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**Converging Industries Research
Foundation**

Practical Solutions for Communications Policy

**Overview of New Technology
Deployment Model:
Broadband with Associated
Depreciation and Overheads**

Executive Summary

March 15, 1995

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Objective of the Model

The objective of the *New Technology Deployment Model* is to identify and quantify the associated issues - regulatory, technical, financial, and market demand - that will assist policy makers in their decisions concerning competition and new technology deployment. The modeling process also identifies key elements associated with broadband deployment and analyzes the result of changing these key elements.

This tool enables regulators, telecommunications companies, and others to experiment with various deployment options and to analyze the results. The *Overview of the Model* presents the research results from the current version of the model.

Development Process

The *New Technology Deployment Model* and its companion *Overview* are part of a continuous line of research on public policies and technology deployment, specifically deployment of a broadband infrastructure and broadband services. Documentation of the research process is included since the objective is to produce research results that are relevant to ongoing issues while preserving the integrity of the research process.

Basic Design of Model

By design, the model requires the user to define a scenario for deployment of the nationwide broadband infrastructure and set a penetration rate for various market segments. The user does this by specifying a number of assumptions.

This model analyzes a specific deployment issue for only one segment of the multi-vendor environment - the cost of local exchange carrier (LEC) deployment of a broadband network. Analyzing different technologies, other network topologies, and alternative network providers would produce different results.

New Research Results

Research results based on this model indicate that broadband deployment is reasonable if done in markets where there is demand or if there are changes in policies that define industry structure (such as allowing companies to offer both basic telephone and cable television services).

Examples of Deployment Patterns

Figure 1 shows the results of the model for a nationwide deployment. The difference between the Infrastructure curve and the Services curve is the additional cost for equipping the infrastructure to provide broadband services. **Figure 1** indicates:

- Existing telephone revenues on average (**Benchmarks**) are adequate to cover the cost (revenue requirement) of building and maintaining modern (fiber optic, or **Broadband Infrastructure**) telecommunications networks if these networks provide only traditional telecommunications services.

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- The increased costs of upgrading these modern telecommunications networks to carry broadband services (**Broadband Services**) will vary for different types of customers. New revenues from broadband services and non-traditional services (e.g., video dial-tone) would support these additional costs.

Other market segmentations such as urban and rural or business and residential are also possible. Results of sample runs indicate the following:

- Deployment costs in urban markets (80% of all lines) are slightly less than those for the nationwide curves. Deployment costs in rural markets (20% of all lines) are significantly higher than in urban markets.
- For residential markets, the costs for the addition of broadband services to a broadband infrastructure is minimal (**Figure 2**).
- The costs for providing broadband business services are significantly higher than the costs for providing residential broadband services because the model assumes advanced capabilities and greater capacity for businesses as compared to residences (**Figure 2**).
- Rural business infrastructure costs are lower than rural residential infrastructure costs because rural businesses tend to be located much closer to their associated local switch than are rural residences.

