTIA.

WiMax

- WiMax or 802.16 is designed to provide wireless broadband access in a Metropolitan Area Network (MAN), operating at speeds up to 75 Mbps over a 30 mile radius.

- WiMax connectivity is fast enough to support more than 60 businesses with T1-level connections and hundreds of homes with DSL-rate connectivity using only 20 MHz of channel bandwidth.

- Intel plans to build WiMax into its Centrino chip platforms, which power 80% of all PCs, by 2006. Motorola plans to commercially offer integrated radio access networks that can handle 3G, Wi-Fi, WiMax and other future wireless innovations. AT&T, Siemens, and Alcatel are also backing WiMax technology.

- Industry analysts predict six-fold growth in WiMax sales over the next three years.

NTIA Rural Wireless Broadband Project Team (RWBPT)

- In February, NTIA released Request for Comment on Usage of 3650-3700 MHz considering:
    - Protection of Existing Government Radar Sites
    - Technical Sharing Criteria
    - Workable Solutions for Industry
    - Promoting transparency in NTIA decision making process
- NTIA is preparing technical report of comments and recommendations for FCC
- RWBPT also reviewing industry white papers and functional descriptions to provide core of expertise within NTIA on Rural Wireless Broadband deployment and requirements
    - Developing database of technical descriptions
    - Reviewing Manufacturer requirement documents
    - Developing Industry Contact list

Broadband Over Power Lines: The Third Wire

"We need to get broadband to more Americans . . . one great opportunity is to spread broadband throughout America via our power lines."

— President George W. Bush, US Department of Commerce, June 24, 2004

HomePlug Modem can turn an electrical outlet into an Internet connection.

- Principal concern is the risk that BPL systems might interfere with federal government radio communications or other state and private radio operators.

- FCC began BPL rulemaking on February 12, 2004.

- On April 27, 2004, NTIA submitted to the FCC a Phase 1 interference report, which suggested interference mitigation techniques to protect critical government radio systems.

- On June 4, 2004, based on additional analyses, NTIA recommended several supplements to the FCC proposed BPL rules to reduce further any risk of harmful BPL interference

Commerce Department's Economic Development Administration Supports Technology

- EDA provides assistance to rural and urban areas for economic development and revitalization.

- EDA's Public Works Program supports projects to expand and upgrade physical infrastructure, including broadband and telecommunications infrastructure, skill training facilities, and business incubator facilities.

  From FY 2001 to date, South Dakota has received EDA funds for:

  - 64 projects

  - Totaling $ 6.9 million

  - In 2003, EDA provided a technical assistance grant to Black Hills State University in Spearfish to help Native American tribes use the Internet and e-commerce for tourist development.

Characteristics of USDA Rural Development RUS Broadband Programs

- Technology neutral

- Examples of approved loan technologies:
  - Fiber to the home
  - Digital Subscriber Line
  - Unlicensed wireless
  - Hybrid Fiber Coax
  - Licensed wireless

- Available to communities up to 20,000 in population

- Loans are competitively neutral – we can fund the second provider in an area.

- http://www.usda.gov/rus/telecom/broadband.htm

Conclusion

- Broadband deployment in the U.S. is robust.

- President Bush's economic policies have helped to fuel and sustain broadband investment, deployment and competition.

- The President's goal will ensure that all Americans have the personal and economic benefits of high-speed Internet applications and services.