MCI Communications Corporation

1801 Pennsylvania Avenue, NW
Washington, DC 20006

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October 1, 1996

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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 Tuesday, October 1, 1996, Michael Pelcovits, and I of MCI spoke with Commissioner Susan Ness and Jim Casserly. The purpose of the meeting was to review MCI's position in this proceeding as stated in MCI's comments. The attached documents were used during the meeting and list the topics discussed.

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.

Sincerely,

Kimberly M. Kirby

Kimberly M. Kirby

Attachment

cc: Commissioner Susan Ness
Jim Casserly

No. of Copies rec'd 0+2
List A B C D E

Blueprint for Universal Service

Jonathan Sallet
Chief Policy Counsel
MCI Communications Corporation
September 25, 1996

Preservation and Advancement of Universal Service

- Replace Existing High Cost Fund
- Use Hatfield To Explicitly Size Subsidy
- Adopt Unitary Fund
- Require All Carriers To Pay on a Competitively-Neutral Basis
- Preserve Service to Low Income Users
- Connect Schools, Libraries, Health Care Providers

Replace Existing High Cost Fund

- The 1996 Act mandates explicit -- not implicit -- subsidies

- Must be independent of access charges

- Embedded cost is inconsistent with Interconnection Order:

  "We first set forth generally, based on the current record, a cost-based pricing methodology based on forward-looking economic costs, which we conclude is the approach for setting prices that best furthers the goals of the 1996 Act"

Hatfield Sizes Explicit Subsidy

- Hatfield determines cost per line in each density zone
- Hatfield includes capital costs for all network components and includes expenses such as as joint and common costs
- Hatfield enables model user to specify the rate that must be supported

Hatfield Model "Refined" Not "Redesigned"

- Version 2.2.2 implements TELRIC to determine the explicit amount of subsidy
- Hatfield 2.2.2 is not a "redesigned" model but rather a "refined" version of earlier models
  - Best matches TELRIC approach of the Interconnection Order
  - Uses existing switching locations, off-the-shelf technology, and current engineering practice
  - Assumptions are explicit and can be changed
  - Cost information derived from on-the-record sources

Hatfield is Superior to Other Models

- BCM2 was an attempt by the LECs to "catch up" with the innovations contained in the Hatfield Model
- Hatfield 2.2.2 goes well beyond the improvements introduced by the ILECs in BCM2
- BCM2 and PacBell models are much more closed, proprietary models than HM2.2.2

A Unitary Fund Gives States a Key Role

- The FCC generates the entire amount of the Unitary Fund and distributes it to the states
  - Amount based on the difference between the nationwide average of basic universal service ($20.00) and the TELRIC based on Hatfield 2.2.2
- States determine the distribution among eligible carriers based on the subsidy needed on a per line basis

All Carriers Must Pay

- All carriers providing telecommunications services must pay into the fund
- Payments based on total net revenues
- FCC may exempt certain carriers

Preserve Basic Universal Service For Low-Income Users

- MCI's Universal Service Fund preserves the Life-Line and Link-Up programs

  - MCI's Universal Service proposal maintains a subsidy that supports basic universal service for low-income users

Connect Schools and Libraries to the Internet

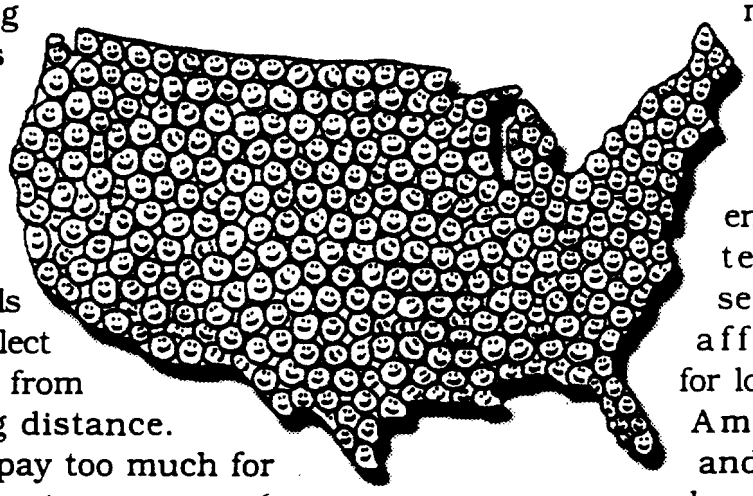
- Provide Internet Access At or Below Cost
- Provide Discounts to Low-Income and Rural Schools
- Target Discounts for High-Bandwidth Services
- Determine the Total Connection Cost
- Require Schools to Have a State-Approved Plan
- Promote Competition Among Service Providers

SUPPORT PEOPLE, NOT MONOPOLIES

To make sure that telephone service is affordable for all Americans, universal service funding was established many years ago.

Where does all the money go?

Right now the cost of providing universal service is between four and six billion dollars. But, to provide universal service, the monopoly Regional Bell Operating Companies collect $14 billion from people who make interstate telephone calls and they collect even more from in-state long distance.



And you pay too much for telephone service.

Where does the excess money go? Right. To the profits of local telephone companies.

The new Federal Telecommunications Act can change all that as federal and state officials work to reform universal service. They can change all that by adopting these principles of universal service.

Principles of universal service

First, encourage competition. Vibrant competition is the first step to ensuring that prices are low and that service is broadly available.