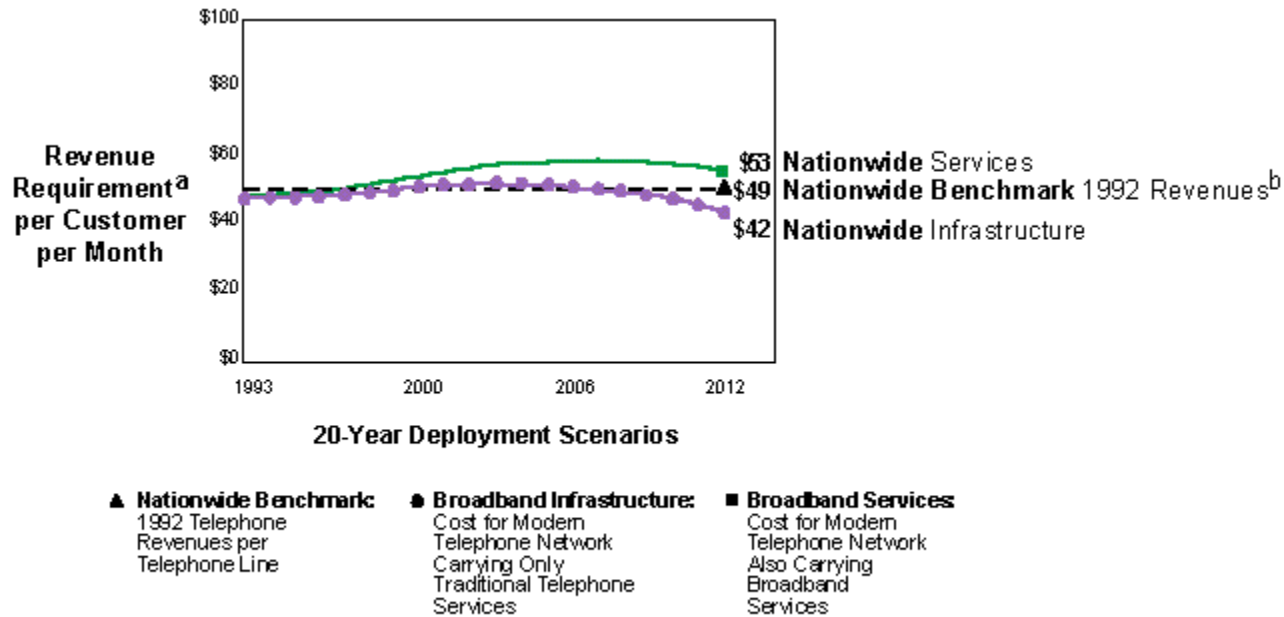
Cumulative Investments

Over 20 years, the investment for providing the **Nationwide Broadband Infrastructure** is \$231 billion and for providing **Nationwide Broadband Services** is \$416 billion (that is, an additional \$175 billion). This amount is the estimated cost for the entire network - including loop, switching, and interoffice transport for both business and residential customers. Comparison of these amounts with current spending levels projected over the next 20 years (\$406 billion) indicates the following:

- The amount of investment needed to provide the nationwide fiber optic infrastructure defined by the model is well within the current spending levels.
- The amount of investment required to equip everyone in the United States for broadband services, including the cost of the infrastructure, is comparable to current spending levels.

Investment Categories:	Broadband Infrastructure		Broadband Services	
	Amount (billions):	Percent of Total:	Amount (billions):	Percent of Total:
Loop Electronics	\$79.6	34.4%	\$148.7	35.7%
Cable and Wire	120.1	51.9%	120.1	28.9%
Circuit Equipment	30.5	13.2%	32.4	7.8%
Digital Switching	1.1	0.5%	114.6	27.6%
Total	231.3	100.0%	415.9	100.0%

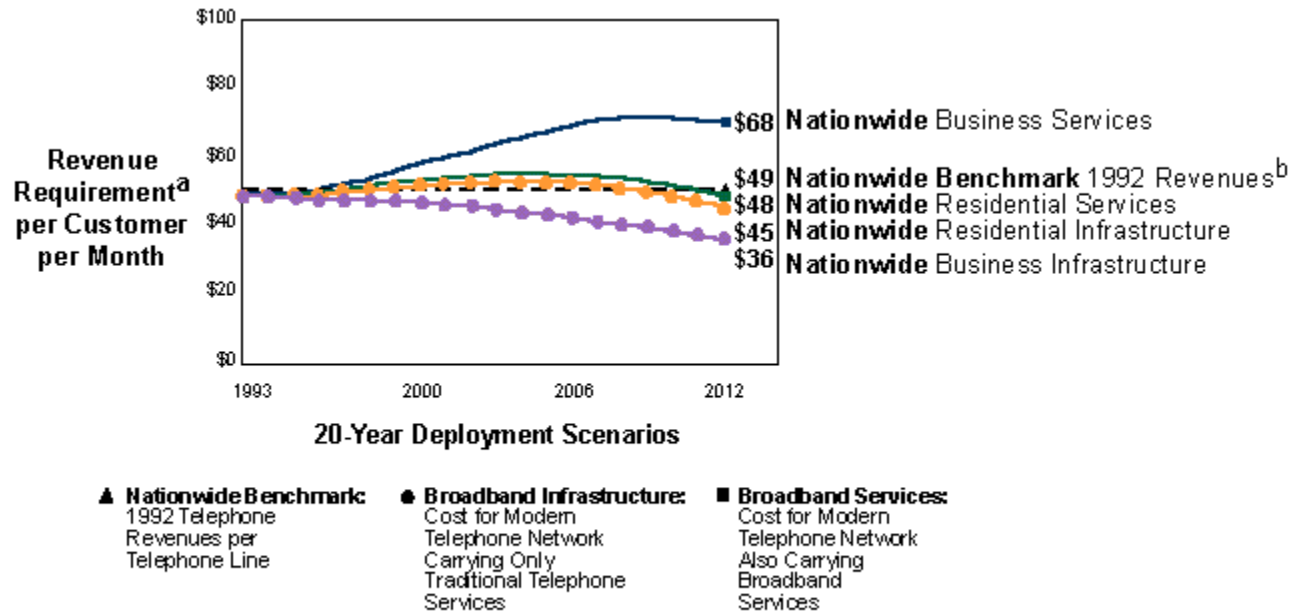
Figure 1
Cost of Deploying a Nationwide Broadband Infrastructure and Nationwide Broadband Services



