



# CIRF

## **Converging Industries Research Foundation**

*Practical Solutions for Communications Policy*

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### **Who Pays Whom? Cash Flow for Some Support Mechanisms and Potential Modeling of Alternative Telecommunications Policies**

**November 15, 1992**

*Presentation at the November 1992  
NARUC Meeting,  
Los Angeles, California*

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***Who Pays Whom?  
Cash Flow for Some Support  
Mechanisms and Potential  
Modeling of Alternative  
Telecommunications Policies***

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## Project Information

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### **Alternative Costing Methods Project:**

### **Who Pays Whom?**

### **Cash Flow for Some Support Mechanisms and Potential Modeling of Alternative Telecommunications Policies**

Carol Weinhaus, Sandra Makeeff, et al.

Presentation at the November 15, 1992, NARUC Meeting, Los Angeles, California

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The Program on Information Resources Policy is jointly sponsored by Harvard University and the Center for Information Policy Research.

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## List of Participants in the Alternative Costing Methods Project

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### List of Participants in the Alternative Costing Methods Project

State Regulators	NARUC
Regional Holding Companies	Ameritech Bell Atlantic BellSouth NYNEX Pacific Telesis Southwestern Bell U S WEST
Large Independents	Centel GTE Southern New England Telephone Sprint Local Telecom Division
Small Telephone Representative	NTCA
Interexchange Carrier	AT&T
Switch Manufacturers	Northern Telecom Philips Kommunikations
Harvard	

### Assisting with *public* data:

Federal Communications Commission  
National Exchange Carrier Association

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## List of Affiliates of the Program on Information Resources Policy

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Advertising Mail Marketing  
Association  
American Telephone & Telegraph  
Co.  
Ameritech Corporation  
Apple Computer, Inc.  
Arthur D. Little, Inc.  
Auerbach Publishers Inc.  
Australian & Overseas  
Telecommunications Corp.  
Bell Atlantic  
Bell Canada  
BellSouth Corporation  
Bull, S.A. (France)  
Centel Corporation  
CMC Limited (India)  
Commission of the European  
Communities  
Communications Workers of  
America  
Computer & Communications  
Industry Assoc.  
Corning  
Cos Enterprises, Inc.  
Dialog Information  
Services Inc.  
DRI/McGraw Hill  
European Parliament  
France Telecom  
Gartner Group, Inc.  
GTE Corporation  
Hitachi Research Institute  
(Japan)  
IBM Corp.  
IQ, Inc.  
Information Gatekeepers, Inc.  
Information Industry Association  
International Data Corp.

International Resource Develop-  
ment, Inc.  
Invoco AB Gunnar Bergvall  
(Sweden)  
I.T. Direction Ltd. (UK)  
Japan Telecom Company  
Kapor Family Foundation  
Knowledge Industry Publica-  
tions, Inc.  
Korea Telecom  
Lee Enterprises, Inc.  
John and Mary R. Markle  
Foundation  
Martin Marietta  
McCaw Cellular Communications,  
Inc.  
Mead Data Central  
MITRE Corp.  
National Telephone Cooperative  
Assoc.  
The New York Times Co.  
NEC Corp. (Japan)  
Newspaper Association of America  
Nippon Telegraph & Telephone  
Corp. (Japan)  
Northeast Consulting Resources, Inc.  
Northern Telecom  
Nova Systems Inc.  
NYNEX  
Pacific Telesis Group  
Philips Kommunikatons  
(Netherlands)  
Public Agenda Foundation  
Puerto Rico Telephone Co.  
Research Institute of Telecomu-  
nications and Economics (Japan)  
RESEAU (Italy)  
Revista Nacional dde Telematica  
(Brazil)

Rhode Island Public Utilities  
Commission  
Scaife Family Charitable Trusts  
SEAT S.P.A. (Italy)  
Siemens Corp.  
Southam Inc. (Canada)  
Southern New England  
Telecommunications Corp.  
Southwestern Bell  
Sprint Communications Company  
L.P.  
State of California Public Utilities  
Commission  
TEKNIBANK S.P.A. (Italy)  
The College Board  
Times Mirror Co.  
Tribune Company  
Unites States Government:  
Department of Commerce  
National Telecommunications  
And Information Administration  
Department of Defense  
National Defense University  
Department of Health and Human  
Services  
National Library of Medicine  
Department of State  
Office of Communications  
Federal Communications  
Commission  
General Services Administration  
National Aeronautics and Space  
Administration  
National Security Agency  
U.S. General Accounting  
Office  
United States Postal Rate  
Commission  
US West

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## List of Acronyms

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AP	Alternative Service Provider
ARMIS	Automated Reporting Management Information System
CAP	Competitive Access Provider
CATV	Cable Television
CCL	Carrier Common Line
CCLS	Carrier Common Line Charge
COE	Central Office Equipment
COS1 (H)	Cost of Service (Historic) Form
CPE	Customer Premises Equipment
EC	Exchange Carrier
FCC	Federal Communications Commission
IS	Interstate
IXC	Interexchange Carrier
LATA	Local Access and Transport Area
LEC	Local Exchange Carrier
LTS	Long Term Support
NECA	National Exchange Carrier Association
PCS	Personal Communications Services
POP	Point of Presence
PSN	Public Switched Networks
REA	Rural Electrification Administration
SLC	Subscriber Line Charge
TRP	Tariff Review Plan
USF	Universal Services Fund
WDEM	Weighted Dial Equipment Minutes

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# I. Introduction

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## Introduction

This paper builds on previous research of the Alternative Costing Methods Project. There are three components in this paper:

- A brief description of the project.
- The size and magnitude of cash flows for selected support mechanisms. This section is a continuation of earlier research on this issue.<sup>1</sup>
- Potential issues and alternatives for future analysis by project participants.

## Background on the Alternative Costing Methods Project

The goal of the Alternative Costing Methods Project is to provide information to support the development of alternative telecommunications 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 of selected issues. This forum incorporates the following elements:

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<sup>1</sup> For earlier research on support mechanism issues by participants in the project, see Carol Weinhaus, Sandra Makeeff, et. al., *Support Mechanisms: Issues and an Example of Potential Problems in the Future*, Program on Information Resources Policy, Harvard University, Cambridge, MA, July 27, 1992; and see Carol Weinhaus and Mark Jamison, *Examples of Modeling – Transport and Other Issues*, Program on Information Resources Policy, Harvard University, Cambridge, MA, July 21, 1991, Appendix A, pages 24-28.

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## I. Introduction, cont.

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- **Broad representation:**

The current forum includes local exchange carriers (LECs), interexchange carriers (IXCs), equipment manufacturers, and federal and state regulators. In the next phase, this forum would be expanded to include other communications industry representatives, such as competitive access providers, cable television companies, computer companies, or publishers.
- **Multiple viewpoints:**

Each participant is 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, including modifications to existing tools.
- **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. The current database will be updated to meet the research requirements of this forum.
- **Neutral setting:**

The project resides in a neutral setting, free of partiality, thereby ensuring objective and independent research.

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## II. Modeling Support Mechanisms

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### Public Policy Goals and Support Mechanisms

In the traditional telecommunications industry, regulatory rules have evolved to promote specific policies. **Figure 1** provides a broad list of these public policy mechanisms embedded in the current regulatory cost and price structures. The introduction of competition and the rapid pace of technological change are creating pressures to change or eliminate existing regulatory structures. **Figure 2** depicts one portion of today's environment – a representative LEC local network interconnected to the interexchange carrier (IXC) point of presence (POP). This figure represents the traditional regulated network.

**Figure 3** completes the picture by adding current and potential network providers for telecommunications services.<sup>2</sup> Given this competitive structure, change is inevitable. Support mechanisms are woven into the traditional networks in **Figure 2** but not into the new networks in **Figure 3**.

As competition increases and more network configurations are deployed, the existing support mechanisms will be affected. There are three alternatives to the treatment of existing support mechanisms:

Leave the support mechanisms alone and let them run their course.<sup>3</sup>

These support mechanisms that were geared to previous public policy goals may have unintended effects.

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<sup>2</sup> Competitors include alternative service providers (APs) – which include cable television (CATV) companies and competitive access providers (CAPs) – and non-traditional telecommunications competitors, such as computer networks, publishing companies, and other information service providers and carriers. One proceeding before the FCC covering competitive access is CC Docket No. 91-141, *In the Matter of Expanded Interconnection with Local Telephone Company Facilities*, FCC Order No. 19-159, June 6, 1991.

<sup>3</sup> Weinhaus and Makeeff, *Support Mechanisms*, July 1992.

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**Figure 1**  
**Some Support Mechanisms Associated with the Regulated Telecommunications Industry**

**Rate and Cost Averaging to Achieve Public Policy Goals:**

Provide "reasonable" rates on a non-discriminatory basis.  
Allocation of historic costs to determine costs for pricing.  
Differences between business and residential rates.  
Pricing averaged across broad geographic areas to promote universal service and Infrastructure development.  
Etc.

**Financial Assistance to Ensure Universal Service:**

Target high cost and low density areas:

- Universal Service Fund.
- Long-term support.
- Small telephone company local switch support.
- REA loans.

Low income households:

- Lifeline programs

Offshore areas:

- Assistance to Alaska, Virgin Islands, Puerto Rico, and Hawaii for interconnection to traditional industry network in the contiguous 48 states.

**Obligation to Serve:**

Carrier of Last Resort

- High Cost and Low Cost Locations.
- Facilities ready to serve a customer (large or small) whenever they want.

Interconnection (Mobile Carriers, Competitive Access Providers, Enhanced Service Providers, etc.).

**Intrastate Services Paying 75% of Shared Local Facility Costs:**

Local Exchange Rates.

Interexchange Usage Charges

Other.

**Special Needs Assistance for Equivalent Access to Telecommunications Network:**

Telecommunications services for hearing-impaired and speech-impaired individuals.

**Oversight of Jurisdictional Shifts:**

Participation through Federal-State Joint Board.

Maintain "reasonable" basic local service rates.

**Depreciation Policies**

Multiple Mechanisms and Authorities.