Then establish a separate fund, outside the control of the monopoly telephone companies, that is the amount needed to ensure access — no more, but no less.

Third, use the fund to ensure that telephone service is affordable for low income Americans and people who need it in rural America. Use it also to provide our schools, public hospitals and libraries with the technology they need.

Finally, reject the idea that fixing universal service requires you to pay more.

Then the people will be served, not the monopolies.

Competition. Just Make it Work.

SOURCE: Universal Service Price Tag, Hatfield Study of 1994 and Benchmark Cost Model; Collection from Interstate Access Charges of the RBOCs; FCC, Statistics of Communications Common Carriers

http://competition.mci.com

MCI

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Matrix of Universal Service Issues

	Individuals	High-Cost Places	Institutions
Eligible Services	**MCI** Maintain Lifeline and Linkup	**MCI** -- Single party service to the first point of switching; local usage; -- touch tone; -- white pages listing -- access to 911, E911, operator services, directory assistance and relay service	**MCI** -- Data grade (Internet) service with incentives for broader bandwidth
Eligible Participants	**MCI** Low-Income People	**MCI** All/High-Cost Residents	**MCI** Schools, Libraries with state approved plans
Calculation of Subsidy	**MCI** Lifeline and Linkup would be maintained as targeted subsidy programs for low-income consumers	**MCI** Difference between the TELRIC (Hatfield) cost and the current nationwide average rate for basic service.	**MCI** TELRIC with larger discounts for (I) low income areas (II) greater bandwidth
Competitively Neutral	**MCI** 1. True Competition is the first step. 2. All subsidies are explicit and in fund. 3. The subsidy is recovered from all telecommunications carriers based on their relative revenues, net of payments for the services of other telecommunications carriers 4. Neutral Administrator	**MCI** Same as "individuals" and: A "carrier of last resort" auction would be held for any area that is or becomes unserved	**MCI** Same as "individuals" and: Requirement of competitive bidding
Evolution	(e.g., Call Waiting)	(e.g., Call Waiting)	(e.g., ISDN)

	Input Name	HM 2.2.2	BCM2	Notes
	Depreciation Lives			
1	Loop Distribution	20	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
2	Loop Feeder	20	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
3	Loop Concentrator	10	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
4	Wire Center	37	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
5	End Office Switching	14.3	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
6	Tandem Switching	14.3	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
7	Transport Facilities	19	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
8	Operator Systems	8	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
9	STP	14	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
10	SCP	14	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
11	Links	19	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
12	Public Telephones	9	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
13	General Support	7	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
14				
15	***Cost of Capital***			
16	Debt Percent	45.00%	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
17	Cost of Debt	7.70%	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
18	Cost of Equity	11.90%	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
19	*Equity Percent*	*55.00%*	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
20	*Overall Cost of Capital*	*10.01%*	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
21				
22	***Misc Expense Factors***			
23	Variable Overhead Factor	10.00%	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
24	Federal Income Tax Rate	40.00%	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
25	Other Taxes Factor	5.00%	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
26	Operating State and Local Income Tax Factor	1.00%	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
27	Billing/Bill Inquiry per line per month	$1.22	n/a	Not user-adjustable in BCM2, implicit in per-line cost additive
28	Directory Listing per line per month	$0.15	n/a	Not user-adjustable in BCM2, implicit in per-line cost additive
29	Forward-Looking Network Operations Factor	70.00%	n/a	Not user-adjustable in BCM2, BCM2 uses embedded data, implicit in annual cost factor
30	Central Office Switching Expense Factor	2.69%	n/a	Not user-adjustable in BCM2, BCM2 uses embedded data, implicit in annual cost factor
31	End Office Traffic-Sensitive Fraction	70.00%	30.00%	
32	per-line Monthly LNP Cost	$0.25	n/a	Not considered in BCM2
33	alternative CO switching factor	0.0269	n/a	Not user-adjustable in BCM2, BCM2 uses embedded data, implicit in annual cost factor
34	alternative circuit equipment factor	0.0153	n/a	Not user-adjustable in BCM2, BCM2 uses embedded data, implicit in annual cost factor
35	Carrier-carrier customer service per line per year	$1.56	n/a	Not considered in BCM2
36	NID expense per line per year	$3.00	n/a	Not user-adjustable in BCM2, implicit in annual cost factors
37	Switch line circuit offset per DLC line	$35.00	n/a	Not applicable to BCM2 because BCM2 uses UDLC, not IDLC
38				
39	***BCM2 Expense Factors***			
40	Factor 1 for cable & Wire Facilities	n/a	0.232761	In BCM2, factors derived from nationwide ARMIS data are applied to three
41	Factor 1 for circuit Facilities	n/a	0.242411	separate categories of investment. In addition, a per-line amount representing
42	Factor 1 for Switching facilities	n/a	0.257033	embedded customer operations and corporate operations expense is added
43	Factor 1 for other loading per line served	n/a	$ 133.39	to the cost of each line. Hatfield develops expenses through state-specific
44	Allocation Factor 1 applied to non-plant related expenses	n/a	0.75	investment factors, and directly for depreciation, return, and taxes.
45				
46				
47	***Fill Factors***			
48	Cable			
49	*Feeder*			
50	0-5	0.65	0.75	
51	5-200	0.75	0.8	
52	200-650	0.80	0.8	
53	650-850	0.80	0.85	

