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Federal Communications Commission
Office of Secretary

October 18, 1996

Mr. William F. Caton, Acting Secretary
Federal Communications Commission
1919 M Street, NW Room 222
Washington, DC 20554

Re: Ex Parte CC Docket 96-45 - Federal-State Joint Board On Universal Service

Dear Mr. Caton:

On Thursday, October 17, 1996, Michael Pelcovits met with Greg Rosston. The purpose of the meeting was to discuss MCI's position as stated in MCI's comments in this proceeding as well as discuss the Hatfield 2.2.2 and BCM proxy cost models. The attached document was used during the meeting and outlines the topics discussed.

Due to the late hour of the meeting two copies of this Notice are being submitted to the Secretary of the FCC in accordance with Section 1.1206(a)(1) of the Commission's rules the next business day.

Sincerely,

Kimberly M. Kirby

Kimberly M. Kirby

Attachment

cc: Greg Rosston

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List ABCDE

Hatfield Model v.2.2.2 & BCM2

Overview

- Properties of cost models to implement TELRIC costing principles
- Comparison of BCM2 and Hatfield 2.2.2
  - Comparison of engineering principles
  - Comparison of inputs and outputs
  - Comparison of models' operation and format
- Conclusions

TELRIC Principles endorsed by FCC

- Forward-looking technology
- Existing network topology
- Total demand considered
- No embedded cost
- No subsidy cost
- Reasonable allocation of joint & common costs

Forward-looking technology

Hatfield

- Combination of copper and integrated DLC on fiber in loop plant
- Digital end office switching
- Digital tandem switching
- Fiber interoffice transport
- SS7 signaling

BCM2

- Uses copper and non-integrated DLC (not forward-looking)
- Digital end office switching
- Interoffice network not explicitly modeled

Existing network topology

Hatfield

- Uses existing wire center locations
- Uses existing tandem locations
- Uses existing STP locations

BCM2

- Uses existing wire center locations
- Does not model interoffice network
- Does not model signaling system

Total demand considered

Hatfield

- Considers both usage (minutes) and non-usage sensitive (lines) demand for all res and bus narrowband services
  - local
  - intraLATA toll
  - switched and special access
  - public telephone
  - operator services

BCM2

- Considers demand only for res and bus local service
- Considers only demand for lines --demand for usage-sensitive network elements (minutes) not modeled

No embedded cost

Hatfield

- In some cases, embedded expenses are adjusted to forward-looking view (*e.g.*, network operations)
- Incremental cost information used wherever available
- Where not available, expenses developed based on historical relationship between expenses and investment

BCM2

- *All* expenses other than switching, circuit eqpt, cable & wire are embedded per-line expenses
- Some cost categories developed through use of ratios of expense to investment

Reasonable allocation of joint & common

Hatfield

- Shared (general support, plant non-specific) costs assigned to network elements based on proportion of direct costs
- Costs common to all services are captured within the 10% markup

BCM2

- Embedded joint and common costs are assigned on a per-line basis

Calculation methodology

Hatfield

- Calculate loop investment from bottom up
- Compute monthly capital carrying cost by explicit calculation of annual depreciation, return, and tax on return
- Calculate direct plant/state/density zone-specific support expense
- *Repeat* for all network elements
- Add in network support expense
- Add in corporate operations and operating tax expense

BCM2

- Calculate loop investment from bottom up
- Compute *aggregate* monthly carrying cost of depreciation, return, taxes, plant-specific and nonspecific support expenses by multiplying by three *national* ARMIS-generated factors
- Repeat only for switching element
- Add in national $133/year factor to collect costs of *all other elements* and *all other types of expense*

Blackbox factors drive BCM 2

- Five national ARMIS-derived factors drive BCM 2's calculations in every LEC in every state and density zone, and for every network element

0.232761	Factor 1 for cable & Wire Facilities
0.242411	Factor 1 for circuit Facilities
0.257033	Factor 1 for Switching facilities
133.391	Factor 1 for other loading per line served
0.75	Allocation Factor 1 applied to non-plant related expenses

- These factors incorporate all depreciation, return, tax, operational support, etc. expense -- without any algorithm allowing their components to be decompiled and examined
- No state, LEC, or technology variation is permitted

Comparison of models

- Both models build on BCM1 for design of loop plant, and make comparable modifications to BCM1
  - Separate development of cable and structure costs
  - Variable number of distribution cables
  - Separate development of DLC fixed and per-line costs