Figure 2  
Traditional Telecommunications Networks

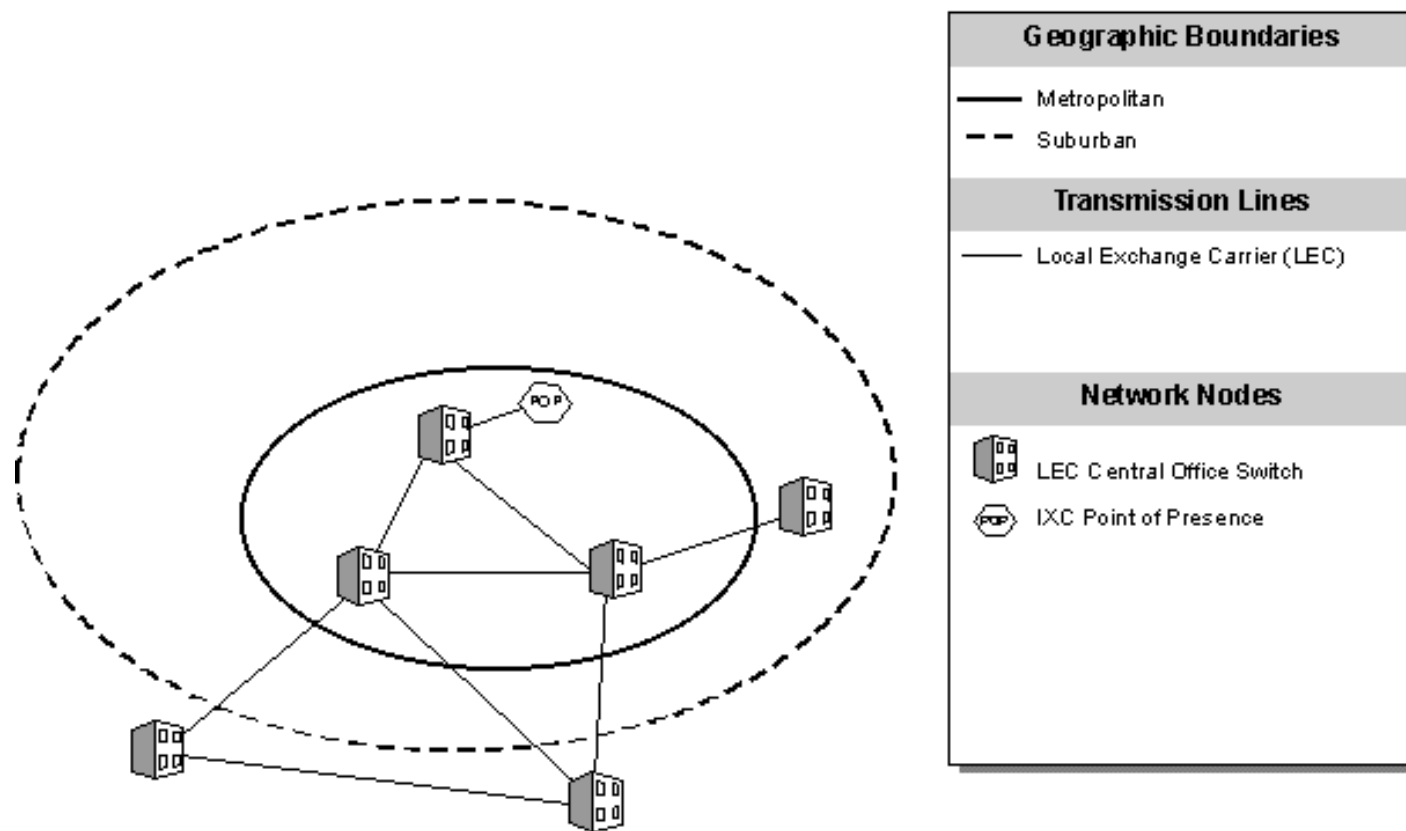
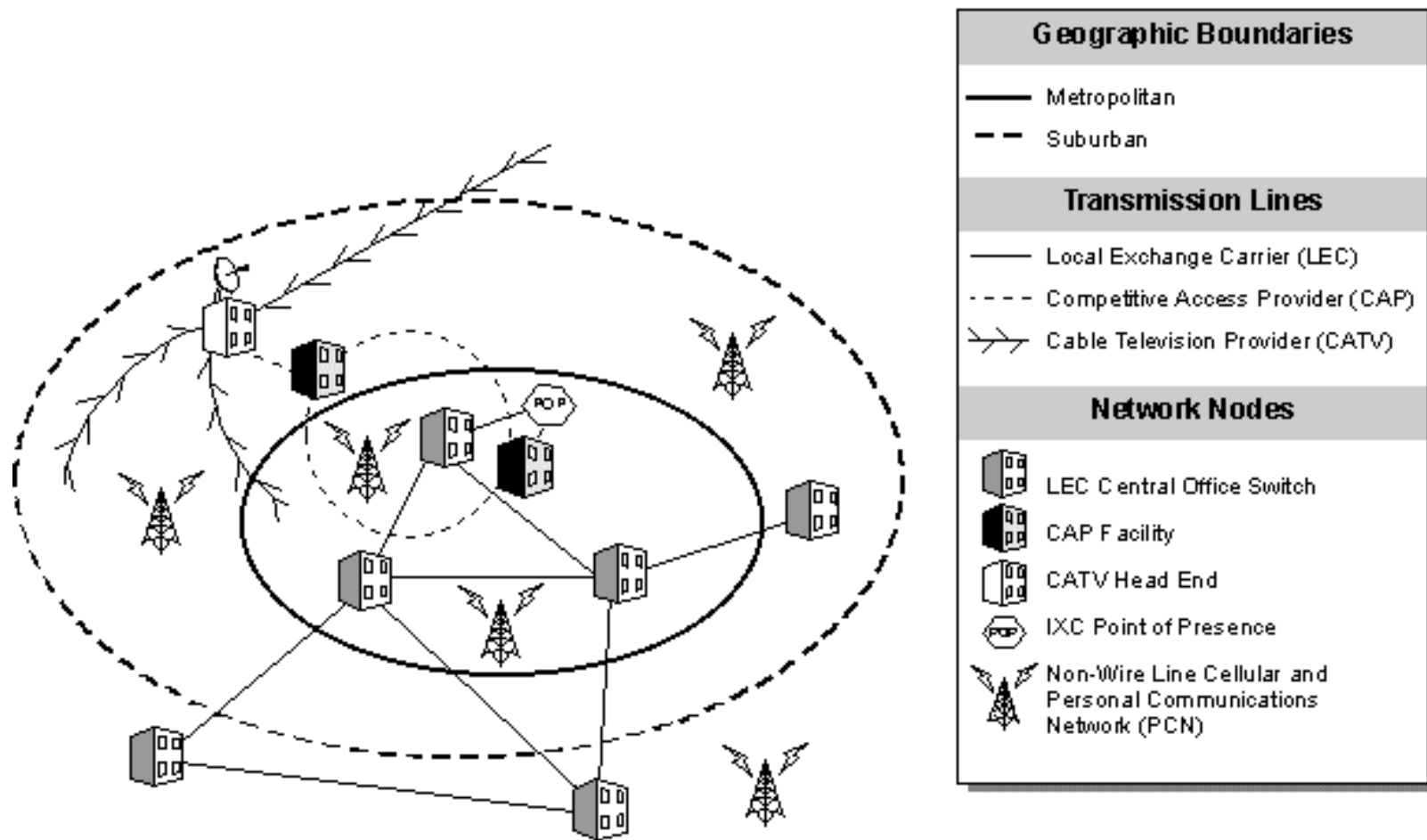


Figure 3  
Current and Potential Telecommunications Networks



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## II. Modeling Support Mechanisms, cont.

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- Change the support mechanisms.
  - a. Redefine the public policy goals.
  - b. Redefine the methods of supporting the goals.
  - c. Broaden or narrow the base of contributors.
- Eliminate one or more support mechanisms.

Some of the current mechanisms may not be appropriate for the competitive environment. For example, it may be necessary to re-examine the concept of universal service.

Change is inevitable due to the altered structure of the telecommunications industry. A given public policy may not survive because of decisions made in other areas that on the surface may have no apparent relation.

Analyzing individual issues requires asking the following questions:

- What is the intent of each support mechanism?
- What is the magnitude of each mechanism?
- Who funds each mechanism?
- What should be changed and what is the impact of the change?

Answering these questions requires three steps. First, the purpose of each support mechanism must be examined in light of whether or not it accomplishes the original intent and if the original intent is still valid in a changing telecommunications environment. Second, the relative sizes of the mechanisms are important simply because the larger the amount of support, the greater the impact of any change to it. Third, the questions of who pays for these supports, how they are funded, and who receives them needs to be answered.

In addition, support mechanisms do not exist in a vacuum. They are embedded in the financial and cost accounting structures of the regulated telephone industry. In general, a

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## II. Modeling Support Mechanisms, cont.

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change in an individual mechanism affects other aspects such as competition or technology deployment. The reverse is also true. Competition or technology deployment affect the support mechanisms. Looking at any one of these three areas requires isolating each effect, and studying each individually. It is also important to examine the interactions among mechanisms.

Change is inevitable given the environment pictured in Figure 3. An existing policy may not survive if the current practices are left to run their course.

The next section in this paper examines a number of existing policies that may be affected fairly soon. Some of these areas are obvious to the typical consumer. In this paper, these consumers are referred to as customers.<sup>4</sup>

### Representative Customer Bills

LEC and IXC customers see only a small fraction of current support mechanisms on their monthly bills. Some mechanisms are obvious. Most are transparent to the customer, but not to the various companies. This section ties what the customer sees on the monthly bill to specific industry cash flow and to selected support mechanisms.

**Figure 4** illustrates what LEC and IXC customers see on their monthly bills. The items are representative – not all customers order all items, service definitions vary, and specific IXC services are not listed (particularly those available to multi-line and private line business customers). In **Figure 4**, only a few items might be classified as support mechanisms: subscriber line charges (SLC) **Item 2**, miscellaneous surcharges **Item 8**, and taxes **Items 9 and 12**. Of these, only the SLC and the miscellaneous surcharges result from specific telecommunications policies. The SLC reduces the amount of local loop costs to be covered

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<sup>4</sup> The telecommunications industry refers to these consumers as end users to distinguish them from customers such as long distance companies, enhanced service providers, etc.

**Figure 4**  
**1989 Representative Monthly Customer Bills**

<b>Local Exchange Carrier Bill</b>		
1. Local Service	-----	16.50
a. Basic Local		
b. Message Units		
2. Subscriber Line Charge *	-----	3.50
3. Optional Features		
a. Touchtone **	-----	1.00
b. Call-Forwarding	-----	3.00
c. Call-Waiting	-----	3.00
d. Three-Way Calling	-----	3.00
e. Etc.		
4. Directory Assistance	-----	1.00
5. Toll	-----	10.00
6. Inside Wire Maintenance	-----	1.00
7. Voice Mail	-----	5.00
8. Miscellaneous Surcharges	-----	1.00
a. 911		
b. Telephone for the Deaf & Disabled		
9. Taxes	-----	2.00
<b>Total</b>		<b>\$50.00</b>
<b>Interexchange Carrier Bill</b>		
10. Long Distance	-----	30.00
11. Directory Assistance	-----	1.00
12. Taxes	-----	1.50
<b>Total</b>		<b>\$32.50</b>
<b>Summary of Carrier Bills</b>		
Local Exchange Carrier Bill	-----	50.00
Interexchange Carrier Bill	-----	32.50
<b>Total</b>	-----	<b>\$82.50</b>

\* Residential and single-line business maximum rate is \$3.50. Multi-line business maximum rate is \$6.00 per line

\*\* In some states this service is part of the basic local service rate.

**Note:** The bills are representative: they include business and residential services; not every customer orders all these items; and special access surcharges are not listed.

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## II. Modeling Support Mechanisms, cont.

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by interstate long distance charges. Miscellaneous surcharges might be for emergency services, telephone services for the hearing impaired, etc.<sup>5</sup>

Various government agencies oversee the prices for items on the bills in **Figure 4**. These agencies – the Federal Communications Commission (FCC), state regulators, and taxing authorities – are already experiencing the effects of the changing environment. Regulatory bodies are often in conflict with one another. Furthermore, authority in the competitive environment is not as clear as it was during the Bell-Independent partnership (1920s to 1970s).<sup>6</sup>

**Figure 5** ties the items on the bills in **Figure 4** to the appropriate agencies. Note that LECs and IXCs have two sets of regulators – the FCC and individual state agencies. The categories in **Figure 5** are as follows:

- State regulated services: Some states have deregulated portions of these services.
- FCC regulated services.
- Federal and state non-regulated services: The FCC considers services listed in this column as non-regulated, but some states regulate these services.
- Taxes.

**Figures 4 and 5** indicate what the customer sees and who regulates the prices. The next set of figures indicates where the money goes.

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<sup>5</sup> The SLC is a flat monthly charge per line paid by LEC customers. Local loop is line that connect customer premises to local exchange switches.

<sup>6</sup> Carol L. Weinhaus and Anthony G. Oettinger, *Behind the Telephone Debates*, Ablex Publishing Corporation, Norwood, New Jersey, pages 10, 25-31, 54-55.

**Figure 5**  
**Rate-Setting Regulation for Items on Representative Customer Bills**

	Authority			
	State Regulated	FCC Regulated	Federal and State Non-Regulated*	Taxing
<b>Local Exchange Carrier Bill</b>				
1. Local Service .....	■			
2. Subscriber Line Charge .....		■		
3. Optional Features .....	■			
4. Directory Assistance .....	■			
5. Toll				
a. State Toll .....	■			
b. Interstate IntraLATA .....		■		
6. Inside Wire Maintenance .....			■	
7. Voice Mail .....			■	
8. Miscellaneous Surcharges				
a. State .....	■			
b. Interstate .....		■		
9. Taxes .....				■
<b>Interexchange Carrier Bill</b>				
10. Long Distance				
a. Interstate ** .....		■		
b. State .....	■			
11. Directory Assistance				
a. Interstate ** .....		■		
b. State .....	■			
12. Taxes .....				■

\*The FCC has considered this non-regulated but some states regulate these services.

\*\* Only dominant interexchange carriers are regulated.

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## II. Modeling Support Mechanisms, cont.

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### 1989 LEC and IXC Cash Flows

**Figure 6** provides an extremely simplified view of the cash flow from customers to LECs and IXCs. It starts with the customer bills on the left, moves to payments to the IXCs, and ends with payments to the LECs. Note that 43.6% of the revenues collected from IXC customers are paid to the LECs for use of the local exchange network. The box on the far right displays total 1989 industry revenues of \$116.8 billion. LEC revenues are approximately 75% of the total. IXC revenues make up the remaining 25%. See **Appendix A** for a description of the calculations for the cash flow and related charts.

**Figure 6** omits the cash flow of the competitors to the traditional industry. This is because the competitors' financial and accounting systems do not directly contribute to the support mechanisms. The only inclusion of competitors in **Figure 7** is in the column labeled "Customer Bills." Here the competitors are LEC and IXC customers.

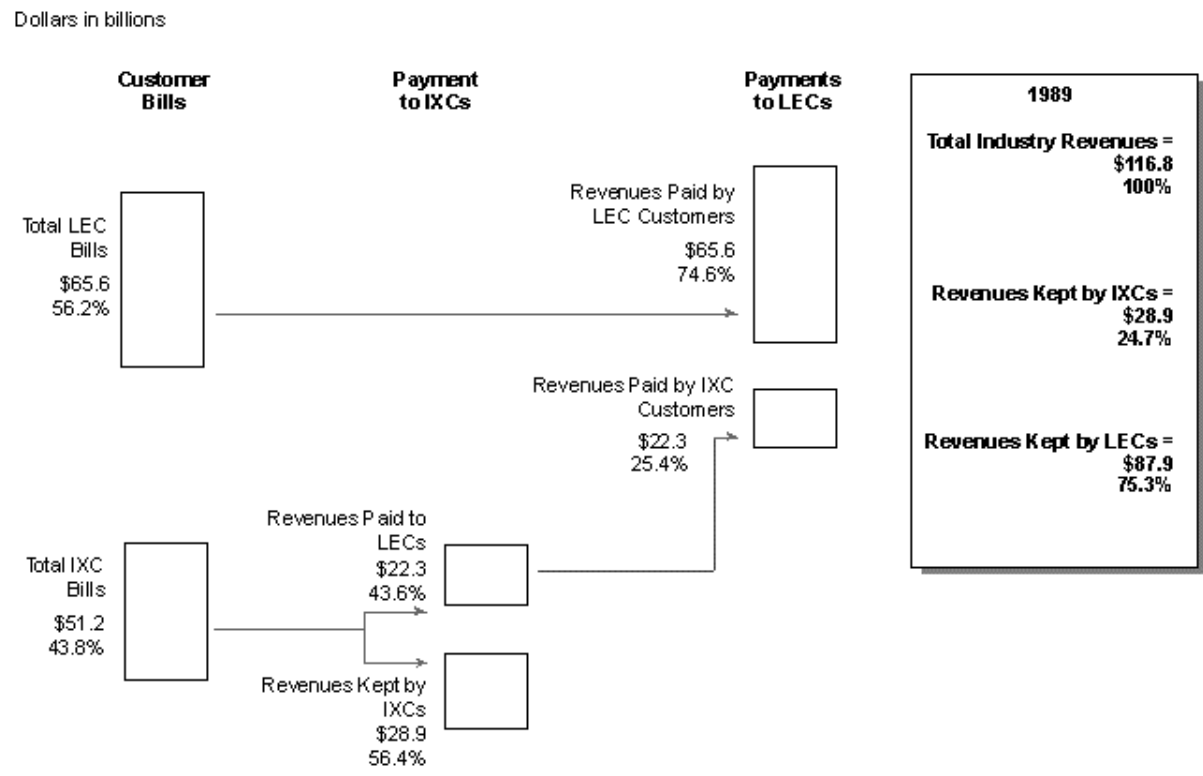
**Figure 7** takes the basic cash flow map, and provides greater detail, and adds two additional columns -- "LEC Cost Categories" and "Revenues by LEC Size." It forms a basic template for displaying some support mechanisms.