	Input Name		HM 2.2.2		BCM2	Notes
54	850-2550		0 80		0 85	
55	2550+		0 80		0 85	
56						
57	*Distribution*					
58	0-5		0 50		0 4	
59	5-200		0 55		0 45	
60	200-650		0 60		0 55	
61	650-850		0 65		0 65	
62	850-2550		0 70		0 75	
63	2550+		0 75		0 8	
64						
65	***EO Switching Parameters***					
66	Busy hour call attempts, residential		1 3		n/a	BCM2 does not model traffic through the switch
67	Busy hour call attempts, business		3 5		n/a	BCM2 does not model traffic through the switch
68	Switch Maximum Line Size		100,000		n/a	not considered in BCM2
69	Switch Maximum Line Fill		0 8		0 8	
70	Switch Maximum Processor Occupancy		0 9		n/a	BCM2 does not model traffic through the switch
71	Processor Feature Loading Multiplier		1		n/a	not considered in BCM2
72	Switch Installation Multiplier		1 1		?	BCM appears to include installation in switch costs, see lines 89-93
73	% of Traffic Sensitive that is local (Enter as decimal)		n/a		0 7393	HM uses actual reported traffic volumes, not a factor
74						
75	*Switch Parameters*					
76	*Switch real-time limit, BHCA*					
77	1 - 1,000		10,000		n/a	BCM2 does not model traffic through the switch
78	1,000 - 10,000		50,000		n/a	BCM2 does not model traffic through the switch
79	10,000 - 40,000		200,000		n/a	BCM2 does not model traffic through the switch
80	40,000+		600,000		n/a	BCM2 does not model traffic through the switch
81						
82	*Switch traffic limit, BHCCS*					
83	1 - 1,000		10,000		n/a	BCM2 does not model traffic through the switch
84	1,000 - 10,000		50,000		n/a	BCM2 does not model traffic through the switch
85	10,000 - 40,000		500,000		n/a	BCM2 does not model traffic through the switch
86	40,000+		1,000,000		n/a	BCM2 does not model traffic through the switch
87						
88	*Switch cost points*	lines				
89	Low line size		2,782		n/a	BCM2 and HM use different break points for switch sizes
90	Mid line size		11,200		n/a	
91	High line size		80,000		n/a	
92		cost/line				
93	Low line size	$	220.00	$	100.00	BCM2 uses a fixed $ per line, and adds a portion of fixed costs per switch
94	Mid line size	$	86.00	$	100 00	In HM, fixed costs are included in the per-line amount. BCM2 figures include trunk circuits,
95	High line size	$	59.00	$	100.00	while those costs are calculated separately in HM.
96						
97	*Fixed/Startup Costs*					
98		Remote	n/a		$250,000	HM does not model remote switches explicitly, but investments included in source data
99		10,000	n/a		$400,000	BCM2 uses a fixed $ per line, and adds a portion of fixed costs per switch
100		60,000	n/a		$600,000	In HM, some fixed costs are included in the per-line amount, and
101		100,000	n/a		$900,000	some are included in wire center cost calculations (see below)
102		500,000	n/a		$1,500,000	HM does not model switches serving more than 100,000 lines
103						
104	Residential Holding Time Multiplier		1.00		n/a	BCM2 does not model traffic through the switch
105	Business Holding Time Multiplier		1.00		n/a	BCM2 does not model traffic through the switch
106	Busy Hour fraction of daily usage		0 10		n/a	BCM2 does not model traffic through the switch
107	Annual to daily usage reduction factor		270.00		n/a	BCM2 does not model traffic through the switch
108						

	Input Name		HM 2.2.2	BCM2	Notes
109	***Interoffice and Tandem Parameters***				
110	Operator Traffic Fraction		0.02	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
111	Total Interoffice Traffic Fraction		0.65	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
112	Direct-Routed Fraction of Local Interoffice		0.98	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
113	Maximum Trunk Occupancy, CCS		27.5	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
114	Trunk Termination Investment, per end		$100	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
115	Average Direct Route Distance, miles		10	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
116	Average Trunk Usage Fraction		0.3	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
117					
118	*Toll traffic inputs*				
119	Tandem-routed % of total intraLATA traffic		0.2	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
120	Average direct intraLATA route distance, mi		25	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
121	Tandem-routed % of total interLATA traffic		0.2	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
122	Average direct access route distance, mi.		15	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
123					
124	*Tandem Switching parameters*				
125	real time limit, BHCA		1,500,000	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
126	port limit, trunks		120,000	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
127	common equipment investment		$1,000,000	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
128	maximum trunk fill		0.8	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
129	maximum real time occupancy		0.9	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
130	common equipment intercept factor		0.25	n/a	BCM2 does not model interoffice costs, included in 1.03 factor applied to switch investment
131					
132	***Wire Center Parameters***				
133					
134	Lot size, multiplier of switch room size		2	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
135	Tandem/EO wire center common factor		0.4	n/a	BCM does not model interoffice costs
136					
137	*Power and frame investment*		sum of power & frame		
138		0	$10,000	n/a	Not user-adjustable in BCM2, included in switch fixed cost
139		1,000	$20,000	n/a	Not user-adjustable in BCM2, included in switch fixed cost
140		5,000	$40,000	n/a	Not user-adjustable in BCM2, included in switch fixed cost
141		25,000	$100,000	n/a	Not user-adjustable in BCM2, included in switch fixed cost
142		50,000	$500,000	n/a	Not user-adjustable in BCM2, included in switch fixed cost
143					
144	*Switch Room size table*		floor area required		
145		0	500	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
146		1,000	1,000	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
147		5,000	2,000	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
148		25,000	5,000	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
149		50,000	10,000	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
150					
151	*Construction costs, per sq ft*		construction/$/sq ft		
152		0	$75	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
153		1,000	$85	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
154		5,000	$100	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
155		25,000	$125	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
156		50,000	$150	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
157					
158	*Land price, per sq ft*		price/sq ft		
159		0	$5.00	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
160		1,000	$7.50	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
161		5,000	$10.00	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
162		25,000	$15.00	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor
163		50,000	$20.00	n/a	Not user-adjustable in BCM2, included in 1.043 land & buildings factor