Loop - Differences

- BCM2 adjustment for population distribution in rural CBGs is incorrect
  - CBG land area reduced by overlaying road network
  - Reduced area collapsed to a smaller square
  - Result is understatement of length of cable runs
- BCM2 over-engineers distribution plant
  - multiple fiber runs into some CBGs to avoid very long copper loops
  - problem can be solved in more efficient way through use of range extenders

Switching - Differences

- BCM2 considers only line demand on switch
- Hatfield considers actual busy hour traffic (based on res/bus mix) and line demand on switch, and sizes switch appropriately
- BCM2 does not limit size of switch, can lead to understatement of switching cost
- Hatfield places upper limit on switch size, installs second switch in wire center if limit exceeded

Interoffice - Differences

- BCM2 does not model interoffice network
  - Investments simulated by applying 3% factor to switching investment
  - No modeling of SS7 network, dedicated and common transport, tandem switching, operator systems, switched access and toll traffic
- Hatfield develops interoffice network costs by modeling all traffic between end offices and tandems
  - Transmission plant, SS7 links, STPs, SCPs and operator systems built from the "ground up"
  - Sized to serve actual DEM, call attempt and busy hour loads

Loop Inputs & Outputs - where are the significant differences?

- Fill factors
  - Default values in both models are very similar
- Structure percentages
  - BCM2 uses very little aerial cable - from 10% to 30%
  - Hatfield uses 50% to 65% aerial
- Structure sharing
  - BCM2 assigns all investment in poles, trenches and conduit to telephony
  - In actuality, these structures are shared between telephony, electric transmission, electric distribution, CATV, CAPs, cellular, private networks, etc.
  - Hatfield assigns 1/3 of total structure to telephony

Operation and Format of Models

- Both models have user-friendly interface, automated operation
- Both models permit specification of large number of inputs (400+ for Hatfield, vs. 200+ for BCM2)
- Both models display and save intermediate calculations and intermediate outputs

Operation and Format of Models

- BCM2 is less flexible on key input parameters
  - Important variables such as depreciation, return, taxes, customer operations and overhead are lumped together in a single number.
  - None of these expense categories are user-adjustable without extensive off-line calculations
- BCM2 uses nationwide expense data measured across all Tier 1 LECs
- Hatfield uses plant category and expense data that are specific to each study area

Input Comparison

Transport Investment	
Terminal Investment	
Number of Fibers	24
FOT capacity, DS-3s	12
FOT fill	0.8
FOT, installed	$43,000.00
Pigtails	$80.00
Panel	$1,000.00
EF&I, per hour	$55.00
EF&I units	32
Medium Investment	
Fraction of structure assigned to telephone	0.33
Fraction of structure shared with feeder	0.25
Distance, mi.	41
Regenerator spacing, mi.	40
Regenerator investment, installed	$15,000.00
Fiber Cable investment per foot	$2.00
Placement	$2.00
Splice Spacing, ft.	20000
Splice Cost	$15.00
Trenching per foot	$45.00
Resurfacing per foot	$10.00
Conduit per foot	$4.00
Number of tubes	2
Manhole investment	$5,000.00
Manhole spacing	1000
Buried installation per foot	$5.00
Pole investment	450
Pole spacing	150
Underground percent	35.00%
Buried percent	50.00%
Aerial percent	0.15