**Figure 7** splits the IXC payment to the LECs into two easily identified support mechanisms -- Universal Service Fund (USF) and Lifeline & Link-up -- and into a third category labeled "Access" which also contains support mechanisms.

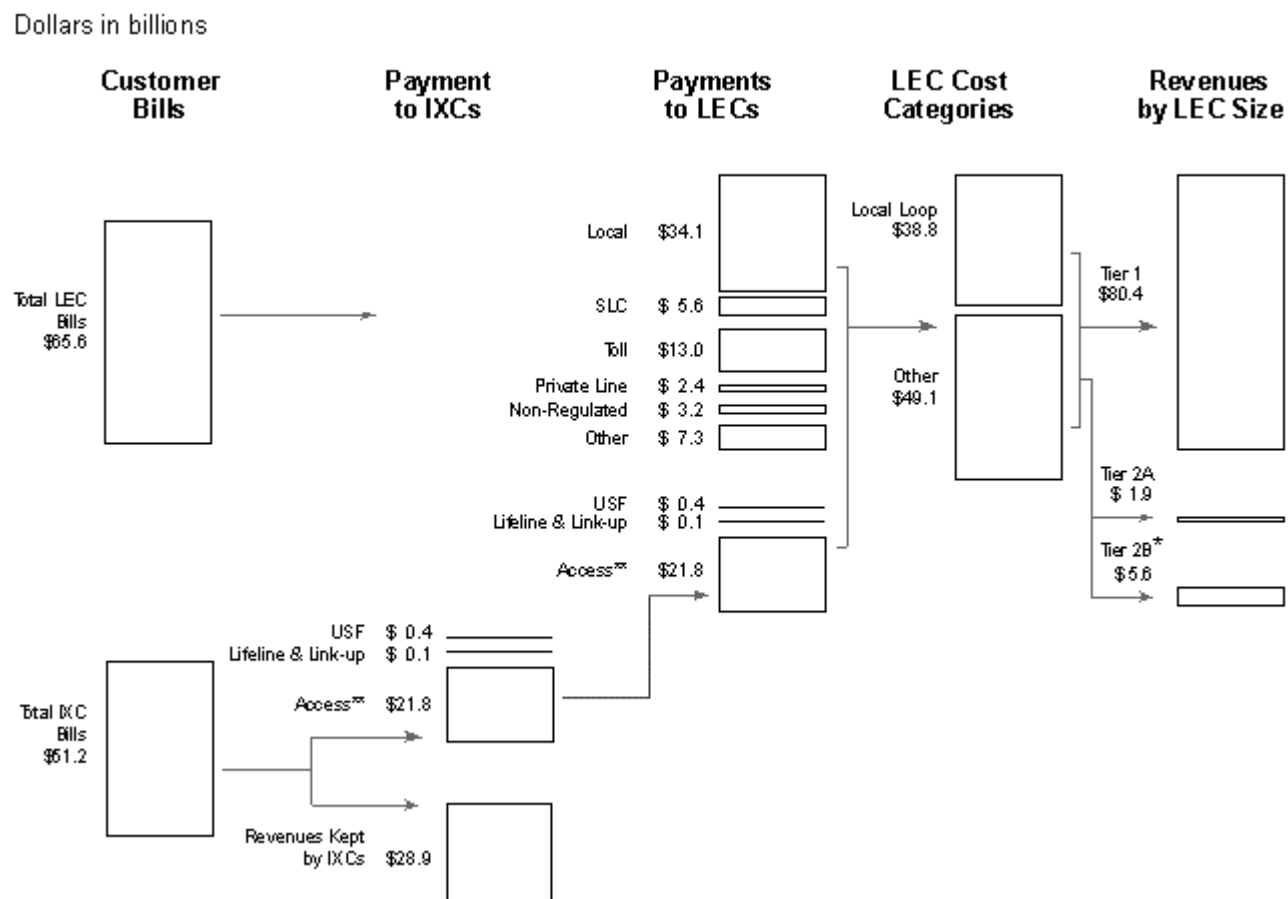
The column labeled "Payments to LECs" indicates the basic services on the LEC customer bill (**Figure 4**) and the amounts received from the IXCs.

The column labeled "LEC Cost Categories" divides total LEC costs into two categories: "Local Loop" and "Other." This split focuses on loop costs because many political battles center around who pays these costs. See **Appendix B** for more detail.

**Figure 6**  
**Cash Flow: 1989 Traditional Telecommunications Industry Revenues**



**Figure 7**  
**Cash Flow: 1989 Customer Dollars**



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## II. Modeling Support Mechanisms, cont.

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The final column divides total LEC revenues according to LEC size: Tier 1, Tier 2A, and Tier 2B.<sup>7</sup> These divisions indicate that the traditional structure has many support mechanisms that are targeted to small companies. For example, the FCC created these divisions to acknowledge that smaller LECs do not have the resources to do cost studies.

The various boxes in **Figure 7** reflect the relative sizes for each division. This shows the magnitudes of the dollars and the relationships among divisions. For dollar amounts under \$1.5 million the boxes become straight lines due to physical constraints.

While **Figure 7** shows the dollars amounts for Tier 1, Tier 2A, and Tier 2B LECs, **Figure 8** gives the percent of 1989 total LEC revenues by LEC size.

The next series of charts based on this template (**Figures 9 through 20**) show interstate support mechanisms. The emphasis on interstate dollars reflects that the data submitted to the FCC only provides interstate details. A more accurate picture would add the state equivalents. Similar detail for state mechanisms on a nationwide basis does not exist.<sup>8</sup>

There is a conflict over what constitutes a support mechanism. Depending on the particular viewpoint, each mechanism may be considered as supporting a basic public policy, as a subsidy, or as basic to the industry structure with no support implied. The nature of the mechanism may be more or less explicit as to who benefits.

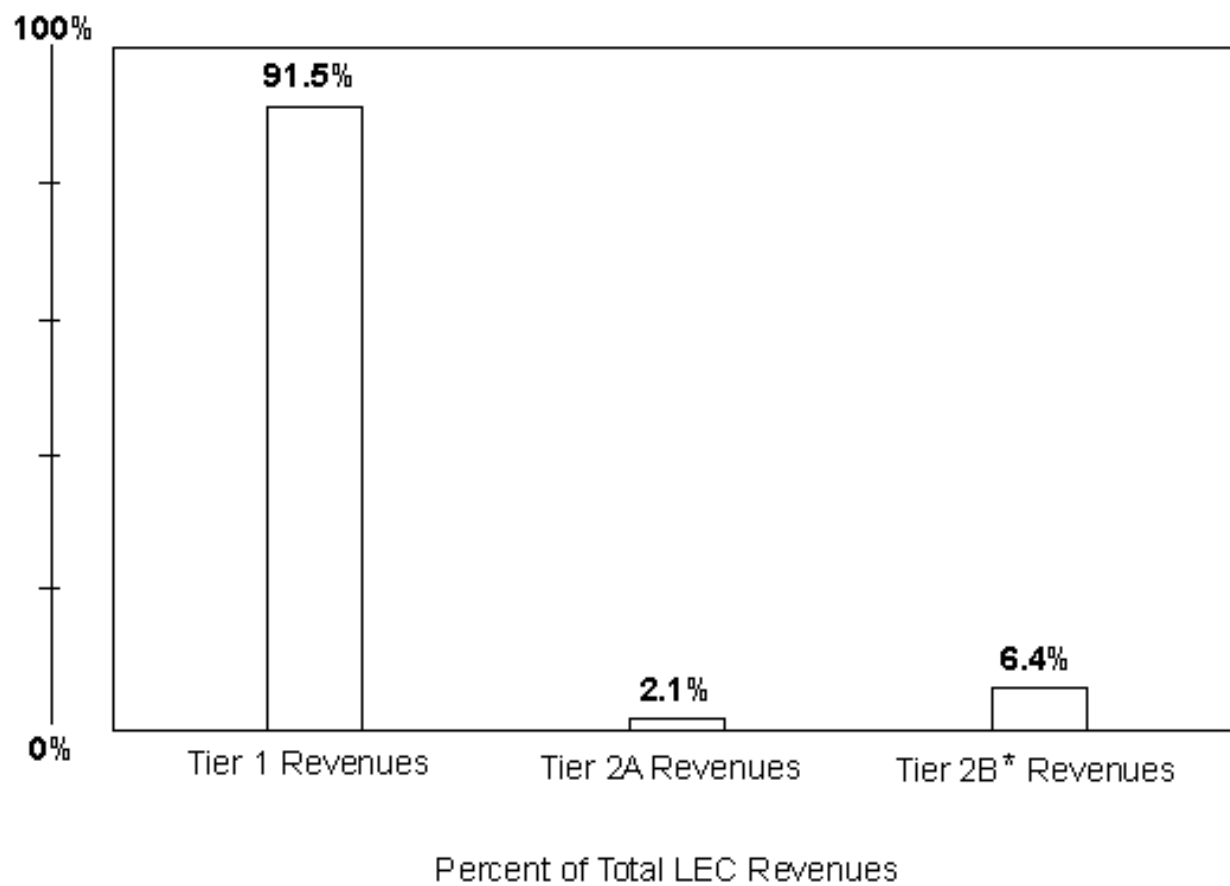
Given the forces pictured in **Figure 1**, there is pressure to revise the regulatory oversight of interconnected networks. Any major reform in this area may alter the results of existing

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<sup>7</sup> Tier 1: LECs with more than \$100 million in annual revenues (same as Class A as defined in the Iniform System of Accounts). Tier 2A: LECs with annual revenues greater than \$40 million, but less than \$100 mullion in regulated revenues. Tier 2B: LECs with annual revenues less than \$40 million. These companies are primarily National Exchange Carrier Association (NECA) pool members. NECA is a creation of the FCC. It assists small LECs by administering revenue pools and tariffs.

<sup>8</sup> This series of charts only shows explicit mechanisms that may be considered supports. Other mechanisms that may be more subtle, for example, allocations of overhead to local transport. Another way of viewing this same example is that these overhead allocations are appropriate. The FCC is currently examining this issue in CC Docket No. 91-141, *In the Matter of Expanded Interconnection with Local Telephone Company Facilities*, FCC Order No. 92-440, October 19, 1992.

**Figure 8**  
**Percent of 1989 Total LEC Revenues by LEC Size**



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## II. Modeling Support Mechanisms, cont.

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support mechanisms. Even if no regulatory change is made, these forces by themselves may create broad changes. The next series of charts is a base line for examining some mechanisms.

### Mechanism: Interstate Common Line Access Charges

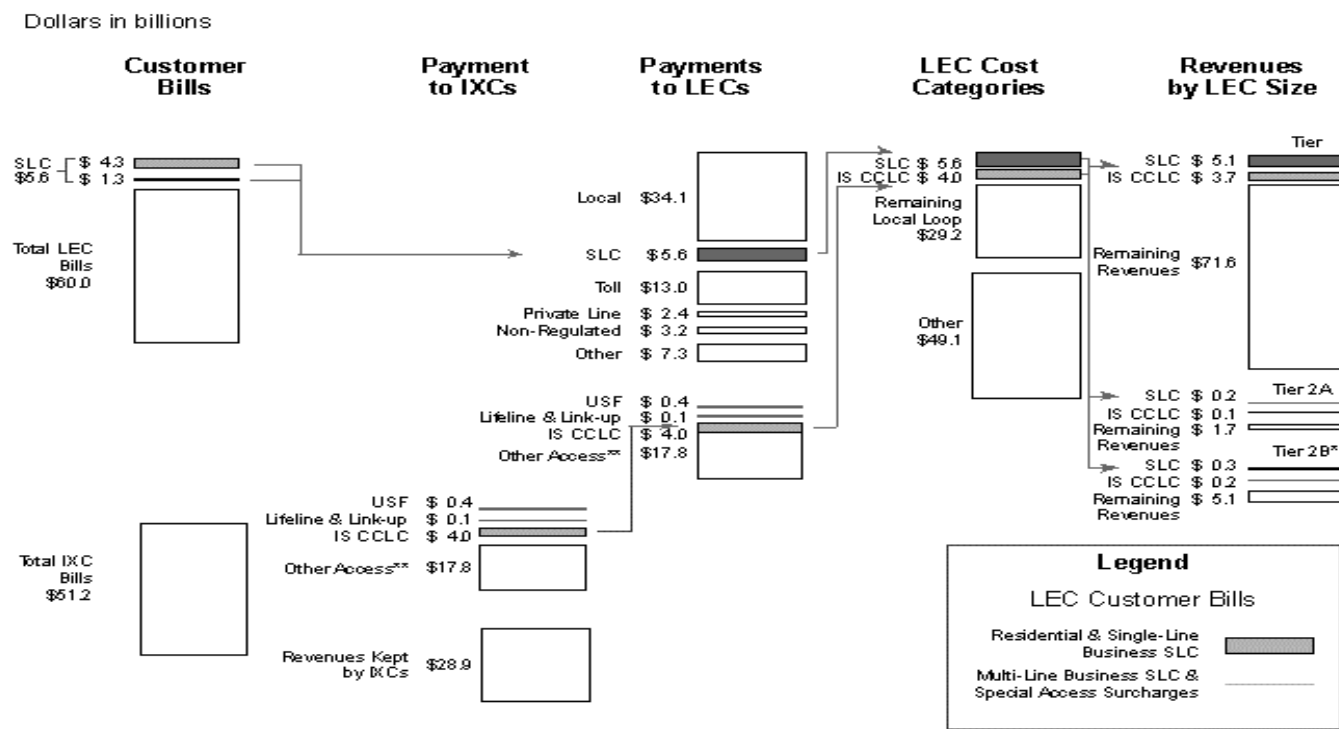
**Figure 9** shows two interrelated mechanisms: subscriber line charge (SLC) and interstate carrier common line charge (IS CCLC). LEC customers pay a flat monthly charge per line called the SLC. This charge is required by the FCC in addition to charges for basic local service. The LEC customer bills in **Figure 9** break out the SLC charges from the total revenues. The next column to the right indicates the amount the IXCs pay the LECs through the IS CCLC. The text and legend on the right side of this figure defines these mechanisms.

