

should reject the stipulation and move forward promptly to ensure that Verizon satisfies its commitments.

BACKGROUND

In the early 1990s, Verizon's predecessor, New Jersey Bell Telephone Company, requested that the Board subject it to an alternative form of regulation in exchange for the company's commitment to make New Jersey a "fully fibered state."¹ The company explained publicly that it pledged to rewire its entire copper telephone network with fiber, and emphasized that the plan would impact "every consumer" because fiber would extend into "every single home and business in the state":²

"The network that we see and we feel is so close at hand is going to impact [] the lives of every consumer," said Dennis M. Bone, director of regulatory planning for New Jersey Bell in Newark.

The company's plan, Mr. Bone said, involves rewiring the entire state by replacing 56.3 million miles of copper wire with fiber-optic cable -- a finger-thick flexible cable made of hair-thin strands of glass. The plan would push forward by 20 years, to the year 2010, a previous date for completing the conversion.

"With fiber going into every single home and business in the state, there will be all sorts of capabilities for everybody to use that simply do not exist today," Mr. Bone said.

A fiber-optic network, he said, will require less cable and will be far superior to the copper cable network that now connects the company's 3.2 million customers. Fiber, he said, can handle thousands of two-way voice, data and video transmissions, compared with hundreds of one-way transmissions that can be made over copper wire. Fiber is easier to install and maintain, provides clearer transmissions, is immune to electromagnetic interference and does not corrode.

¹ J. Romano, *Speed-Up of Fiber-Optic Network Debated*, The New York Times, Dec. 8, 1991, available at: <http://www.nytimes.com/1991/12/08/nyregion/speed-up-of-fiber-optic-network-debated.html?pagewanted=all&src=pm>.

² *Id.*

Mr. Bone said a "fully fibered network" would provide consumers with unprecedented access to information and entertainment services and would encourage economic development as well.

"If we develop this capability first, there's going to be a rush of information service providers coming here to set up shop," Mr. Bone said. "We're going to be the best test-bed in the world for this stuff."

In 1993, the Board approved New Jersey Bell's plan.³ The Board's order specifically obligated the company to achieve a framework called "Opportunity New Jersey" requiring the company "to invest in the accelerated deployment of advanced switching and transmission technologies for its communications network."⁴ It required the company to transform its "public switched network" to one that provides "narrowband digital, wideband digital, and broadband digital service capabilities" that support "video and high speed data services."⁵ It further required that by the year 2010, the company would provide "switching technologies matched with transmission capabilities [that] support data rates up to 45,000,000 bits per second and higher" and that this would enable services "that will allow residential and business customers to receive high definition video and to send and receive interactive (i.e., two way) video signals."⁶ This "broadband public switched network" would be "ubiquitous" and "provide opportunities for new service providers to offer their products utilizing the transmission capabilities on NJ Bell's advanced network."⁷ The company explained that "as the network is modernized under

³ *In re Application of New Jersey Bell Telephone Company for Approval of Its Plan for an Alternative Form of Regulation*, Docket No. TO02-30358 (May 6, 1993) ("PAR-1").

⁴ *Id.* at 1.

⁵ *Id.* at 5.

⁶ *Id.* at 74.

⁷ *Id.* at 96-97.

[Opportunity New Jersey] and fiber replaces copper lines, an all fiber network will provide clearer transmission and be easier to maintain.”⁸

The Board emphasized that the company could not escape the Opportunity New Jersey commitments. Although the plan would allow the company to restructure rates under certain circumstances or to increase rates if there occurred a “major, unexpected extraordinary or exogenous event that is beyond [the Company’s] control,”⁹ this would not allow the company to “lessen[] its investment in Opportunity New Jersey.”¹⁰

The Board concluded that Opportunity New Jersey would enhance economic development—but only if the company adhered to its requirements strictly.¹¹ The staff emphasized that the plan must be considered a “firm commitment”:

[Because] these calculations have been predicated on the projected deployment of the network and are therefore wholly dependent upon the timely completion of ONJ, and accordingly, that any drastic deviation from the schedule as submitted by NJ Bell would have a direct and likely negative impact on the employment and tax revenue projections, Staff submits that it is, therefore, important for the Board to monitor ONJ and require NJ Bell to commit to *achieving the entire plan, including fiber to the curb, so the projected benefits become a reality*. Thus, in exchange for permitting NJ Bell to be governed by an alternative form of regulation, Staff recommends that *it is critical that the deployment scheme described in ONJ be considered a firm commitment on NJ Bell's part*.¹²

The staff described this commitment as one “for deployment of full broadband capability” that extends “beyond the term of the plan.”¹³ It stressed that it reserved the right to commence a

⁸ *Id.* at 137.

⁹ *Id.* at 51, 63.