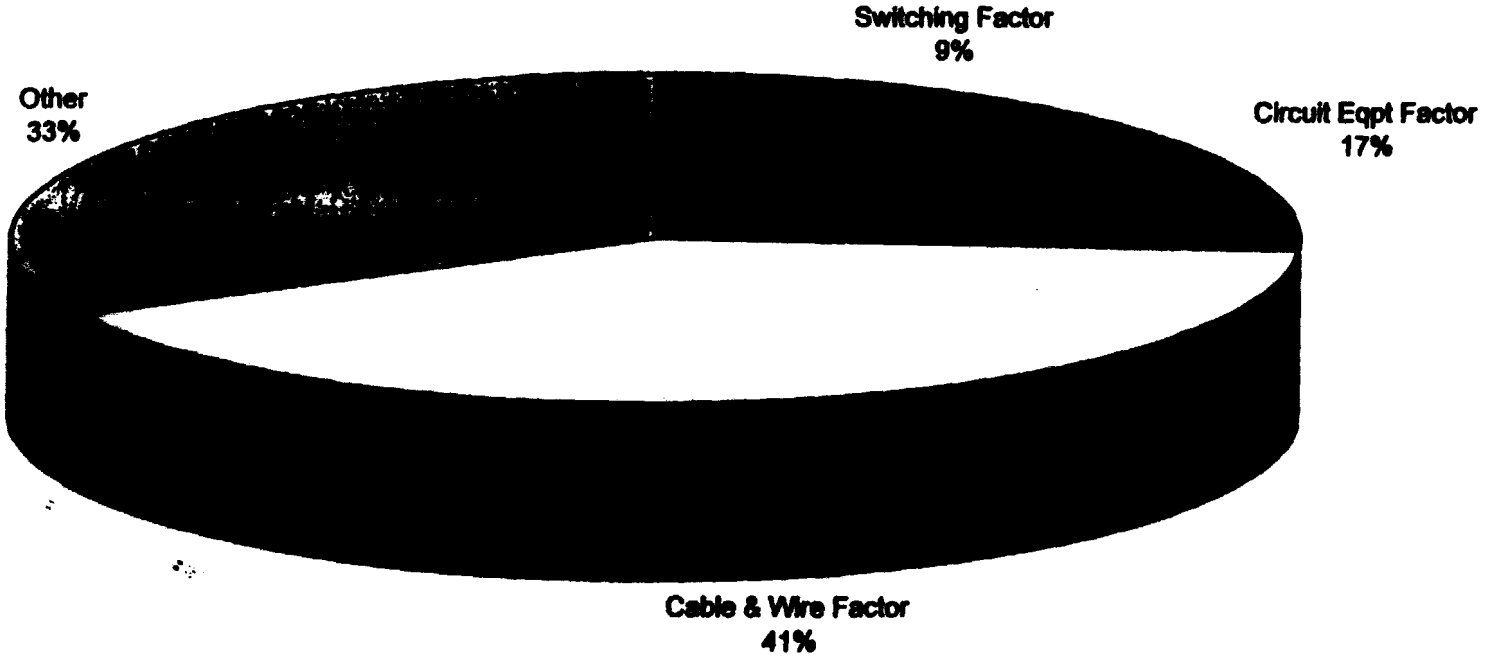
and much more in Hatfield is lumped into a *single* number in BCM2

0.03 times switch investment

BCM2 Expense Development

- BCM2 applies factors to three broad categories of plant; these cover:
  - return
  - Federal, State, & Local Taxes
  - Plant-Specific Expenses
  - Plant Non-specific Expenses
  - Depreciation
- Additional $100/line added to cover local allocation of:
  - customer operations
  - corporate operations
  - other depreciation/amortization
- All expenses lumped into 3 plant factors plus 1 per-line factor