The SLC and the IS CCLC are linked. If the SLC increases or decreases, the IS CCLC moves in the opposite direction. From the customer's viewpoint, an increase in the SLC raises their monthly bill for local service. However, changes in the IS CCLC are not identified on the IXC customer bill. In the past, increases in the SLC have translated into lower interstate toll rates through a reduction in the IS CCLC.

There are differences of opinion as to how to view these two mechanisms. One viewpoint is that the IS CCLC supports costs of basic local service and helps keep rates for this service affordable. Another view is that interstate toll uses the subscriber line, and, therefore should pay. According to this view, the IS CCLC mechanism is reasonable. In this view, the SLC is seen as a support that keeps interstate toll rates low by keeping the IS CCLC low.

**Figure 10** shows the percentage of LEC revenues from SLC and IS CCLC. Each block of columns are percents by LEC size. For example, Tier 1 LECs recover 6.4% of their total revenues through SLCs, and 4.6% through IS CCLC. This pattern is similar for Tier 2A and Tier 2B companies. The revenues from the IS CCLC tend to be approximately two-thirds of the revenues from SLCs. For all three categories of LECs, the amounts received from these two mechanisms are significant.

**Figure 9**  
**Cash Flow: 1989 Interstate Common Line Access Charges**



**Interstate Common Line Access Charges**

**Subscriber Line Charge (SLC):** LEC customers pay a flat monthly charge per line. This charge is required by the FCC in addition to charges for basic local service.

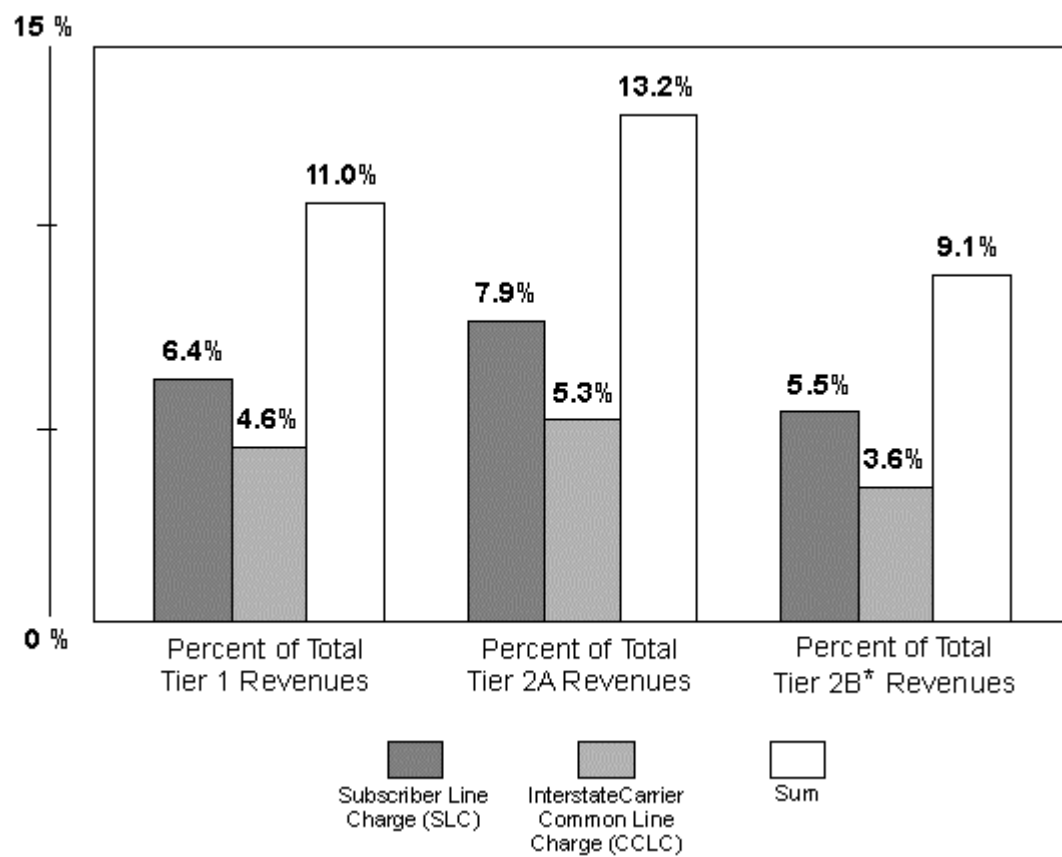
**Carrier Common Line Charge (CCLC):** A per minute charge built into the IXC rates and paid to the LECs.

**Special Access Surcharge:** LEC customers who use interstate special access service and interconnect that service to the public switched network pay a flat monthly charge per connected line.

**Result**

Recover a portion of local loop costs from three different types of LEC customers who use the local loop.

**Figure 10**  
**Percent of 1989 Revenues Recovered via Interstate Common Line Access Charges by LEC Size**



\* Primarily NECA pool companies

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## II. Modeling Support Mechanisms, cont.

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### Mechanism: Universal Service Fund (USF)

**Figure 11** shows a mechanism intended to support universal service. The USF is a payment from the IXC's to the LECs and does not appear as an item on the IXC customer bill. Since **Figure 11** uses 1989 dollars, the USF is only five-eighths of a transition to be completed during 1992. Therefore, the amount of this mechanism is greater today. The text on the right side of **Figure 11** describes the mechanism and its result.

There are at least two issues associated with how the USF should be funded. There is a question as to whether or not the IXC's should provide all, some, or none of the funding. As indicated in the figure, IXC's currently provide all of the funding.

There is another question as to how the IXC's should pay into the USF. One view is that IXC's should pay based on the number of lines. Each customer must determine which IXC will automatically carry the customer's "1 + " long distance calls.<sup>9</sup> This assignment is called presubscribed lines. IXC's pay into the USF based on their number of presubscribed lines. The result of this policy is that IXC's with a greater proportion of low-volume customers (generally rural) fund a relatively higher share of the USF than the remaining IXC's. This is the method in use today.

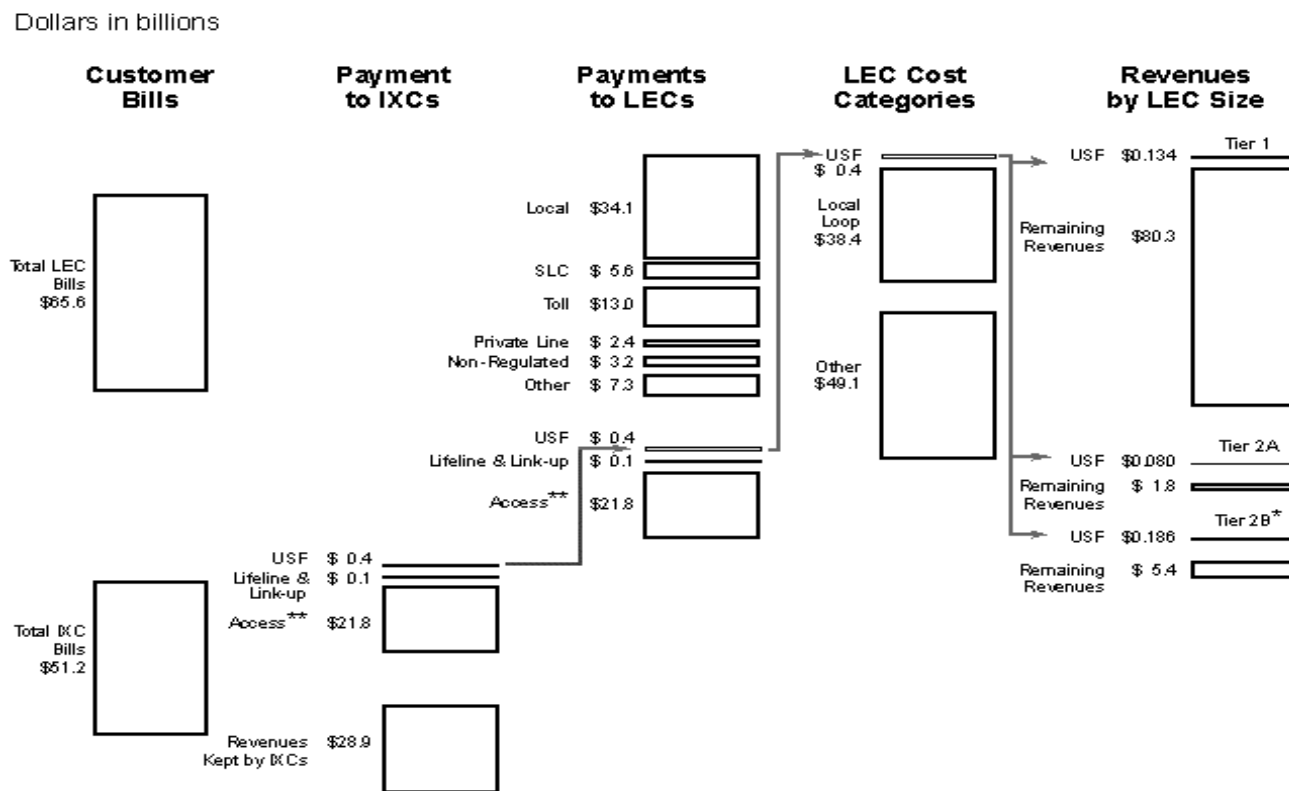
Another view of USF funding is that IXC's should pay on a per minute basis. The result of this policy would be that IXC's with a higher proportion of high-volume customers would fund a relatively higher share of the USF than the remaining IXC's.

While **Figure 11** shows that the Tier 1 companies receive the most USF dollars, only some of these companies benefit. **Figure 12** indicates that, as a whole, the USF is more important to the Tier 2A and Tier 2B LECs.

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<sup>9</sup> This applies to interLATA (local access and transport area) calls only. Some states have implemented presubscription for intraLATA calls, but that presubscription does not apply to funding the USF.

**Figure 11**  
**Cash Flow: 1989 Universal Service Fund (USF)**



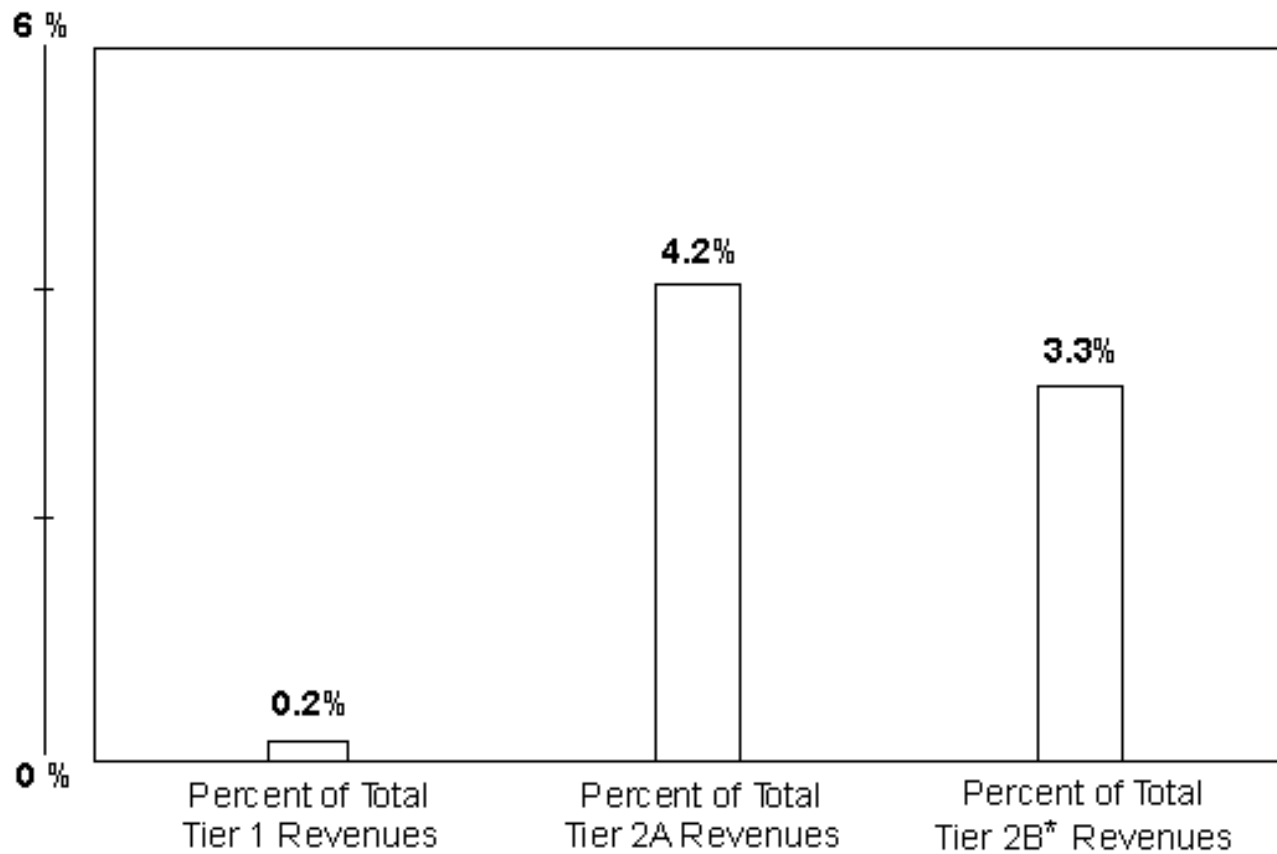
**Universal Service Fund (USF)**

Financial assistance for LECs with high local loop costs. This assistance is paid by IXC customers as part of the prices for IXC services.