^a Revenue requirement = expenses + tax + return on investment.
^b LEC revenue requirements (including basic service, state toll, and access).

Note: Assumes a 2.35% annual growth in nationwide access lines. For the Broadband Services curve, each year 5% of broadband-capable access lines (Broadband infrastructure) also become equipped for Broadband Services. The Nationwide Benchmark of \$49.98 is a calculated revenue requirement for Tier 1 local exchange carriers (LECs) divided by the number of access lines. Costs are for all access lines (broadband-capable plus non-converted).

Figure 2
Cost of Deploying a Nationwide Broadband Infrastructure and Nationwide Broadband Services: Business and Residential Markets



^a Revenue requirement = expenses + tax + return on investment.
^b LEC revenue requirements (including basic service, state toll, and access).

Note: Assumes a 2.35 annual growth in nationwide access lines. For the Broadband Services curve, each year 5% of broadband-capable access lines also become equipped for Broadband Services. The Nationwide Benchmark of \$49.98 is a calculated revenue requirement for Tier 1 local exchange carriers (LECs) divided by the number of access lines for Tier 1 LECs. Costs are for all access lines (broadband-capable plus non-converted). This benchmark is an aggregate for both business and residential services. Definitions of business and residential services are different.

Project Information

List of Participants in the Telecommunications Industries Analysis Project, 1995

State Regulators	NARUC representatives from: Illinois Commerce Commission Iowa Utilities Board Massachusetts Department of Public Utilities New York Public Service Commission Washington Utilities and Transportation Commission
Regional Holding Companies	Ameritech Bell Atlantic BellSouth NYNEX Pacific Telesis SBC Communications Inc. U S WEST
Independents	Anchorage Telephone Utility GTE Sprint Local Telecom Division
Interexchange Carrier	AT&T Sprint
Foreign Domestic	InfoCom Research, Inc. NTT America
Local, National, and International Services	BT France Telecom North America
Materials Manufacturers	Corning
Telecommunications Equipment Manufacturers	Northern Telecom

Sponsors:

Corporation for Public Broadcasting

Assisting with *public* data:

Bellcore
Federal Communications Commission
National Exchange Carrier Association

Project Information, cont.

Background on the Telecommunications Industries Analysis Project

The goal of the Telecommunications Industries Analysis Project (TIAP) is to provide information to support the development of alternative communications policies to meet the needs of stakeholders in an environment that includes competitive and non-competitive markets, federal and state regulatory jurisdictions, and a proliferation of new services made possible by technological advances. The purpose of the project is to produce research and analysis which will assist policy makers in making informed decisions.

The project is a neutral forum of communications industry stakeholders exploring multiple viewpoints on selected issues. This forum incorporates the following elements:

- **Broad representation:** The current forum includes local exchange carriers, interexchange carriers, materials and equipment manufacturers, and regulators. The project actively seeks expansion of this forum to include other communications industry representatives such as competitive access providers, cable television companies, computer companies, electric power utilities, and publishers.
- **Multiple viewpoints:** Participants are required to have an active role in the research and analysis, to represent their own interests, to understand and to assist in developing others' perspectives, and to work toward the common goal of representing multiple views.
- **Analysis and results of alternative policies:** Research tools, including a jointly produced data base and computer software models, and data analysis developed by this forum create a common language for examining issues. The common language allows the participants to focus on underlying issues. Appropriate computer software tools are developed, and existing tools are modified.
- **All data, analysis methods, and results are public:** Data used by this project must be publicly available on a nationwide basis. Research products become public domain information.
- **Neutral setting:** The project resides in a neutral setting, free of partiality, thereby ensuring objective and independent research.