BCM Expense Development

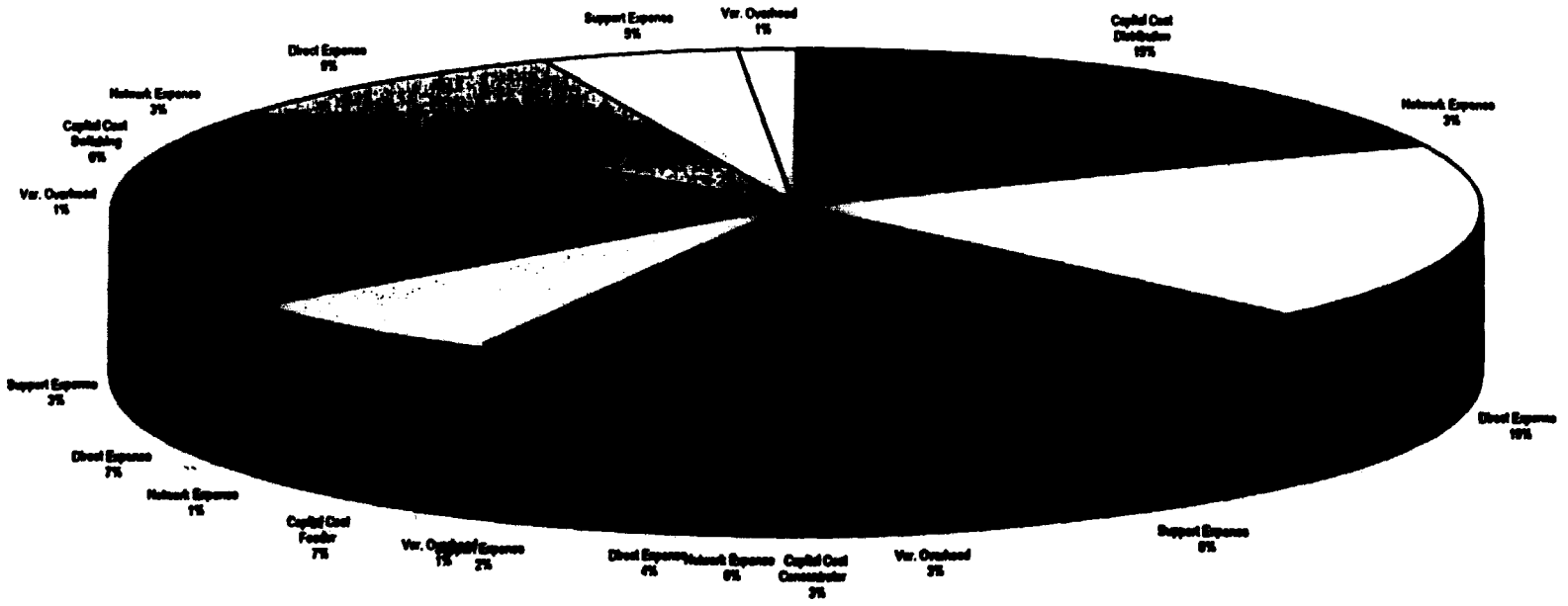


BCM2 breakdown of total expenses

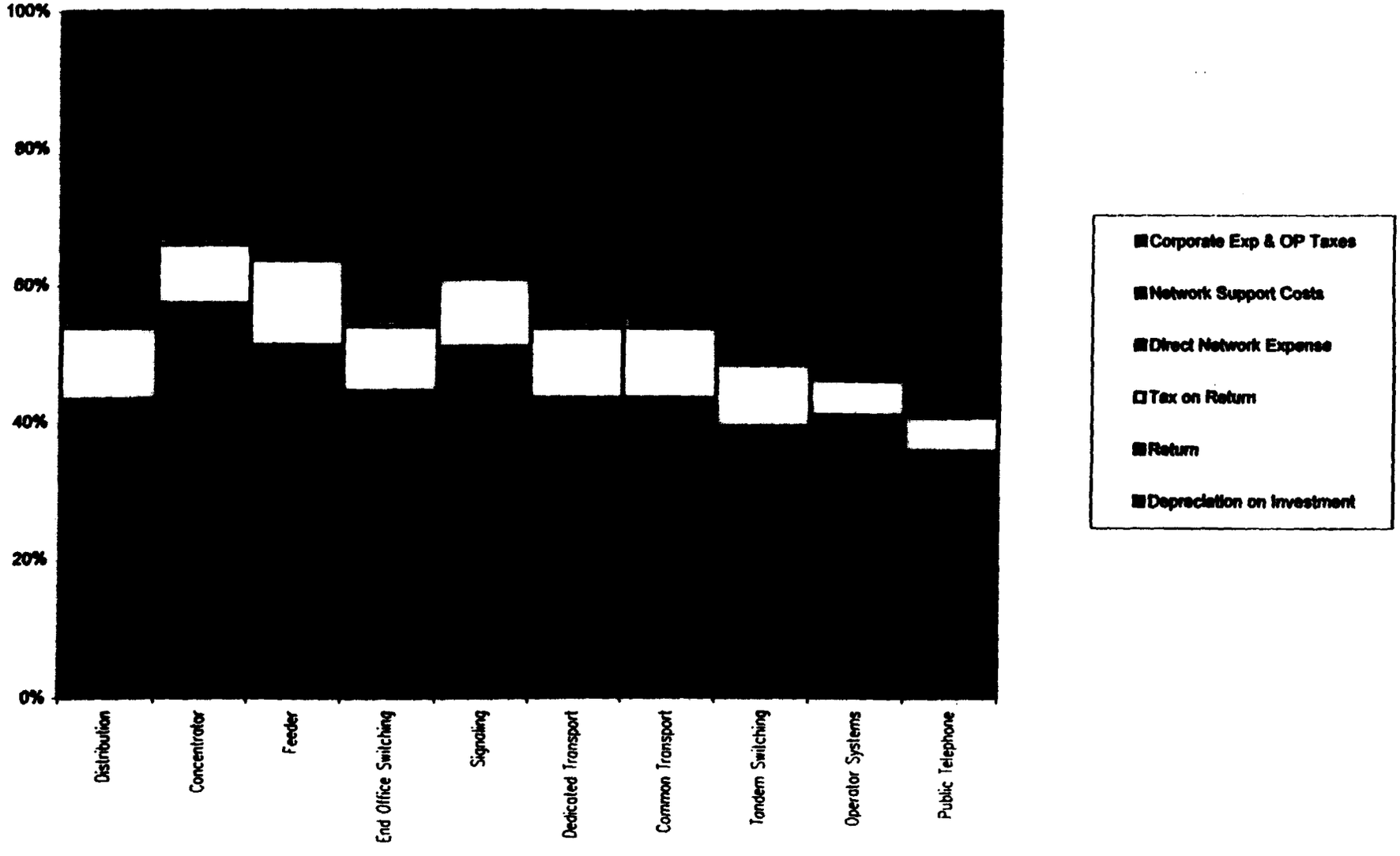
Hatfield Expense Development

- Hatfield Model develops separately for each network element:
  - depreciation expenses
  - return & taxes
  - plant-specific expenses
  - plant non-specific expenses
  - support expenses
  - variable overheads
- *Hundreds* of separate expense items are developed and reported by the model