	Input Name	HM 2.2.2	BCM2	Notes
164				
165	***Misc Values used in BCM2***			
166	Loading Factor for Outside Plant Engineering	n/a	1.05	HM includes engineering in installation costs (Loop Module)
167	Loading Factor for splicing of fiber cable (Enter as decimal)	n/a	0.045	HM adds splicing costs directly (Convergence Module)
168	Additive for in line pedestals, cross connects, etc (fiber)	n/a	0.07	HM adds these costs directly (Convergence Module)
169	Loading Factor for splicing of copper cable (Enter as decimal)	n/a	0.07	HM adds splicing costs directly (Convergence Module)
170	Additive for in line pedestals, cross connects, etc (Copper)	n/a	0.1	HM adds these costs directly (Convergence Module)
171	Normal Placement Depth in inches for Buried/Underground Copper Cable	n/a	24	Not used in HM
172	Normal Placement Depth in inches for Buried/Underground Fiber	n/a	36	Not used in HM
173	Depth in feet at which water impacts placement costs	n/a	3	Hatfield Associates has determined that water does not impact placement costs
174	% Cost increase for presence of water within critical depth	n/a	30	Hatfield Associates has determined that water does not impact placement costs
175	Residence Lines per household multiplier	n/a	1.207	HM "trues up" to the actual number of residential lines in each state
176	Maximum Fiber Cable Size	n/a	144	Not a user variable in HM
177	Maximum Copper Feeder Cable Size	n/a	4,200	Not a user variable in HM
178	Maximum Copper Distribution Cable Size	n/a	3,600	Not a user variable in HM
179	Maximum length of copper cable in the CBG distribution area	n/a	12,000	Not a user variable in HM
180	Value that triggers new terrain variable multiplier	n/a	5	Not used in HM
181	Cost multiplier when new terrain variable exceeds trigger point	n/a	1	Not used in HM
182	Point at which minimum slope effects placement distance	n/a	12	Not used in HM
183	Change in distance due to increased average slope	n/a	1.1	Not used in HM
184	Point where presence of very high slope causes yet more cable distance	n/a	30	Not used in HM
185	Change in distance due to a maximum only slope presence	n/a	1.05	Not used in HM
186	Secondary change in distance due to substantial slope presence	n/a	1.2	Not used in HM
187	Engineering and installation loading factor for electronics	n/a	35	HM includes these costs in calculating costs from the bottom up
188	Digital Switching Discount % (Enter whole %)	n/a	20	HM uses discounted prices
189	Fiber Cable Discount % (Enter whole %)	n/a	20	HM uses discounted prices
190	Copper Cable Discount % (Enter whole %)	n/a	20	HM uses discounted prices
191	AFC Electronics Discount % (Enter whole %)	n/a	10	HM uses discounted prices
192	SLC Electronics Discount % (Enter whole %)	n/a	20	HM uses discounted prices
193	Fill Factors for High Capacity Optic Multiplexers	n/a	0.95	?
194	Average cost for each DS-3 for CO and field DS3 to DS1 multiplexers	n/a	$ 162,000	Included in DLC cost calculation (see lines 457, 466)
195	Average Cost per DS-1 on copper (both terminals & repeater)	n/a	$ 1,133	Included in DLC cost calculation (see lines 457, 466)
196	Structure Cost multiplier for cables 401 to 900 pr versus < 400 pr	n/a	1.2	Not considered in HM
197	Structure Cost multiplier for cables 901 to 1500 pr versus < 400 pr	n/a	1.3	Not considered in HM
198	Structure Cost multiplier for cables 1501 to max size versus < 400 pr	n/a	1.4	Not considered in HM
199	Structure Cost Multiplier for fiber cables >60 fibers versus < 60 fibers	n/a	1.2	Not considered in HM
200	Cost per ft to pull UG cables into conduit duct	n/a	$ 0.77	HM includes these costs in installation costs (Loop Module)
201	Loop Investment Cap	n/a	$ 10,000	HM does not impose a loop investment cap
202	Ratio of Special Access Lines to Business and Special Access		0.13	HM trues up to actual number of lines in each state by category
203				
204				
205				
206	***Distribution Structure Inputs***			
207				
208	*Aerial Fraction*			
209	0-5	0.5	0.1	
210	5-200	0.5	0.2	
211	200-650	0.5	0.3	
212	650-850	0.5	0.3	
213	850-2550	0.4	0.2	
214	2550+	0.65	0.1	
215				
216	*Buried Fraction*			
217	0-5	0.5	0.9	
218	5-200	0.5	0.8	

