

1 **Element Pricing**

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3 **Q. Please turn to the fourth section of your direct testimony. Have you conducted**
4 **any cost studies to determine the long run economic cost of unbundled network**
5 **elements?**

6 A. Yes. I have prepared cost studies analyzing the economic cost of the following
7 individual elements:

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- 9 (1) The network interface device (NID);
10 (2) The local loop (excluding the NID);
11 (3) End office switching;

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13 I have developed cost estimates which are consistent with the FCC's TELRIC
14 methodology, since I find this to be a reasonable and appropriate approach.

15 Furthermore, if the FCC's Implementation Order were to be upheld on appeal, the
16 Board would be required to follow the FCC's TELRIC methodology. Hence, it is
17 useful to know what level of cost would be estimated using this approach, even if the
18 Board prefers an alternative methodology. In addition to the FCC's approach, I have
19 also prepared some other economic cost estimates. In one study I followed the general
20 approach developed by the FCC, with one important difference: rather than looking at
21 the long run cost of unbundled elements in the context of an incumbent carrier serving
22 100% of the market, I estimated the long run economic cost facing a new entrant
23 installing its own facilities, assuming it would serve just 25% of the market.

24 In preparing these studies, I used an updated and revised version of the same
25 economic costing model that I relied upon in Phase I of this proceeding. I analyzed

1 more than 200 specific wire centers in New Jersey within both Bell Atlantic's New
2 Jersey service territory and the areas served by Sprint-United and Warwick
3 Telephone. To run the model, I used data from the BCM2 model submitted to the FCC
4 in its Universal Service concerning the number of loops, and average loop length within
5 each wire center. This procedure avoids the use of Bell Atlantic data that is allegedly
6 proprietary, and it allowed me to apply the model to all three LECs on a consistent
7 basis.

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9 **Q. Would you please explain Schedule 1?**

10 A. Yes. This schedule contains long run economic cost estimates (using TELRIC) of
11 providing unbundled copper loops and other network elements in New Jersey. I have
12 separated estimated the cost of the network interface device (NID), drop wire/building
13 cable, network terminal, feeder/distribution cable, non-traffic sensitive end office
14 switching and other end office switching costs. While it isn't necessary to unbundle and
15 price each of these items separately, it would not be unreasonable to do so.

16 For instance, drop wire/building cable costs can vary widely, depending upon
17 the specific circumstances that apply at each customer location (e.g., distance from the
18 network terminal to the network interface device). Drop wire/building cable could be
19 unbundled, and rates could be developed which vary more precisely with the relevant
20 circumstances (e.g., distance from the network terminal to the NID). While I don't
21 think it is necessary to follow this more detailed approach at this time, I thought it would
22 be useful to separately state my cost estimates for these categories.

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1 **Q. Would you please summarize your cost estimates?**

2 A. Yes. The following table summarizes the statewide cost estimates from page 1 of
3 schedule 1, where I average the monthly per-line costs for all of the wire centers in
4 each of five density categories. These are weighted averages, where the cost per unit in
5 each wire center is weighted by the total number of lines in that wire center.

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Density Cell	5 to 200	201 to 650	651 to 850	851 to 2550	> 2550
NID	.56	.62	.63	.64	.61
Loop	21.80	11.98	10.07	7.87	6.03
Switching	5.69	5.45	5.38	5.34	5.12

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Providing these unbundled elements to carriers will entail some additional costs that will vary with the specific circumstances applicable to each carrier. These additional items include the non-recurring costs of processing a carrier's order (which would vary depending upon the number of element ordered at one time), the cost of making the physical connection between the element and the purchasing carrier's co-located equipment (which would vary depending upon the nature of the co-location arrangement), the cost of billing and collection (which would vary depending upon the total size of the carrier's bill, and the amount of billing detail they require), and perhaps some additional maintenance and testing (which might be required to meet a particular carrier's needs, beyond the minimum level reflected in these estimates).

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Furthermore, it should be noted that these cost estimates include an allowance of 10% for administrative, general support, and other common costs. This is a conservative estimate of the common costs which can directly be associated with each

1 network element. However, there are additional common costs, such as overall
2 network planning and engineering, which cannot be directly associated with particular
3 elements. These common costs have not been reflected in these estimates. While it is
4 appropriate to recover a share of these costs from the unbundled network element
5 prices, I believe this can best be accomplished in setting prices for each element, rather
6 than by including a larger allowance for common costs in the underlying cost
7 calculations. I have provided an additional allowance for these items in developing my
8 recommended rates, but it is not necessarily an identical percentage markup for each
9 item. This provides additional flexibility, since it allows the markup to vary depending
10 upon demand considerations and other factors.

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12 **Q. Would you please explain your cost estimates for “zone 1 and zone 2”?**

13 A. Yes. Schedule 1 also includes some cost estimates for “zones” or geographic
14 subcategories within each wire center. These calculations provide a further indication of
15 the diversity of cost conditions which can occur within each market area. Within each
16 wire center, our model provides for two geographic zones. Zone 1 is representative of
17 the highest density portions of the overall geographic area, which are assumed to be in
18 the immediate vicinity of the central office or switch. Zone 2 lies beyond this vicinity,
19 covering a much larger area, with greater loop lengths and a lower concentration of
20 customers.