**Result**

Keeps state rates down, often applied to basic local service. Used to further the state and federal goal of universal service.

**Figure 12**  
**Percent of 1989 Revenues Recovered via Universal Service Fund (USF) Mechanism by LEC Size**



\* Primarily NECA pool companies

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## II. Modeling Support Mechanisms, cont.

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### **Mechanism: Lifeline & Link-up**

These two mechanisms provide assistance to low-income households for basic local service. Like USF, their objective is universal service. But in this case, the target is to a specific type of customer instead of particular types of companies.

Lifeline reduces the SLC and basic local service rates. Link-up reduces the price of installing new telephone service.

**Figure 13** shows the cash flow of these two mechanisms. As with USF, these mechanisms are a payment from the IXCs to the LECs, and they do not appear as an item on the IXC customer bill. As with USF, Lifeline and Link-up mechanisms assign the cost to the IXCs on the basis of presubscribed lines. Compared to the support mechanisms already discussed, Lifeline & Link-up revenues are currently relatively small (**Figure 14**).

### **Mechanism: Interstate Weighted Dial Equipment Minutes (WDEM)**

This support mechanism helps offset higher switching costs for small companies (those with less than 50,000 loops).<sup>10</sup> WDEM increases the amount of interstate switching revenues received from the IXC payment to the LEC. **Figure 15** shows this pattern.

**Figure 16** shows that WDEM provides more assistance to Tier 2A and Tier 2B companies than Tier 1 companies. Only a few Tier 1 LECs receive WDEM.

### **Mechanism: Interstate Long Term Support (LTS)**

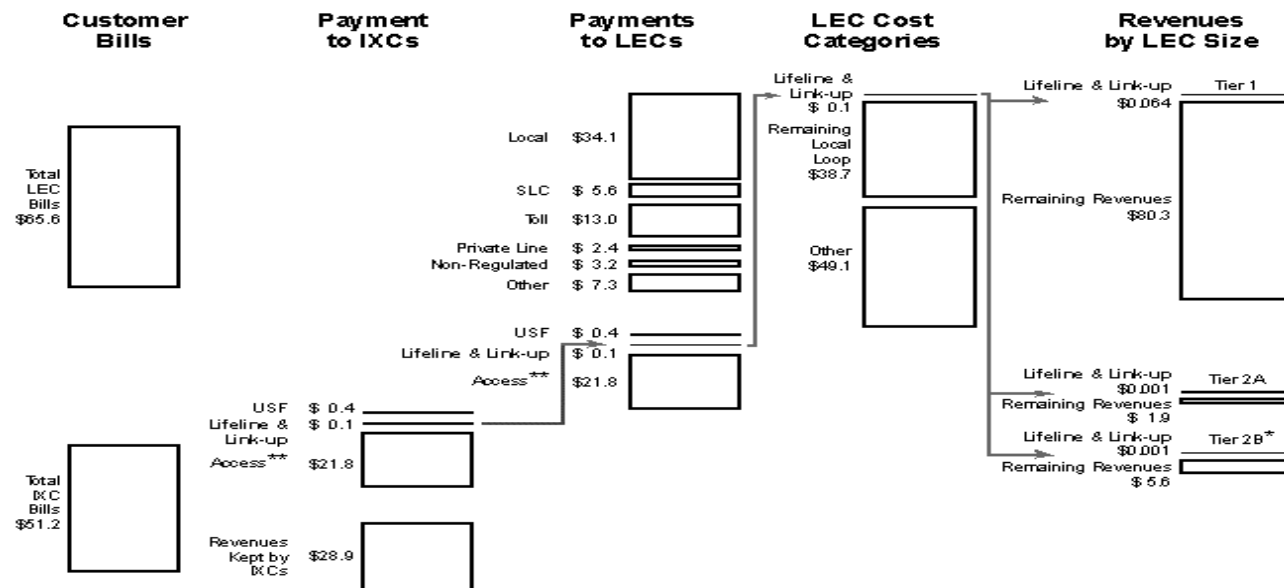
**Figure 17** illustrates a support mechanism with a completely different cash flow. LTS keeps IS CCLC prices down for LECs that choose to receive this assistance through the NECA

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<sup>10</sup> To be specific, the mechanism is for companies with study areas with less than 50,000 lines. A study area is a geographic boundary determined by the FCC. A study area generally is a LEC's operating territory within a state.

**Figure 13**  
**Cash Flow: 1989 Lifeline and Link-up**

Dollars in billions



**Lifeline & Link-up**

Provides assistance to low-income subscribers by reducing the rates associated with basic local service. The Lifeline program reduces the Subscriber Line Charge (SLC) and the basic local service charge. The Link-up program reduces the initial charge for connecting basic local service. This assistance is paid by IXC customers as part of the prices for IXC services and other state services.

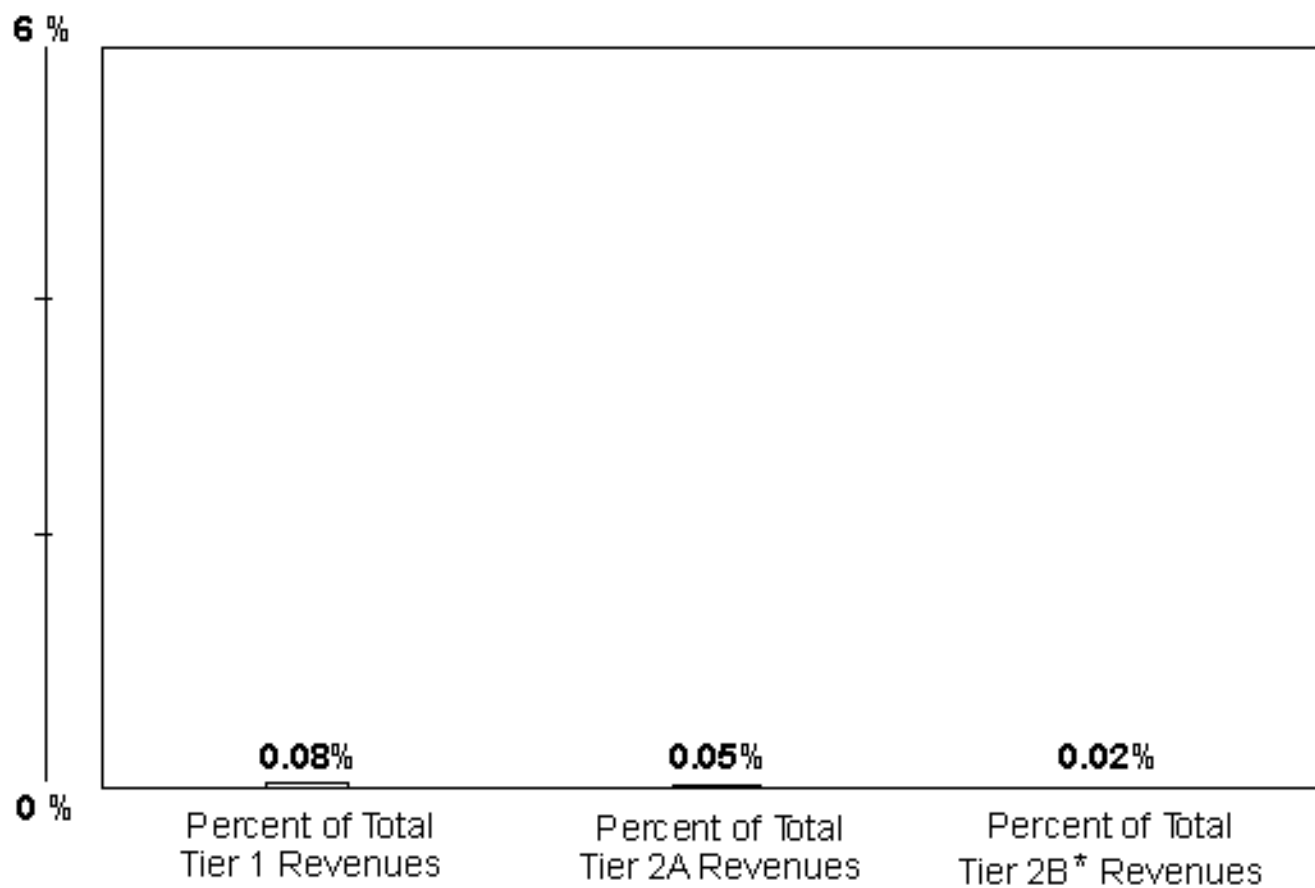
**Result**

This program keeps low-income subscribers from dropping off the telephone network as well as encouraging low-income households without service to connect to the network.

\*Primarily NECA pool companies.

\*\*Includes special

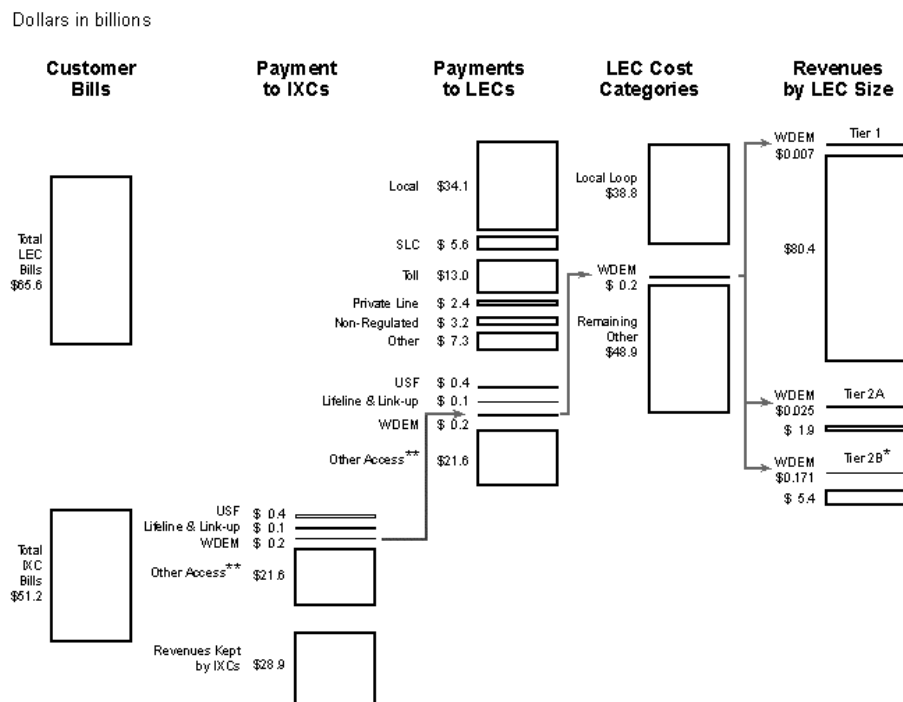
**Figure 14**  
**Percent of 1989 Revenues Recovered via Lifeline and Link-up Mechanisms by LEC Size**



\*Primarily NECA pool companies.

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**Figure 15**  
**Cash Flow: 1989 Interstate Weighted Dial Equipment Minutes (WDEM) Mechanism**



**Interstate Weighted Dial Equipment Minutes (WDEM)**

Allows small LECs (under 50,000 lines) to increase prices for interstate switching services provided to IXCs and allows state rates to be reduced.

**Result**

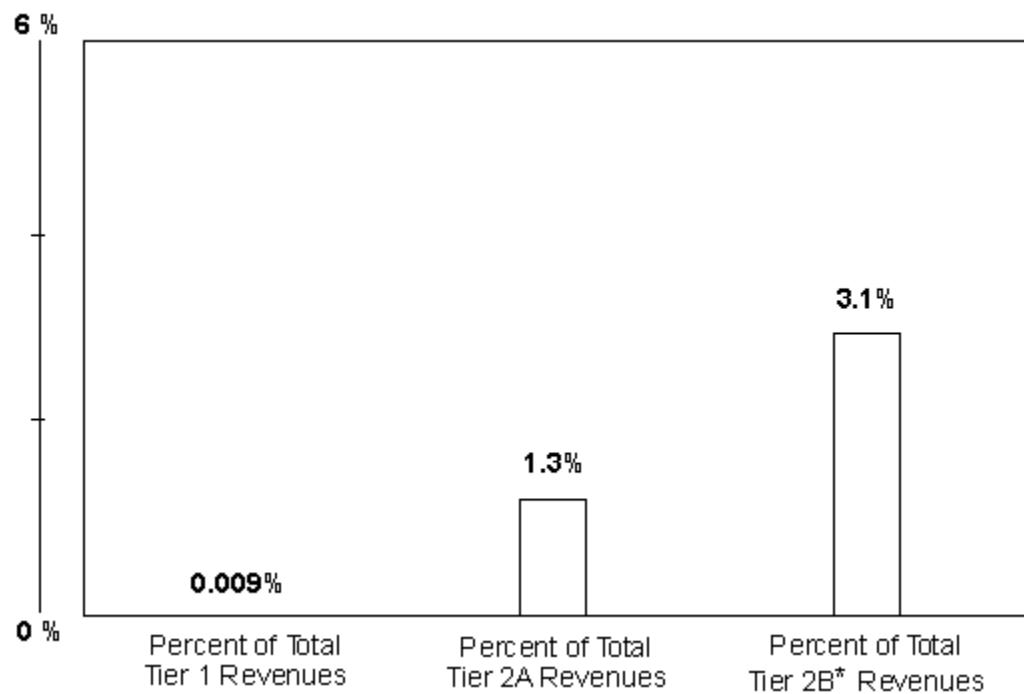
Provides assistance to small telephone companies (under 50,000 lines) for switching costs.