¹⁰ *Id.* at 56, 67.

¹¹ *Id.* at 73.

¹² *Id.* at 86 (emphasis added) (internal references omitted).

¹³ *Id.*

proceeding to ensure the company “does not receive the benefits of the alternative form of regulation without at the same time fulfilling its obligations.”¹⁴

At the outset of this proceeding, the Board asserted that Verizon must achieve Opportunity New Jersey “in its entirety” and that this includes “full broadband capability.”¹⁵ The Board further asserted that “full deployment of broadband has not been achieved.”¹⁶ It found in particular that “residents of Greenwich and Stow Creek, Cumberland County, are not being provided broadband capabilities consistent with ONJ.”¹⁷ It therefore ordered Verizon to “show cause before the Board why the Board should not find that Verizon failed to comply with the PAR Order in providing full broadband capability by 2010.”¹⁸

Verizon responded that its FIOS network “passed 2.1 million premises with . . . fiber-to-the-home technology”; that it “has deployed 3.7 million miles of fiber optic cable”; and that it has “made DSL available in 100% of Verizon Central Offices.”¹⁹ Verizon claimed that broadband availability is “virtually” ubiquitous because in more than 99% of its census blocks, the company is capable of providing customers with DSL.²⁰ In Greenwich Township and Stow Creek specifically, the company explained that it had “equipped that central office with

¹⁴ *Id.* at 87, 97.

¹⁵ *In re Verizon New Jersey, Inc.’s Alleged Failure to Comply With Opportunity New Jersey Commitments*, Docket No. TO12020155 (March 12, 2012).

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ Verizon New Jersey Inc.’s Answer to Order to Show Cause, Docket No. TO12020155, at 5 (Apr. 12, 2012) (“Verizon Answer”).

²⁰ *Id.* at 7-9.

equipment to provide DSL,” but complained that it is “difficult” and “too expensive” to reach individual households with broadband.²¹

The Board now asks for comment on a stipulation of settlement arising out of the show-cause order that would “modify the process” under Opportunity New Jersey. The stipulation does not penalize Verizon for failing to honor its Opportunity New Jersey commitments in Greenwich Township and Stow Creek (or anywhere else). Instead, it would effectively release Verizon from its commitments there and everywhere, and replace them with a “new broadband request process known as a bonafide retail request” (“BFRR”).

DISCUSSION

Because the Board has emphasized that Verizon must not “receive the benefits of the alternative form of regulation without at the same time fulfilling its obligations,”²² it is critical that any stipulation resolving this compliance proceeding either require compliance, or at least ensure that any substitute performance guarantees the same or greater benefits.²³ The proposed stipulation does not do so—not even close. As the attached economic analysis demonstrates, adopting the stipulation would be a serious step in the wrong direction for the state.

I. THE STIPULATION IS NOT JUSTIFIED BY VERIZON’S RESPONSE.

The stipulation is not justified by Verizon’s response here. As explained above, the Board’s PAR-1 order requires Verizon “to invest in the accelerated deployment of advanced

²¹ *Id.* at 22.

²² PAR-1 at 97.

²³ Given the delays in Verizon’s compliance, additional benefits to protect underserved and distressed communities are also in order.

switching and transmission technologies for its communications network.”²⁴ The company must transform its “public switched network” to one that provides “narrowband digital, wideband digital, and broadband digital service capabilities” that support “video and high speed data services.”²⁵ This “broadband public switched network” must be “ubiquitous” and “provide opportunities for new service providers to offer their products utilizing the transmission capabilities on NJ Bell’s advanced network.”²⁶ The company explained that “as the network is modernized under [Opportunity New Jersey] and fiber replaces copper lines, an all fiber network will provide clearer transmission and be easier to maintain.”²⁷ The Board emphasized that by the year 2010, the company would provide “switching technologies matched with transmission capabilities [that] support data rates up to 45,000,000 bits per second and higher” and that this would enable services “that will allow residential and business customers to receive high definition video and to send and receive interactive (i.e., two way) video signals.”²⁸ The staff called it “critical” that the company achieve the “entire plan” and that it be considered a “firm commitment.”²⁹

Verizon’s response does not show that the company has complied with this commitment. The company says virtually nothing about the extent that it has upgraded its public switched telephone network. To be sure, it claims that its FIOS network now passes 2.1 million premises,

²⁴ *Id.* at 1.

²⁵ *Id.* at 5.

²⁶ *Id.* at 96-97.

²⁷ *Id.* at 137.

²⁸ *Id.* at 74.