	Input Name		HM 2.2.2	BCM2	Notes
219	200-650		0.5	0.7	
220	650-850		0.5	0.7	
221	850-2550		0.5	0.8	
222	2550+		0.05	0.9	
223					
224	*Underground Fraction*				
225	*0-5*		*0*	n/a	BCM2 does not break out buried and underground facilities, they are combined in
226	*5-200*		*0*	n/a	the model. HM equivalents of BCM values would be the sum of HM fractions for
227	*200-650*		*0*	n/a	buried and underground
228	*650-850*		*0*	n/a	
229	*850-2550*		*0.1*	n/a	
230	*2550+*		*0.3*	n/a	
231					
232	*Buried Installation/foot*				
233	0-5		$2.00		Because of the different approaches taken by the two models, it isn't possible
234	5-200		$2.00		to directly compare installation costs. HM expresses these costs on a per-foot
235	200-650		$2.00		basis by density zone, while BCM2 distinguishes only between urban and rural
236	650-850		$3.00		settings. HM separately calculates buried, underground, and aerial, while
237	850-2550		$3.00		BCM2 considers buried and underground as one category. HM calculates
238	2550+		$20.00		aerial installation and structure directly in the model based on the pole spacing
239					and pole investment inputs, while BCM2 uses a fixed cost per foot.
240	*Conduit Installation/foot*				
241	0-5		$25.00		BCM2 distinguishes three terrain factors in calculating placement costs --
242	5-200		$25.00		Hard Rock, Soft Rock, and Normal. HM instead imposes a 20% distance
243	200-650		$25.00		penalty (affecting not only installation and structure costs, but cable costs as
244	650-850		$25.00		well) whenever difficult terrain is present, in the belief that in most cases cable
245	850-2550		$45.00		runs will be routed around difficult terrain rather than placed in such terrain.
246	2550+		$70.00		
247					
248	Pole spacing, feet		150		
249	Pole investment		$450		
250	Conduit investment per foot		$1.00		
251	Manhole investment, per manhole		$3,000		
252	Buried cable armoring multiplier		1.1		
253					
254	*Urban Copper Cable Table - underground*				
255		RockH		$ 20.84	
256		RockS		$ 13.92	
257		Normal		$ 10.70	
258					
259	*Rural Copper Cable Table - underground*				
260		RockH		$ 13.59	
261		RockS		$ 5.76	
262		Normal		$ 2.92	
263					
264	*Urban Copper Cable Table - aerial*				
265		RockH		$ 14.18	
266		RockS		$ 10.59	
267		Normal		$ 7.62	
268					
269	*Rural Copper Cable Table - aerial*				
270		RockH		$ 8.07	
271		RockS		$ 5.86	
272		Normal		$ 4.08	
273					
274					

	Input Name	HM 2.2.2	BCM2	Notes
275				
276				
277	***Copper Feeder Structure Inputs***			
278				
279	*Aerial Fraction*			
280	0-5	0.5	0.3	
281	5-200	0.5	0.28	
282	200-650	0.5	0.25	
283	650-850	0.4	0.25	
284	850-2550	0.1	0.2	
285	2550+	0.05	0.1	
286				
287	*Buried Fraction*			
288	0-5	0.45	0.7	
289	5-200	0.45	0.72	
290	200-650	0.45	0.75	
291	650-850	0.4	0.75	
292	850-2550	0.1	0.8	
293	2550+	0.05	0.9	
294				
295	*Underground Fraction*			
296	*0-5*	*0.05*	n/a	BCM2 does not break out buried and underground facilities, they are combined in
297	*5-200*	*0.05*	n/a	the model. HM equivalents of BCM values would be the sum of HM fractions for
298	*200-650*	*0.05*	n/a	buried and underground
299	*650-850*	*0.2*	n/a	
300	*850-2550*	*0.8*	n/a	
301	*2550+*	*0.9*	n/a	
302				
303	*Buried Installation/foot*			
304	0-5	$2.00		Because of the different approaches taken by the two models, it isn't possible
305	5-200	$2.00		to directly compare installation costs. HM expresses these costs on a per-foot
306	200-650	$2.00		basis by density zone, while BCM2 distinguishes only between urban and rural
307	650-850	$3.00		settings. HM separately calculates buried, underground, and aerial, while
308	850-2550	$3.00		BCM2 considers buried and underground as one category. HM calculates
309	2550+	$25.00		aerial installation and structure directly in the model based on the pole spacing
310				and pole investment inputs, while BCM2 uses a fixed cost per foot.
311	*Conduit Installation/foot*			
312	0-5	$25.00		BCM2 distinguishes three terrain factors in calculating placement costs --
313	5-200	$25.00		Hard Rock, Soft Rock, and Normal. HM instead imposes a 20% distance
314	200-650	$25.00		penalty (affecting not only installation and structure costs, but cable costs as
315	650-850	$25.00		well) whenever difficult terrain is present, in the belief that in most cases cable
316	850-2550	$45.00		runs will be routed around difficult terrain rather than placed in such terrain.
317	2550+	$75.00		
318				See lines XXX through XXX above for BCM2 installation costs. BCM2 does
319	*Manhole Spacing, ft.*			not distinguish between copper used in distribution and copper used in feeder
320	0-5	800		
321	5-200	800		
322	200-650	800		
323	650-850	800		
324	850-2550	600		
325	2550+	400		
326				
327	Pole spacing, feet	150		
328	Pole investment	$450		
329	Conduit investment per foot	$1.00		