\*Primarily NECA pool companies.

\*\*Includes special

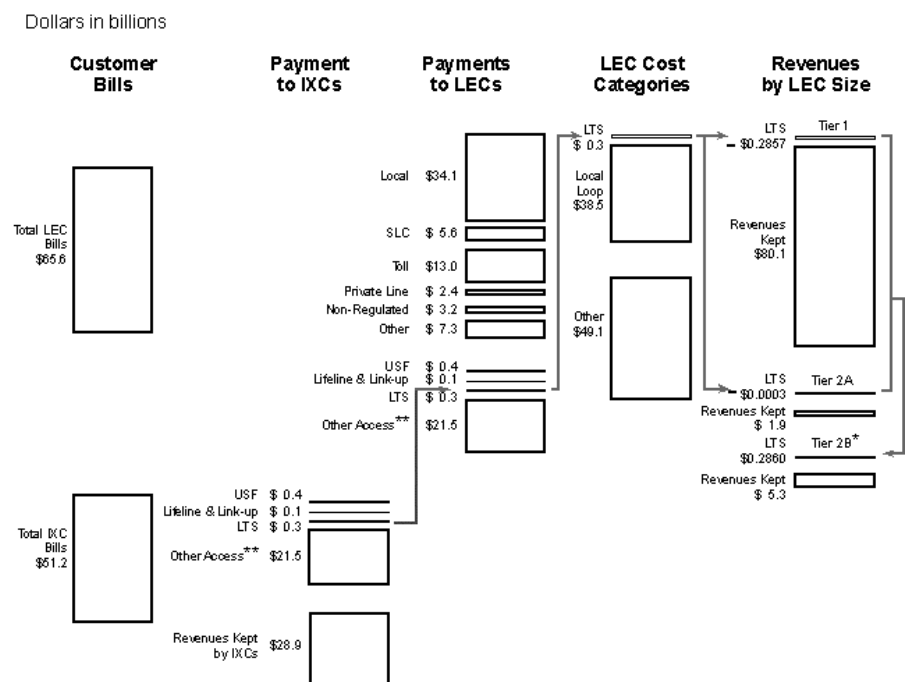
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**Figure 16**  
**Percent of 1989 Revenues Recovered via Interstate Weighted Dial Equipment Minutes (WDEM) Mechanism**



\*Primarily NECA pool companies.

**Figure 17**  
**Cash Flow: 1989 Interstate Long Term Support (LTS)**



**Long Term Support (LTS)**

Allows the NECA pool LECs to charge the nationwide average interstate CCLC rate to IXCs by sharing above average costs of pool members with other LECs. The CCLC rates charged to IXCs by these other LECs include LTS costs.

**Result**

Keeps CCLC rates competitive for the NECA pool companies.

\*Primarily NECA pool companies

\*\*Includes special

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## II. Modeling Support Mechanisms, cont.

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Common Line pooling process. Initially, the cash flow looks like some of the other mechanisms since it starts with the IXC payment to the LECs. However, the revenues then flow directly to Tier 1 and Tier 2A LECs. These companies in turn pass the money to NECA who distributes to the Tier 2B companies through a pooling process.<sup>11</sup>

This transfer of revenues is indicated by negative LTS dollar amounts for Tier 1 and Tier 2A LECs, a decrease in revenues for these LECs to produce "Revenues Kept," and positive LTS dollars for Tier 2B LECs. **Figure 18** emphasizes this transfer. Proportionally, LTS payments are very small amounts for Tier 1 and Tier 2A LECs. However, LTS payments are relatively large for Tier 2B LECs.

### Summary of Mechanisms

**Figure 19** summarizes the mechanisms from the cash flow diagrams. Because there is more conflict over whether SLC and IS CCLC are considered support mechanisms, these items are separate from the other support mechanisms.

Taken in total, the mechanisms discussed in this paper are important to all LECs, but they are more important to smaller LECs (**Figure 20**).

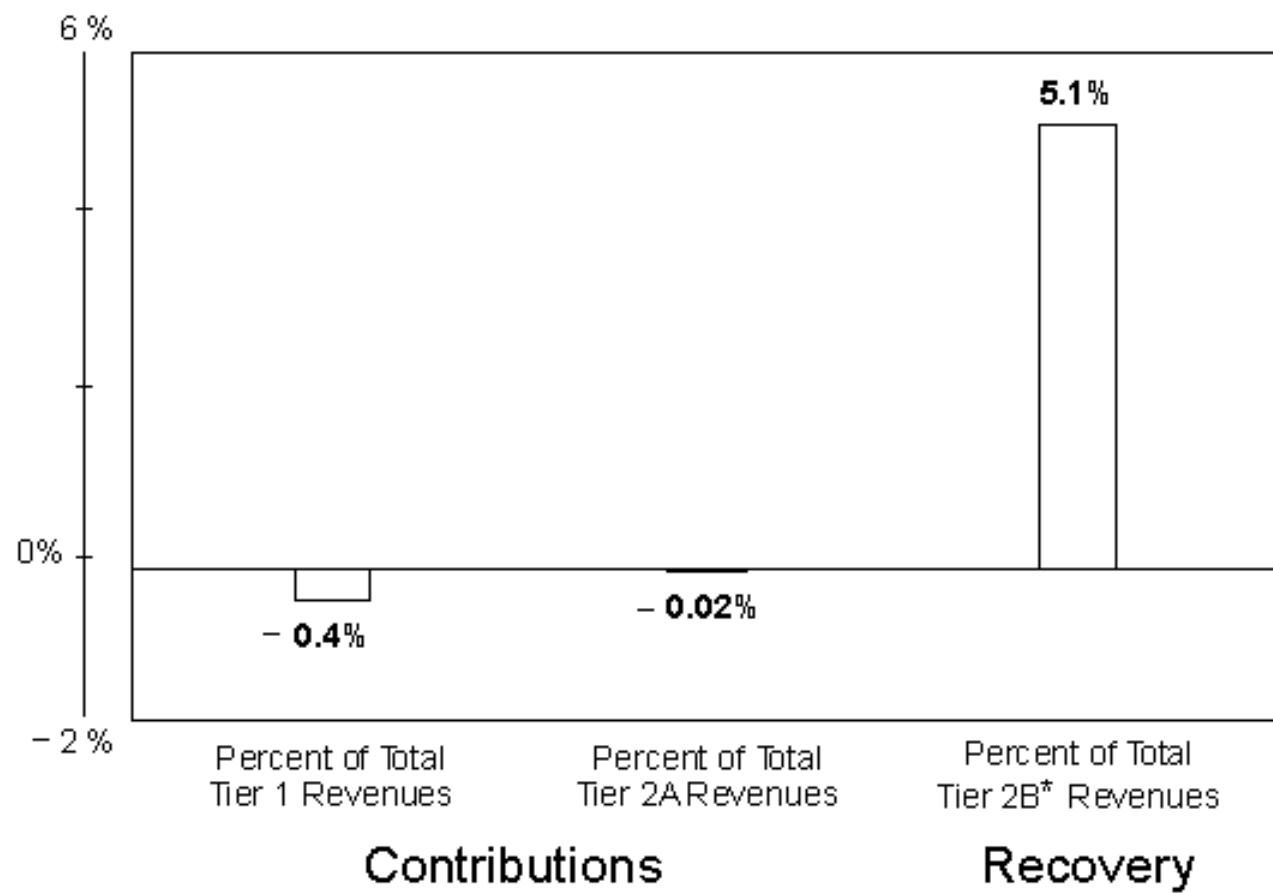
The charts in this paper illustrate just one piece of the whole picture. They exclude details on customers, such as those owning private networks.

In the past, all of the mechanisms described in this paper had specific purposes. Should these same public policy goals continue in the changing, more competitive environment? If not, what are the effects of dropping the goals and the mechanisms? Are there new goals? What other mechanisms might be appropriate?

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<sup>11</sup> These LECs are in a voluntary cost pool administered by NECA. The pooling process allows these companies to charge uniform CCLC prices and have the tariffs administered by NECA. LTS provides revenues to this pool so that the CCLC prices are kept low.

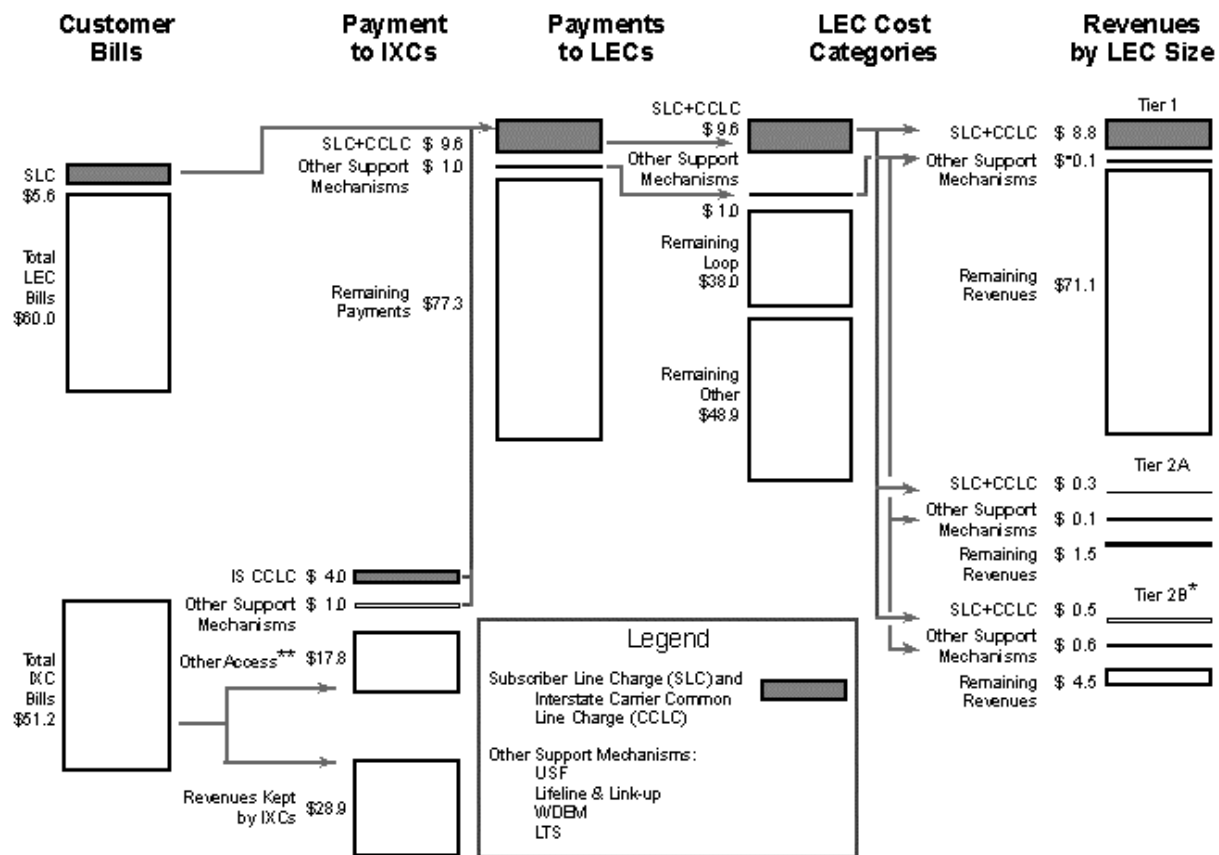
**Figure 18**  
**Percent of 1989 Interstate Long Term Support (LTS) Revenue Shift by LEC Size**



\*Primarily NECA pool companies.