21 This modeling approach somewhat simplifies the actual conditions in each wire
22 center, where customers may be scattered and distributed in a more random pattern.
23 Also, due to rounding and other complications, the cost estimates for individual zones
24 within individual wire centers are not necessarily as reliable as the overall estimates for
25 each wire center. Nevertheless, our model does provide some useful insights

1 concerning the degree to which costs can be expected to vary within the same serving
2 area, due to the fact that customers are not uniformly dispersed. Customers who are
3 grouped in higher concentrations (e.g., in a large apartment complex) tend to be less
4 costly to serve than customers individually scattered over wide areas far from the wire
5 center.

6 For many purposes, the average cost figures for each wire center (or density
7 category) are entirely adequate. However, it is important to remember that
8 heterogeneous cost differences exist below the wire center level of aggregation, and
9 these differences can be very important. If an analysis exclusively focuses on the
10 composite cost data for wire centers as a whole, it tends to ignore the fact that
11 incentives exist for “cream skimming,” by new carriers who are considering where to
12 install their own facilities, and where to rent unbundled loops from the incumbent LEC.
13 Accordingly, the zone estimates provide a useful supplement to my primary cost
14 estimates.

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16 **Q. Would you please explain the cost estimates on Schedule 2?**

17 A. Yes. As I mentioned above, while I have primarily focused on the cost of network
18 elements provided by the incumbent carriers, I have also prepared some estimates that
19 indicate the magnitude of the analogous long run economic costs facing a smaller carrier
20 that constructs its own network facilities.

21 The cost estimates on Schedule 1 were based upon a network large enough to
22 serve 100% of the incumbents’ existing business and residential lines. Accordingly,
23 these cost estimates correspond to the long run costs facing the incumbent carriers at
24 this time. However, it is useful to consider the cost picture from the perspective of a

1 new entrant as well. The incumbent carrier's current market share of nearly 100% is
2 unlikely to endure forever.

3 As the local market is increasingly opened to competition, MFS and other
4 carriers will undoubtedly adapt and expand their existing facilities to serve portions of
5 the New Jersey local telecom market. Other carriers (e.g., AT&T) may also install
6 network facilities for this purpose. Thus, some consideration should be given to the
7 costs facing new carriers that anticipate serving a minority of the market. Schedule 2
8 serves this purpose, by illustrating the cost of a network that is just 25% as large as the
9 one reflected in Schedule 1. By comparing these two sets of estimates, it is readily
10 apparent that a network serving 25% of the market does not benefit from economies of
11 scale to the same degree as a network serving 75% of the market. The greatest
12 discrepancy in cost occurs in the wire centers with relatively low densities.

13 An understanding of the long run costs facing a smaller carrier is particularly
14 useful in this proceeding since the relative balance between the unbundled element
15 rates and the cost to a new carrier of building its own facilities significantly affects the
16 incentive to invest in new network facilities in New Jersey. If the unbundled element
17 prices are extremely low relative to the costs facing a facilities based carrier, new
18 entrants will have less incentive to build their own facilities, and will more likely to rely
19 upon the incumbent's unbundled network.

20 Of course, some carriers may choose to build their own facilities even if the
21 costs of self provision are higher than the unbundled network rates, in order to gain
22 increased control over their operations. A facilities-based carrier can better control its
23 quality, the technical attributes of its network, and its costs, while a carrier relying upon
24 the incumbent's unbundled facilities is somewhat at the mercy of the incumbent's
25 operating decisions.

1 **Q. Would you please explain the cost estimates on Schedule 3?**

2 A. Yes. For the reasons stated earlier, I have primarily focused on estimating the cost of
3 unbundled bops provided on an all-copper network. However, I realize that there is a
4 trend towards increased use of fiber optic loop facilities, because this technology can
5 reduce costs in situations where distances are long, or bandwidth requirements are
6 large. Fiber is most cost effective where sufficient distance is covered to allow the cable
7 savings to “pay” for the electronics. The tradeoff between fiber and copper is thus
8 largely determined by the relative price of fiber and copper cable, the cost of the
9 electronics (which can vary widely) and the distance that is covered by the fiber. In
10 general, fiber tends to be less costly than copper where large amounts of bandwidth are
11 involved (e.g. large numbers of bops), because this allows a small number of fiber pairs
12 to be used in lieu of a large number of copper pairs. However, the savings in cable can
13 only be achieved with an additional investment in electronic equipment at each end of
14 the fiber, and thus the distance is important as well as the price paid for the electronics.

15 In many local markets the distances are short, or the bandwidth requirements
16 are small, and thus traditional copper technology remains less expensive than fiber
17 optics. However, even if fiber is slightly more expensive, it may be selected by the
18 carrier because of its greater potential for future revenue growth from broadband
19 applications (data and video) services, particularly if the carrier can negotiate a good
20 price for the required electronics.

21 To provide the Board with additional insight into these issues, I prepared some
22 cost estimates for a network configuration in which fiber and copper technology is
23 mixed, with copper used for the final segment of distribution cable (connecting to the
24 drop wire/building cable at the customer’s premises). Copper cable was used in
25 locations where the total number of loops was relatively small, or the distance from the

1 wire center was relatively short. More specifically, fiber optic cable was deployed on
2 routes where two criteria were met: a minimum fiber distance of 7,500 feet, and a
3 minimum of 40 lines served by the remote terminal.

4 Page 1 of Schedule 3 shows the result for a network serving 100% of the
5 existing access lines in the state; this can be directly compared to the copper cost
6 estimates on page 1 of Schedule 1. Page 2 of Schedule 3 shows the analogous cost
7 estimates for a network which serves 25% of the lines; this can be directly compared to
8 the copper cost estimates on Schedule 2.

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