	Input Name	HM 2.2.2	BCM2	Notes
330	Manhole investment, per manhole	$3,000		
331	Buried cable armoring multiplier	1.1		
332				
333	***Fiber Feeder Structure Inputs***			
334				
335	*Aerial Fraction*			
336	0-5	0.35	0.5	
337	5-200	0.35	0.15	
338	200-650	0.35	0.3	
339	650-850	0.2	0.3	
340	850-2550	0.1	0.2	
341	2550+	0.05	0.1	
342				
343	*Buried Fraction*			
344	0-5	0.6	0.95	
345	5-200	0.6	0.85	
346	200-650	0.6	0.7	
347	650-850	0.6	0.7	
348	850-2550	0.1	0.8	
349	2550+	0.05	0.9	
350				
351	*Underground Fraction*			
352	*0-5*	*0.05*	n/a	BCM2 does not break out buried and underground facilities, they are combined in
353	*5-200*	*0.05*	n/a	the model. HM equivalents of BCM values would be the sum of HM fractions for
354	*200-650*	*0.05*	n/a	buried and underground
355	*650-850*	*0.2*	n/a	
356	*850-2550*	*0.8*	n/a	
357	*2550+*	*0.9*	n/a	
358				
359	*Buried Installation/foot*			
360	0-5	$2.00		Because of the different approaches taken by the two models, it isn't possible
361	5-200	$2.00		to directly compare installation costs. HM expresses these costs on a per-foot
362	200-650	$2.00		basis by density zone, while BCM2 distinguishes only between urban and rural
363	650-850	$3.00		settings. HM separately calculates buried, underground, and aerial, while
364	850-2550	$3.00		BCM2 considers buried and underground as one category. HM calculates
365	2550+	$20.00		aerial installation and structure directly in the model based on the pole spacing
366				and pole investment inputs, while BCM2 uses a fixed cost per foot.
367	*Conduit Installation/foot*			
368	0-5	$25.00		BCM2 distinguishes three terrain factors in calculating placement costs --
369	5-200	$25.00		Hard Rock, Soft Rock, and Normal. HM instead imposes a 20% distance
370	200-650	$25.00		penalty (affecting not only installation and structure costs, but cable costs as
371	650-850	$25.00		well) whenever difficult terrain is present, in the belief that in most cases cable
372	850-2550	$45.00		runs will be routed around difficult terrain rather than placed in such terrain.
373	2550+	$70.00		
374				
375	*Manhole Spacing, ft.*			
376	0-5	2,000		
377	5-200	2,000		
378	200-650	2,000		
379	650-850	2,000		
380	850-2550	2,000		
381	2550+	2,000		
382				
383	Buried cable armoring per foot, fiber	$0.20		
384				

	Input Name		HM 2.2.2	BCM2	Notes
385	*Urban Fiber Table - underground*				
386		RockH		$ 20.84	
387		RockS		$ 13.92	
388		Normal		$ 10.70	
389					
390	*Rural Fiber Table - underground*				
391		RockH		$ 13.59	
392		RockS		$ 5.76	
393		Normal		$ 2.92	
394					
395	*Urban Fiber Table - aerial*				
396		RockH		$ 14.18	
397		RockS		$ 10.59	
398		Normal		$ 7.62	
399					
400	*Rural Fiber Table - aerial*				
401		RockH		$ 8.07	
402		RockS		$ 5.86	
403		Normal		$ 4.08	
404					
405					
406	***Misc Loop Investment Inputs***				
407					
408	Drop investment per line		$ 40.00	$ 0.10	BCM2 figure is cost per foot
409	NID investment per line		$ 30.00	$ 30.00	
410	Terminal and splice per line		$ 35.00	$ 48.22	BCM2 figure is for "cost of pedestal"
411	Average lines per business location		4	10	
412	Feeder structure fraction shared w/ interoffice		0.25	n/a	BCM2 does not model interoffice costs
413					
414	*Distribution structure % assigned to telephone*				
415		aerial	0.33	n/a	BCM2 assigns 100% of structure costs to telephony
416		buried	0.33	n/a	BCM2 assigns 100% of structure costs to telephony
417		underground	0.33	n/a	BCM2 assigns 100% of structure costs to telephony
418					
419	*Feeder structure % assigned to telephone*				
420		aerial	0.33	n/a	BCM2 assigns 100% of structure costs to telephony
421		buried	0.33	n/a	BCM2 assigns 100% of structure costs to telephony
422		underground	0.33	n/a	BCM2 assigns 100% of structure costs to telephony
423					
424	*SAI Investment, installed*				
425	*Distribution cable size*		copper feeder		
426		0	$500.00	?	We have been unable to determine where these costs are included in
427		100	$700.00	?	BCM2
428		200	$900.00	?	
429		400	$1,100.00	?	
430		600	$1,300.00	?	
431		900	$1,500.00	?	
432		1200	$1,700.00	?	
433		1800	$1,900.00	?	
434		2400	$2,100.00	?	
435		3000	$2,300.00	?	
436		3600	$2,500.00	?	
437					
438	*Distribution cable size*		fiber feeder		
439		0	$2,500.00	?	