**Figure 19**  
**Cash Flow Summary: Some 1989 Support and Other Mechanism**

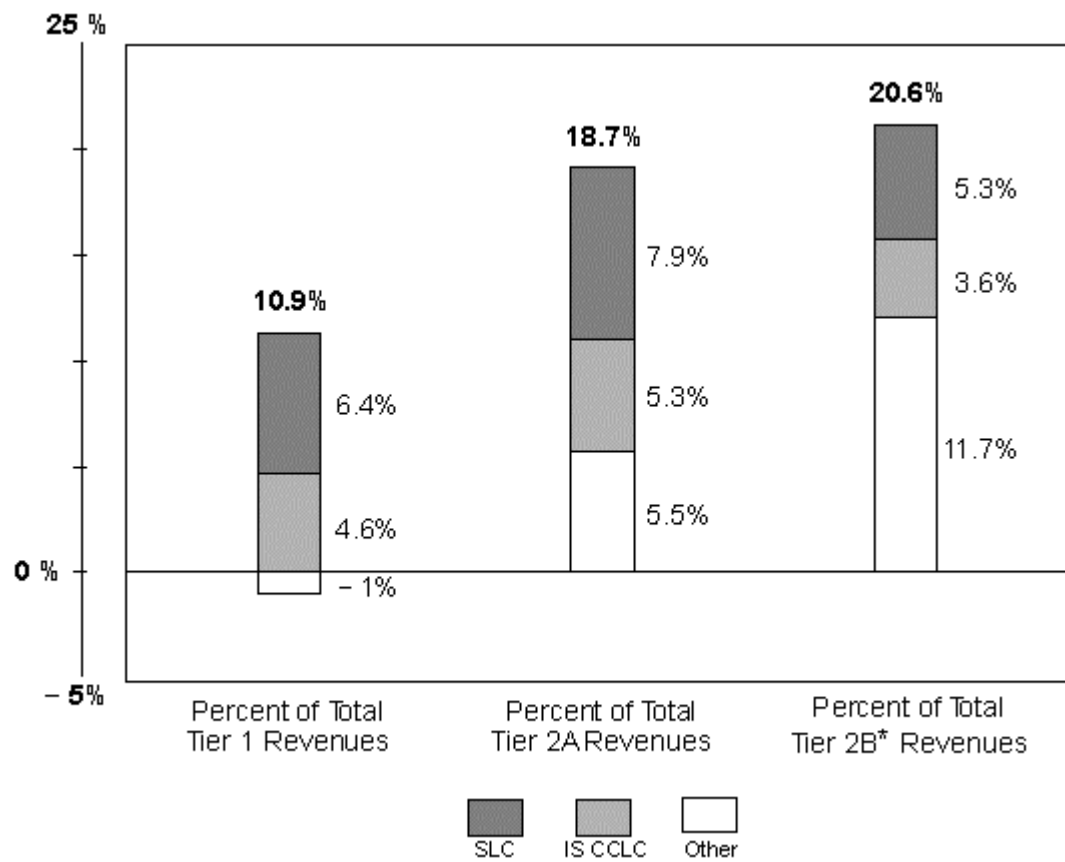
Dollars in billions



\*Primarily NECA pool companies

\*\*Includes special

**Figure 20**  
**Percent of 1989 Revenues Recovered from Some Support Mechanisms by LEC Size**



\*Primarily NECA pool companies.

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## **II. Modeling Support Mechanisms, cont.**

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If these same public policy goals continue, should there be additional goals? Should there be new mechanisms for the existing goals? For the new goals?

The remaining sections of this paper walk through some potential alternatives for support mechanisms and identify other issues.

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### III. Approach to Develop Alternatives

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#### Developing Alternatives

In general, potential alternatives to the traditional telecommunications industry structures fall under four headings:

- Support mechanisms: potential revisions and alternative recovery methods.
- Competition in the regulated environment.
- New technology and its effect on cost.
- Balancing short and long term regulatory approaches.

The previous sections of this paper set the stage for modeling alternatives to the current support mechanisms. This is just one issue that needs to be examined in the near future. The objectives are as follows:

- Identify potential issues for future analysis.
- Discuss some alternatives for selected issues.

The next sections broaden the focus of the research beyond costs to include the transition from the current regulatory environment to an alternative structure that has more competition.

In each of the remaining sections, issues are briefly defined and followed by representative questions and potential alternatives. These issues are under consideration for future analysis by this project.

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## IV. Support Mechanisms: Potential Revisions and Alternative Recovery Methods

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### Targeting and Recovery Methods: Definition of Issues

The current regulatory environment encompasses a wide variety of support mechanisms as indicated by the list in **Figure 1**. In the changing environment of competition and new technology, it may be necessary to examine the intent of these methods and to revise, eliminate, or redefine them.

### Targeting and Recovery Methods: Representative Questions and Alternatives

What are the support mechanisms? What are the purposes? What are the effects? What is the current level of support, and what changes should be made, if any?

What mechanisms can be easily identified, such as assistance to low-income households, and what mechanisms are more difficult to determine, such as rate averaging?

Who should benefit from a specific support mechanisms?

Supports may be targeted to specific groups. There are a number of ways to define the group receiving a particular benefit. Conversely, does a particular benefit place another group at a disadvantage? A group may refer to a company, a type of customer, a specific service, or a geographic territory. For example, USF is currently targeted at companies with higher than average loop costs.

What is the appropriate method for funding support?

Customers of the regulated telephone industry have funded a number of support mechanisms. Customers of competitors, such as alternative providers or cable television companies, have not. Even within the telephone industry, some companies and some customers for specific services pay for support while others do not.

Changes in support mechanism might include some of the following:

- Elimination of rate averaging and revised targeting for supports, insuring that all customers of telecommunications services and alternative service providers (cable

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## IV. Support Mechanisms: Potential Revisions and Alternative Recovery Methods, cont.

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television, private networks, computer companies, etc.) contribute to the supports in an equitable manner.

- Treat portions of existing networks, such as a portion of the loop, in a manner similar to other public utilities. Electric and water utilities provide main wires and pipes through their territories. It is up to the building contractor or owner to pay for the construction and maintenance of individual hook-ups to these main routes. For example, electrical wiring inside a building is covered by mortgage or by rent.
- Target taxes to provide support – for example, levy taxes on all telecommunications equipment, both foreign and domestic. Generally, existing taxes on traditional telephone industry bills support the federal and state treasuries and not specific telecommunications policies. The resulting revenues might contribute support for residential services from telephone, cable television, cellular, or personal communication service (PCS) providers.
- Make selected supports part of the traditional welfare assistance programs.
- Eliminate some or all of the existing support mechanisms.

### Carrier of Last Resort: Definition of Issues

The carrier of last resort is expected to provide telephone service to customers within its territory regardless of the cost of providing that service. There is a question of how to define the carrier of last resort obligations. The introduction of competition has exacerbated the question of who will provide services to those geographic areas or customers where profits are minimal.<sup>12</sup> Before competition, the traditional telephone industry used rate averaging to meet the needs of these customers. If averaging is not desirable for all areas, further examination of this issue may be required. This issue is closely linked to competitive issues.

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<sup>12</sup> In 1949, the *Amendment to the Rural Electrification Act of 1936*, Pub. L. No. 423, 63 Stat. 948 (1959). Congress Provided low interest loans (at 2%) for the development of telephone service in remote areas. The House Report accompanying this amendment stressed the need for universal service, calling it "area service", Weinhaus, *Behind the Telephone Debates*, Figure 17.1, page 158.

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## IV. Support Mechanisms: Potential Revisions and Alternative Recovery Methods, cont.

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### Carrier of Last Resort: Representative Questions and Alternatives

What is the definition of a carrier of last resort? Are they necessary? If yes, what services are they required to provide? Are there alternative systems?

If the last provider of service in a given market fails or withdraws, who will provide service? What are the incentives to attract another carrier? What is the balance between these incentives and the creation of barriers that prohibit the entry of competition?

One incentive may be a charge by a company which must stand by and be ready to serve upon request. This provides customers the ability to receive full capacity upon demand. Another incentive could be a direct support payment to the company that is standing by.

In other industries – railroad, airlines, and bus – deregulation or revised policies have led to loss of service for high cost routes or for non-profitable areas. Could this pattern repeat itself in the telecommunications industry? What incentives might prevent this?

What are the acceptable penetration rates for basic service? Are there other methods of measuring these levels beside the current standard of percentage of households? For example, population might be stratified by income levels, geographic areas, telephones per square mile, telephones per person, telephone numbers per person, quantity of customer premises equipment (CPE, such as telephone, fax, modem, etc.), or location of CPE.

What are the service requirements a customer can expect?

There are a number of customer requirements which need to be defined. These include maximum rates, minimum levels of service, quality of service standards, and standards for connecting equipment. For example, minimum levels of service might be defined as basic local service.

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## **IV. Support Mechanisms: Potential Revisions and Alternative Recovery Methods, cont.**

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### **Is there a difference in the definitions among carriers?**

Do the traditional company definitions apply to the carrier of last resort? For example, small telephone companies have been allowed to provide cable television services to compensate for the lack of providers. In the future, what if any restrictions should apply to provider of last resort services? Theoretically, a satellite company could provide local telephone, cable television, and long distance services.

What are the quality of service requirements? What are the minimum levels of service?

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## V. Competition in the Regulated Environment

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### Impact of Competition: Definition of Issues

Competition is in direct conflict with the regulatory policies established for the traditional telephone industry in the 1930s and 1940s.<sup>13</sup> Many of the regulatory proceedings, such as the FCC's interconnect and transport dockets,<sup>14</sup> are beginning to examine the many issues associated with the shift to a competitive marketplace.

### Impact of Competition: Representative Questions and Alternatives

How do various forms and amounts of competition affect the regulatory processes?

In some cases, such as the long distance carrier market, regulatory decisions facilitate competition. However, technological advances are outstripping established industry and regulatory boundaries. The pattern of telecommunications markets consists of those with some forms of competition and those with no competition. The extreme alternatives range from the elimination of all regulatory requirements to expanded oversight of unregulated industries.

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<sup>13</sup> For history, see Weinhaus, *Behind the Telephone Debates*.

<sup>14</sup> For more information on regulatory actions on interconnection, see *Expanded Interconnection*, June 6, 1991; and FCC Order No. 92-441, Oct. 16, 1992.

Also, see CC Docket No. 85-229, *Amendment of Sections 64.701 of the Commission's Rules and Regulations (Third Computer Inquiry)*, FCC Third Report and Order, July 3, 1986; and CC Docket No. 91-346, *Intelligent Networks, Notice of Inquiry*, 6 FCC Rcd 7256, December 6, 1991.

For more information on transport which covers the use of interoffice facilities, see CC Docket Nos. 78-72 and 91-213, *Transport Rate Structure and Pricing*, FCC Order and Further Notice of Proposed Rulemaking, 6 FCC Rcd 5341, August 30, 1991.

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## V. Competition in the Regulated Environment, cont.

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One alternative is two sets of guidelines – one for competitive markets and the other for non-competitive ones. How do support mechanisms fit into this environment? Are there different guidelines for rural and urban areas? Technology is blind to current regulatory boundaries: federal and state authority for the telephone companies; federal, state, and municipal authority for cable television companies. Are there more suitable methods of reconciling jurisdictional differences?

Do the existing accounting and cost structures hinder the development of competition?

Current regulatory rules apply to selected companies or portions of the communications industry. In examining existing rules, two factors need to be balanced. First, new market entrants need to be protected from anti-competitive behavior from existing service providers. Second, the rules governing existing service providers send market signals that encourage inefficiency.

Should cost allocation systems be used? If no, how should prices be determined? If yes, where should they be applied?

What is the treatment of telephone numbers in a competitive environment? Who owns the telephone numbers?

What is the balance between public and private networks? Partnerships?

### **Impact of Deaveraging: Definition of Issues**

In the traditional telecommunications industry, the public switched network (PSN) was accessible to all customers with averaged nationwide, statewide, or citywide rates. Tension arose from those customers with high-volume traffic to create their own

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## V. Competition in the Regulated Environment, cont.

---

networks, resulting in a loss of revenues to the PSN.<sup>15</sup> This deaveraged the prices paid for telecommunications services. Similar trends are now appearing in local telecommunications markets. For example, the FCC's transport proceeding is a direct result of pressures by high-volume customers and their carriers for lower rates.<sup>16</sup> In addition, non-traditional service providers (competitive access providers, or CAPs) have entered some large metropolitan markets. What is the balance between the needs of nationwide interconnected networks accessible to all customers and the needs of high-volume, potentially lower-cost customers?

### Impact of Deaveraging: Representative Questions and Alternatives

What are the reasons for deaveraging? Is it value of service? Is it pressures from competition? Is it availability of similar services?

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<sup>15</sup> Weinhaus, *Behind the Telephone Debates*, pages 138-139. : "A...Factor building momentum for competition was the system of price-averaging set up by the traditional monopoly and reinforced by the regulatory system. The cost pressures facing high-volume users clashed directly with the cost pressures driving the PSN. In theory, the traditional industry could have built and operated a tailored system more cheaply than even the most communications-intensive customers. However, in the universal PSN, communications-intensive customers helped cover the costs of low-density, high-cost routes – primarily residential and rural services. As seen by an engineer in a communications-intensive company surrounded by changing technology, the cost of building high-density routes decreased without a corresponding decrease in the traditional industry's prices for these routes. As seen by the traditional industry, price averaging, reinforced by regulators, resulted in price inflexibility."

<sup>16</sup> For earlier papers on the transport issue written by project participants, see Carol Weinhaus, Mark Jamison, et al., *New Wine and Old Wineskins – Modeling Effects of Competition and Expanded Interconnection in the Local Exchange*, Program on Information Resources Policy, Harvard University, Cambridge, MA, July 27, 1992; Weinhaus and Jamison, *Examples of Modeling – Transport and Other Issues*, July 21, 1992; and Weinhaus and Seaver, *An Example of Modeling an Issue – Transport: Equal Charge for Equal Unit of Traffic*, April 19, 1991.

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## V. Competition in the Regulated Environment, cont.

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### What are the impacts of deaveraging?

Traditionally averaging has provided support for targeted customers, services, and companies. Existing alternatives and the entrance of new competitors are accelerating pressures to deaverage more services. At what point do these pressures lead to loss of market share, increased rates for remaining customers, and decreased investment in high cost areas? What role do existing regulatory rules play?

If some form of financial support is to continue, what are the appropriate mechanisms in a competitive environment?

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## VI. New Technology Deployment and Its Effect on Costs

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### **New Technology Deployment: Definition of Issues**

New technology deployment is affected by capital recovery mechanisms, competitors placing new technologies, alternative forms of regulation that do not ensure cost recovery, demand for services, investor and shareholder requirements, and infrastructure objectives. What is the balance between customer rates, investor requirements, company viability, and regulatory policies?