Hatfield Expense Development

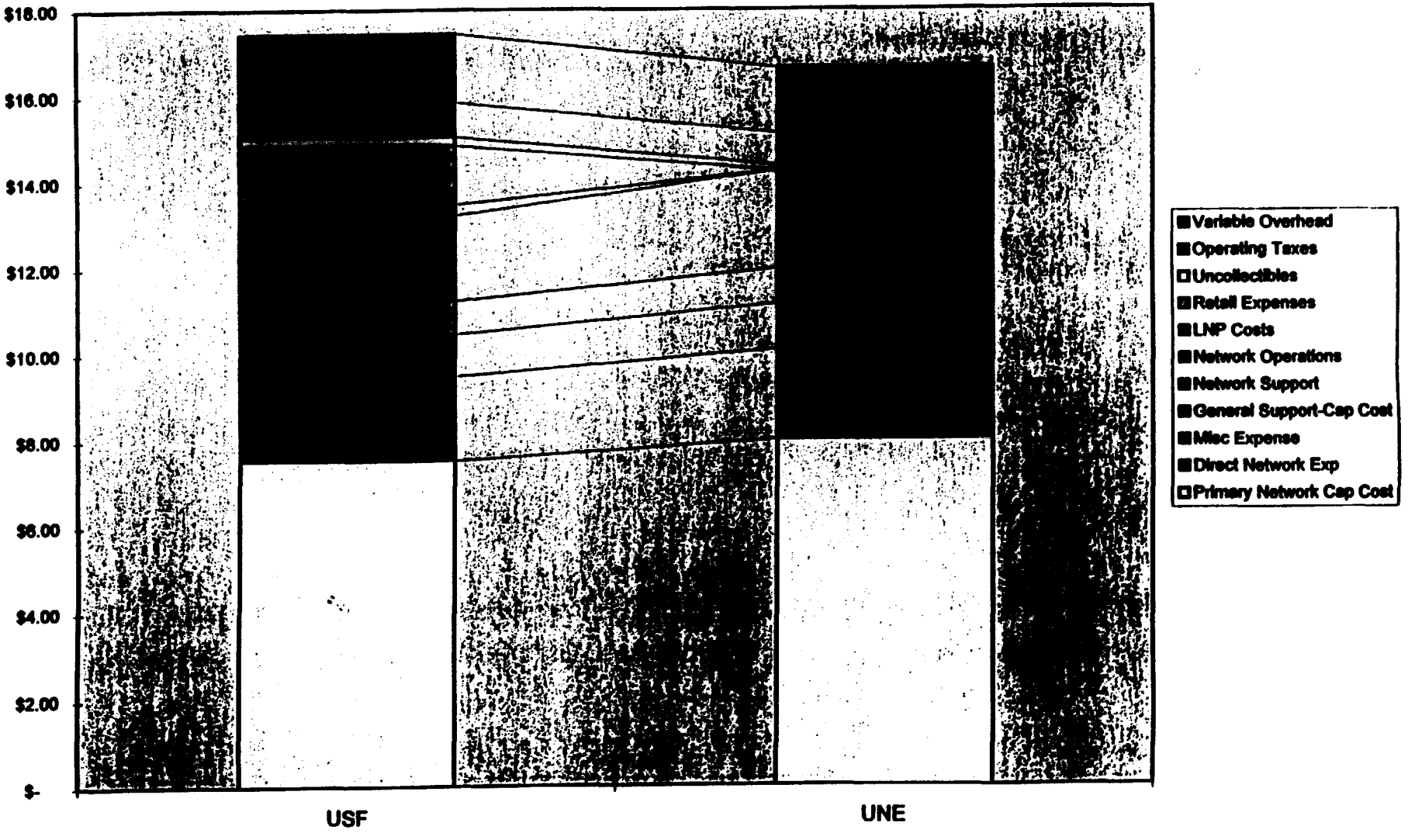


Hatfield Unbundled Element Cost Breakdown



attribution Chart 1

Hatfield Monthly Cost Breakdown



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