	Input Name		HM 2.2.2	BCM2	Notes
440		100	$2,700.00	?	
441		200	$2,900.00	?	
442		400	$3,100.00	?	
443		600	$3,300.00	?	
444		900	$3,500.00	?	
445		1200	$3,700.00	?	
446		1800	$3,900.00	?	
447		2400	$4,100.00	?	
448		3000	$4,300.00	?	
449		3600	$4,500.00	?	
450					
451	***Digital Loop Carrier Inputs (HM)***				
452					
453	*SLC (TR-303)*				
454	site, housing, and power per remote terminal		$3,000.00		The HM determines the cost of Digital Loop Carrier equipment from the ground
455	maximum lines		672		up, calculating separately the individual cost components that make up the
456	remote terminal fill factor		0.9	0.85	remote terminals and CO equipment. BCM2 appears to use a fixed cost per
457	common equipment investment		$42,000.00		terminal and a per-line cost. We are unable to reconcile the two calculations.
458	channel unit investment per line		$75.00		The user inputs to both calculations are presented here.
459	DS-0s per fiber		2,016		
460	Fibers per remote terminal		4		
461					
462	AFC				
463	site, housing, and power per remote terminal		$2,500.00		
464	maximum lines		100		
465	remote terminal fill factor		0.9	0.85	
466	common equipment investment		$10,000.00		
467	channel unit investment per line		$150.00		
468	DS-0s per fiber		2,016		
469	Fibers per remote terminal		4		
470					
471	Fiber feeder distance threshold, ft. (feeder length)		9,000	12,000	
472					
473	***Cost for AFC/SLC 200/LightSpan equipment (BCM2)***				
474		0		$ 7,700	
475		48		$ 8,500	
476		120		$ 10,500	
477		240		$ 77,330	
478		672		$ 94,909	
479		1334		$ 105,409	
480					
481					
482		0		$ 250	
483		48		$ 250	
484		120		$ 250	
485		240		$ 184	
486		672		$ 184	
487		1334		$ 184	
488					
489					
490					
491	***Signaling Parameters***				
492					
493	STP Link Capacity		720	n/a	BCM2 does not model signaling network costs

	Input Name	HM 2.2.2	BCM2	Notes
494	STP Maximum Fill	0.8	n/a	BCM2 does not model signaling network costs
495	STP Investment, per pair, fully equipped	$5,000,000	n/a	BCM2 does not model signaling network costs
496	STP common equipment investment, per pair	$1,000,000	n/a	BCM2 does not model signaling network costs
497	Link Termination, both ends	$900	n/a	BCM2 does not model signaling network costs
498	Signaling Link Bit Rate	56000	n/a	BCM2 does not model signaling network costs
499	Link Occupancy	0.4	n/a	BCM2 does not model signaling network costs
500	C Link Cross-Section	24	n/a	BCM2 does not model signaling network costs
501	ISUP messages per interoffice BHCA	6	n/a	BCM2 does not model signaling network costs
502	ISUP message length, bytes	25	n/a	BCM2 does not model signaling network costs
503	TCAP messages per transaction	2	n/a	BCM2 does not model signaling network costs
504	TCAP message length, bytes	100	n/a	BCM2 does not model signaling network costs
505	Fraction of BHCA requiring TCAP	0.1	n/a	BCM2 does not model signaling network costs
506	SCP investment per transaction per second	$20,000	n/a	BCM2 does not model signaling network costs
507				
508				
509	***Misc Inputs***			
510				
511	*Operator position parameters*			
512	Investment per position	$3,500.00	n/a	BCM2 does not model operator services costs
513	Maximum utilization per position, CCS	27	n/a	BCM2 does not model operator services costs
514	Operator intervention factor	10	n/a	BCM2 does not model operator services costs
515	Operator position remote distance, mi.	0	n/a	BCM2 does not model operator services costs
516				
517	*Other*			
518	DS0/DS1 crossover	24	n/a	Used in Hatfield to calculate unit costs -- BCM2 does not model these costs
519	DS1/DS3 crossover	28	n/a	Used in Hatfield to calculate unit costs -- BCM2 does not model these costs
520				
521	Public Telephone investment per station	$1,200.00	n/a	BCM2 does not model public telephone costs
522				
523	***Transport Investment***			
524				
525	*Terminal Investment*			
526	Number of Fibers	24	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
527	FOT capacity, DS-3s	12	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
528	FOT fill	0.8	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
529	FOT, installed	$43,000.00	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
530	Pigtails	$60.00	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
531	Panel	$1,000.00	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
532	EF&I, per hour	$55.00	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
533	EF&I units	32	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
534				
535	*Medium Investment*			
536	Fraction of structure assigned to telephone	0.33	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
537	Fraction of structure shared with feeder	0.25	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
538	Distance, mi.	41	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
539	Regenerator spacing, mi.	40	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
540	Regenerator investment, installed	$15,000.00	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
541	Fiber Cable investment per foot	$2.00	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
542	Placement	$2.00	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
543	Splice Spacing, ft.	20000	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
544	Splice Cost	$15.00	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
545	Trenching per foot	$45.00	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
546	Resurfacing per foot	$10.00	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
547	Conduit per foot	$4.00	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
548	Number of tubes	2	n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment

	Input Name			HM 2.2.2		BCM2	Notes
549	Manhole investment			$5,000.00		n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
550	Manhole spacing			1000		n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
551	Buried installation per foot			$5.00		n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
552	Pole investment			450		n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
553	Pole spacing			150		n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
554	Underground percent			35.00%		n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
555	Buried percent			50.00%		n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
556	Aerial percent			0.15		n/a	BCM2 does not model interoffice costs, contained in 1.03 factor applied to switch investment
557							
558	***Cable Costs***						
559	*Feeder*						
560		*Underground*					
561		Cable Size	Cost UG				
562		4200	$	74.25	$	25.70	HM values include discounted materials cost, engineering, delivery, and installation
563		3600	$	63.75	$	22.20	(but not structure costs), while the BCM2 values appear to be materials costs only.
564		3000	$	53.25	$	18.80	
565		2400	$	42.75	$	14.30	
566		1800	$	32.25	$	12.44	
567		1200	$	21.75	$	10.68	
568		900	$	16.50	$	7.82	
569		600	$	11.25	$	7.13	
570		400	$	7.75	$	4.62	
571		200	$	4.25	$	2.36	
572		100	$	2.50	$	1.27	
573		50		n/a	$	0.68	Min cable size in HM is 100
574		25		n/a	$	0.37	Min cable size in HM is 100
575							
576		*Aerial*					
577		Cable Size	Cost Aerial				
578		4200	$	74.25	$	25.40	HM values include discounted materials cost, engineering, delivery, and installation
579		3600	$	63.75	$	21.90	(but not structure costs), while the BCM2 values appear to be materials costs only.
580		3000	$	53.25	$	18.50	
581		2400	$	42.75	$	14.10	
582		1800	$	32.25	$	12.24	
583		1200	$	21.75	$	10.00	
584		900	$	16.50	$	7.51	
585		600	$	11.25	$	7.05	
586		400	$	7.75	$	4.56	
587		200	$	4.25	$	2.33	
588		100	$	2.50	$	1.26	
589		50		n/a	$	0.67	Min cable size in HM is 100
590		25		n/a	$	0.36	Min cable size in HM is 100
591							
592	*Distribution*						
593		*Underground*					
594	Cable Size		Cost UG				
595		3600	$	63.75	$	22.20	HM values include discounted materials cost, engineering, delivery, and installation
596		3000	$	53.25	$	18.80	(but not structure costs), while the BCM2 values appear to be materials costs only.
597		2400	$	42.75	$	14.30	
598		1800	$	32.25	$	12.44	
599		1200	$	21.75	$	10.68	
600		900	$	16.50	$	7.82	
601		600	$	11.25	$	7.13	
602		400	$	7.75	$	4.62	
603		200	$	4.25	$	2.36	

	Input Name		HM 2.2.2	BCM2	Notes
604		100	$ 2.50	$ 1.27	
605		50	$ 1.63	$ 0.68	
606		25	$ 1.19	$ 0.37	
607		18	n/a	$ 0.32	Min cable size in HM is 25
608		12	n/a	$ 0.28	Min cable size in HM is 25
609					
610					
611					
612		*Aerial*			
613	Cable Size		Cost Aerial		
614		3600	$ 63.75	$ 21.90	HM values include discounted materials cost, engineering, delivery, and installation
615		3000	$ 53.25	$ 18.50	(but not structure costs), while the BCM2 values appear to be materials costs only.
616		2400	$ 42.75	$ 14.10	
617		1800	$ 32.25	$ 12.24	
618		1200	$ 21.75	$ 10.00	
619		900	$ 16.50	$ 7.51	
620		600	$ 11.25	$ 7.05	
621		400	$ 7.75	$ 4.56	
622		200	$ 4.25	$ 2.33	
623		100	$ 2.50	$ 1.26	
624		50	$ 1.63	$ 0.67	
625		25	$ 1.19	$ 0.36	
626		18	n/a	$ 0.32	Min cable size in HM is 25
627		12	n/a	$ 0.28	Min cable size in HM is 25
628					
629	*Fiber*				
630		*Underground*			
631	Cable Size		Cost UG		
632		216	$ 13.10	n/a	Max cable size in BCM2 is 144
633		144	$ 9.50	$ 5.56	HM values include discounted materials cost, engineering, delivery, and installation
634		96	$ 7.10	$ 3.80	(but not structure costs), while the BCM2 values appear to be materials costs only.
635		72	$ 5.90	$ 2.84	
636		60	$ 5.30	$ 2.41	
637		48	$ 4.70	$ 1.98	
638		36	$ 4.10	$ 1.60	
639		24	$ 3.50	$ 1.18	
640		18	$ 3.20	$ 0.98	
641		12	$ 2.90	$ 0.79	
642		*Aerial*			
643	Cable Size		Cost Aerial		
644		216	$ 13.10	n/a	Max cable size in BCM2 is 144
645		144	$ 9.50	$ 5.24	HM values include discounted materials cost, engineering, delivery, and installation
646		96	$ 7.10	$ 3.53	(but not structure costs), while the BCM2 values appear to be materials costs only.
647		72	$ 5.90	$ 2.65	
648		60	$ 5.30	$ 2.23	
649		48	$ 4.70	$ 1.84	
650		36	$ 4.10	$ 1.46	
651		24	$ 3.50	$ 1.05	
652		18	$ 3.20	$ 0.85	
653		12	$ 2.90	$ 0.66	