### **New Technology Deployment: Representative Questions and Alternatives**

How should the introduction of new technology be handled and deployed into the network? Who pays? How should it be funded – capital markets, ratepayers, etc.?

What methods of recovery of embedded investment allow for new technology deployment?

The alternatives depend on the viewpoint of the affected parties: traditional and non-traditional companies, regulated and non-regulated companies, regulators, large and small customers, and shareholders. Other aspects include the examination of pricing strategies, costing definitions (incremental, fully distributed, or some other method), and volume of equipment deployment. The replacement of old or out-dated facilities must be balanced or handled in an equitable manner.

What are the pressures from customers and competitors for new technology deployment?

For example, what occurs if a new service, cellular or PCS, bypasses the wire-line facilities? How does a company balance the introduction of new technology versus staying with currently deployed technologies?

What is the impact of various transmission technologies?

These technologies include spectrum allocation, narrowband, wideband, and broadband capabilities, and the uncoupling of content and transmission paths for all providers.

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## VI. New Technology Deployment and Its Effect on Costs, cont.

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How many points of interconnection should a company be required to provide?

There is a balance between the cost incurred by the companies and passed on to the ratepayers and the need for interconnection with other networks. On one hand, if the platforms for interconnection are too large, then the prices for services rise accordingly. On the other hand, if the platforms are too small, there are not enough ports for competitors, security agencies, or other utilities.

Does the definition of the telecommunications network as it exists today need to expand from a monopolistic to a multi-provider viewpoint?

What incentives does a company have to deploy new technology under rate of return regulation?

Rate of return regulation provides an incentive to invest, but does not provide a very strong incentive to direct the investment towards efficiency or new revenues. Other forms of regulation, such as price caps, have fewer incentives to invest, but the incentives are more directed. At the same time, customer and competitive pressures may encourage a company to deploy new technology. Is there a better framework that encourages new technology deployment other than this approach?

Changes in technology no longer occur at thirty-year, twelve-year, or even five-year intervals. There is no longer the luxury of waiting to see the trend before acting. The rapid pace of technological change is erasing barriers between previously separate industries such as CATV, telephone companies, and newspapers. The need to continually deploy new technology to meet customer needs and new competitors may force consolidations among all companies involved.

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## VII. Balancing Short and Long Term Regulatory Approaches

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### Quick Fixes and Long Term Policies: Definition of Issues

There are two requirements facing telecommunications policy makers. First, short term decisions must be made regardless of whether or not a long term framework exists. Second, will there be long term solutions, given the volume and intensity of short term decisions? The key is to have short term decisions be part of a transition to long term solutions.

### Quick Fixes and Long Term Policies: Representative Questions and Alternatives

In what direction should the telecommunications industry be proceeding? Where should the telephone companies and the competitors place themselves strategically? Will there be competition, partnership, mergers, or some combination? What types of companies will survive the transition?

What are the long term policy goals? What balance should be achieved between public policy goals, competition, and new technology?

Short term decisions should be made in the context of long term needs. If there are no long term policy goals, or if these goals exist but there are no transition plans, then the short term decisions may produce undesirable results in the long run.

What controls should be applied to the LECs? Should limitations be applied to all other competitors?

Should minimum quality of service be established for the various services that must be met by all providers?

What is the impact of dismantling the local monopoly?

What should be the new pricing system, if one is needed? What should be the transition from the current system to one that is more consistent with universal service, competition, interconnection, and infrastructure development?

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## VIII. Summary

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### Summary

The questions raised in **Sections IV through VII** arise from current issues that will not go away. Changes in technology continue to lower the barriers to entry for providing telecommunications services. Not only does this open the telecommunications market to competition, but it brings in competitors with very different cost structures than the traditional participants. In turn, these new entrants effect the traditional telecommunications industry structure.

Therefore, change is inevitable. Competition (as indicated in **Figure 3**) will continue, and advancing technology will further complicate this competitive environment. All this affects the traditional telecommunications industry structure.

At the same time, the traditional structure contains public policies that many customers and companies depend on. For example, the mechanisms discussed in **Section II** of this paper provide support infrastructure development and for keeping prices for telephone services reasonable. Some mechanisms provide assistance for low-income households.

The rules and regulations of the traditional structure apply to some companies but not to others. Furthermore, even within this structure, there are variations as to which customers pay for various public policies. Since change is inevitable, funding for these policies may no longer be possible if no adjustments are made to the regulatory structure.

All the stakeholders – customers, companies, regulators, and legislators – need to determine whether their objectives are best served by letting current events run their course or by altering the system.

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## IX. Appendix A: Calculations for Figures

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### Calculate Access Lines

Access lines:

1. Tier 1 access lines from ARMIS 43-01
  2. Tier 2A access lines from Tariff Review Plan (TRP) access filings
  - Sum of:
  3. Tier 2B access lines from TRP access filings
  4. NECA access lines from TRP access filings
- to produce an industry total of access lines, number of access lines by LEC size, and calculate percentages by LEC size.

### Calculate Common Line and Other Revenue Requirements

*To calculate a revenue requirement per line and distribute across Tier 1, Tier 2A, and Tier 2B/NECA LECs:*

5. Tier 1 LEC total revenue requirement from ARMIS 43-04.
6. NECA LEC total revenue requirement from cost studies.
7. Tier 1 LEC revenue requirement (Line 5) divided by Tier 1 number of access lines (Line 1).
8. NECA LEC revenue requirement (Line 6) divided by NECA number of access lines (Line 4).
9. Develop an average cost per line based on Tier 1 and NECA LECs by dividing the sum of Lines 7 and 8 by 2.
10. Develop Tier 2A revenue requirement by multiplying Tier 2A access lines (Line 2) by the average cost per line (Line 9).
11. Develop Tier 2B revenue requirement by multiplying Tier 2B access lines (Line 3) by the NECA cost per line (Line 8).

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## IX. Appendix A: Calculations for Figures, cont

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*To calculate average schedule costs and NECA expenses:*

12. Total common line revenues from NECA COS1 (H), 1989.
13. Common line average schedule costs and NECA expenses, from NECA TRP COS1 (H), 1989.
14. Total switched revenues, from NECA TRP COS1 (H), 1989.
15. Switched average schedule costs and NECA expenses, from NECA TRP COS1 (H), 1989.
16. Total special revenues, from NECA TRP COS1 (H), 1989.
17. Special average schedule costs and NECA expenses, from NECA TRP COS1 (H), 1989.

*To distribute average schedule costs and neca expenses between common line and other categories:*

18. Develop a common line ratio (NECA cost exchange carriers, or ECs, to total) by first subtracting average schedule costs and NECA expenses (Line 13) from total common line revenues (Line 12). Then divide this result by total common line revenues (Line 12).
19. Develop an other cost ratio by dividing:  
(Line 14 + Line 16 - Line 15 - Line 17)/(Line 15 + Line 17).
20. Calculate common line NECA cost ECs by multiplying NECA total revenue requirements (Line 6) by the common line ratio of .485 (the percent common line of total access revenue requirements for the NECA pool).
21. Calculate other NECA cost ECs by subtracting NECA cost ECs from NECA total revenue requirements (Line 6).

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## IX. Appendix A: Calculations for Figures, cont

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22. Calculate NECA common line costs, including average schedule costs, by dividing NECA cost ECs (Line 20) by the common line ratio (Line 18).
23. Calculate NECA other costs, including average schedule costs, by dividing NECA cost ECs (Line 21) by the other ratio (Line 19).

*To split revenue requirements for common line and other cost categories by LEC size:*

24. Calculate Tier 1 common line costs by multiplying Tier 1 total revenue requirement (Line 5) times the common line ratio of .435 (the percent common line of total access revenue requirements for Tier 1 LECs).
25. Calculate Tier 1 other costs by subtracting Tier 1 common line costs (Line 24) from Tier 1 total revenue requirement (Line 5).
26. Calculate Tier 2A common line costs by multiplying Tier 2A revenue requirement (Line 10) times the common line ratio of .435.
27. Calculate Tier 2A other costs by subtracting Tier 2A common line costs (Line 26) from Tier 2A total revenue requirement (Line 10).
28. Calculate Tier 2B common line costs by multiplying Tier 2B revenue requirement (Line 11) times the common line ratio of .485.
29. Calculate Tier 2B other costs by subtracting Tier 2B common line costs (Line 28) from Tier 2B total revenue requirement (Line 10).

### Additional Revenue Requirements

30. Total USF revenues, full amount from NECA USF filing.
31. Calculate transition amount by multiplying the total (Line 30) by 5/8.
32. Long term support from NECA TRP COS1 (H), 1989.
33. Lifeline and link-up from NECA lifeline filing.

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## IX. Appendix A: Calculations for Figures, cont

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### Totals for Common Line and Other Revenues by LEC Size

34. Calculate common line total:  
(Line 22 + Line 24 + Line 26 + Line 28 + Line 31 + Line 32 + Line 33).
35. Calculate other total:  
(Line 23 + Line 25 + Line 27 + Line 29).
36. Calculate Tier 1 total for common line and other revenues:  
(Line 24 + Line 25).
37. Calculate Tier 2A total for common line and other revenues:  
(Line 26 + Line 27).
38. Calculate Tier 2B total for common line and other revenues:  
(Line 22 + Line 23 + Line 28 + Line 29 + Line 31 + Line 32 + Line 33).

### Development of LEC Revenues

39. Revenues for companies filing ARMIS 43-03 Reports (Tier 1 LECs).
40. Total number of access lines for these Tier 1 companies (Line 1).
41. Divide Line 39 by Line 40 to produce a ratio of revenues per access line for the Tier 1 LECs.
42. Total number of access lines for the LECs (Line 1 + Line 2 + Line 3 + Line 4).
43. Multiply ratio from Line 41 by Line 42 to produce total industry revenues.
44. Repeat steps in Lines 39 through 43 to develop SLC, Toll, Private Line, Non-Regulated, Other, and Access revenues.

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## IX. Appendix A: Calculations for Figures, cont

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### Development of SLC Revenues

45. Develop an average percentage of single-line business access lines to the total number of access lines from Line 42.
46. Develop an average percentage of residence access lines from Line 42, from the ARMIS 43-01 reports, from the FCC Schedules S-3 and S-4, and from NECA TRP data.
47. Multiply the sum of Lines 44 and 45 by the 1989 total number of access lines, Line 4, to produce the number of residential and single-line customers.
48. Multiply Line 46 by the maximum monthly SLC of \$3.50 times 12 to produce the SLC revenues for residential and single-line customers.
49. Subtract Line 48 from total SLC revenues developed in Line 6 to produce the revenues for multi-line business and special access surcharge customers.
50. Use percentages developed for number of access lines by LEC size (Tier 1, Tier 2A, and Tier 2B/NECA) to derive SLC revenues by LEC size.

### Ratio of Carrier Common Line (CCL)/Subscriber Line Charge (SLC)

51. Total SLC revenues from December 1988 filing for 1989.
52. CCL revenue requirement from December 1988 filing for 1989.
53. Develop a ratio of CCL (Line 52) divided by SLC (Line 51) Based on 1989 numbers.
54. Derive CCL revenue requirements based on ratio from 1989 prospective TRP access filing (Line 53) times SLC revenues (Line 50).

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## IX. Appendix A: Calculations for Figures, cont

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### Distribute CCL by LEC Size

55. Calculate Tier 1 CCL by multiplying CCL revenue requirements (Line 54) by Tier 1 percentage of access lines (Line 1).
56. Calculate Tier 2A CCL by multiplying CCL revenue requirements (Line 54) by Tier 1 percentage of access lines (Line 2).
57. Calculate Tier 2B CCL by subtracting the Tier 1 and Tier 2A CCL amounts (Line 55 + Line 56) from the total CCL (Line 54).

### Lifeline and Link-up by LEC Size

58. Percent of Tier 1 Lifeline and Link-up costs from data filed with the FCC.
59. Percent of Tier 2A Lifeline and Link-up costs from data filed with the FCC.
60. Percent of Tier 2B Lifeline and Link-up costs from data filed with the FCC.
61. Total Lifeline and Link-up costs from 1989 data filed with the FCC.
62. Multiply Tier 1 percent (Line 58) by total lifeline costs (Line 61).
63. Multiply Tier 2A percent (Line 9) by total lifeline costs (Line 61).
64. Multiply Tier 2B percent (Line 60) by total lifeline costs (Line 61).

### Total IXC Revenues

65. FCC, *Statistics of Communications Common Carriers*, 1990-1991 Edition, Washington, D.C., Table 1.3, page 6.

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## X. Appendix B: Background for LEC Cost Categories

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### Background on Loop Oriented Divisions in Cash Flow Charts

The flow charts in **Figures 7 through 19** focus primarily on loop costs because of the following:

- Telephone companies connect customers by means of lines to each subscriber, a switch or an operator to establish a path between the desired customers and the network which transports the call.

In order to maintain and promote universal service, most support mechanisms focus on the loop, also called subscriber line facilities. These include USF, Lifeline & Link-up, and LTS mechanisms. In addition, one view considers SLC and IS CCLC rates as further support.

- The WDEM mechanism assists the provision of modern switching facilities in territories of small telephone companies. The impact is to keep subscriber rates down.

The FCC has several dockets <sup>17</sup> which raise the possibility that other portions of the network may require new regulatory treatment. The transport issues fall under the category of averaging. There are three different viewpoints on the resolution of transport questions. One view considers these practices to be support which should be continued in some other form. In a second view, the support should disappear. The third view is that these practices are not support.

- Other support mechanisms for transport facilities are less easily identified and are under consideration by the FCC.

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<sup>17</sup> See *Expanded Interconnection* and *Third Computer Inquiry*.