²⁹ *Id.* at 86.

and that it has deployed 3.7 million miles of fiber-optic cable.³⁰ But when it touted its Opportunity New Jersey commitments, the company publicly proclaimed that it would replace “56.3 million miles of copper wire with fiber-optic cable,”³¹ and that an “all fiber network will provide clearer transmission and be easier to maintain.”³² Moreover, even if the company’s FIOS deployment were “ubiquitous,”—and it is not—Verizon’s filing never claims that the company “provide[s] opportunities for new service providers to offer their products utilizing the transmission capabilities” on the company’s network.³³ Newark is an important example. Although Verizon is required by law to provide “cable television service” “throughout the residential areas” of the City by October 2014,³⁴ this says nothing about the company’s obligations to upgrade its public switched telephone network. The company need not extend service to businesses, and the statute has a number of exceptions.³⁵ Although Newark expects the company to fully meet its statutory obligation, to date, Verizon is marketing FIOS service in only two of the City’s five wards. However one views Verizon’s cable-franchise obligations, they are a far cry from what Opportunity New Jersey mandates.

The company fails to show that it has complied with Opportunity New Jersey in other respects. Although the company notes that it provides DSL service to “100% of Verizon Central

³⁰ Verizon Answer at 5.

³¹ J. Romano, *Speed-Up of Fiber-Optic Network Debated*, The New York Times, Dec. 8, 1991, available at: <http://www.nytimes.com/1991/12/08/nyregion/speed-up-of-fiber-optic-network-debated.html?pagewanted=all&src=pm> (emphasis added).

³² PAR-1 at 137 (emphasis added).

³³ *Id.* at 96-97.

³⁴ N.J. Stat. Ann. § 48:5A-25.2.

³⁵ *Id.*

Offices,”³⁶ this too reveals little. DSL often does not begin to approach “data rates up to 45,000,000 bits per second and higher that will allow residential and business customers to receive high definition video and to send and receive interactive (i.e., two way) video signals.”³⁷ More importantly, Verizon admits that even though it had equipped the central offices in Greenwich Township and Stow Creek with “equipment to provide DSL,” it still does not provide many households with this service because it is “difficult” and “too expensive.”³⁸ The company is effectively saying that building out the “last mile” is costly—a point that is self-evident—but requiring that build-out is one of Opportunity New Jersey’s central objectives. Opportunity New Jersey did not allow the company to upgrade only where it was convenient.

In sum, considering Verizon’s response, unless a stipulation requires Verizon to comply fully with Opportunity New Jersey, or creates a substitute that both results in an equivalent or superior network *and* satisfies all the goals of the Board’s PAR-1 and PAR-2 orders, the Board should not adopt the stipulation, but should move forward to conclude this proceeding and to adopt appropriate remedies for noncompliance. As we now discuss, the proposed stipulation cannot substitute for Verizon’s commitments here.

³⁶ Verizon Answer at 5.

³⁷ PAR-1 at 74.

³⁸ Verizon Answer at 22.

II. THE STIPULATION IS SERIOUSLY FLAWED AND SHOULD NOT SUBSTITUTE FOR VERIZON'S OPPORTUNITY NEW JERSEY COMMITMENTS.

As the attached economic analysis demonstrates,³⁹ the stipulation is “seriously flawed and deficient” for a number of reasons. As a result, even if the Board could alter Verizon’s requirements by stipulation without a hearing on the matter,⁴⁰ it should not do so.

A. The Stipulation’s Definition of “Broadband” Is Inadequate.

As the IAE report explains, the stipulation’s definition of “broadband” is inadequate. It defines “broadband” as “delivering, through the use of any technology medium (including 4G-based wireless, fiber, copper, or cable), data transmission service at speeds no less than the minimum speed of Verizon NJ’s Digital Subscriber Line Services (“DSL”) that is provided by Verizon NJ as of today’s date.” This definition does not satisfy broadband’s required capabilities today, let alone the much higher performance levels that must characterize broadband in the near future. The standard is problematic for a number of reasons, including:

- The minimum speed of Verizon’s DSL services today—0.5-1 Mbps download and 384 kbps upload—is inadequate to support a reasonable grade and quality of service

³⁹ Information Age Economics, Analysis of the Proposed Stipulation Between Verizon and New Jersey Board of Public Utilities, attached as Attachment A (“IAE Report”).

⁴⁰ New Jersey Stat. Ann. § 48:2-21.18 governs how the Board may approve an alternative form of regulation. Because the stipulation would alter a central component of Verizon’s alternative form of regulation under PAR-1, the Board may only “approve the plan, or approve with modifications, if it finds, after notice and hearing, that the plan” satisfies eight statutory factors. *Compare In re Board Investigation Regarding the Reclassification of Incumbent Local Exchange Carrier Services as Competitive*, Docket No. TX07110873 (Dec. 21, 2007) (rejecting Rate Counsel argument that change would modify alternative form of regulation and therefore require notice and hearing). Here, the stipulation plainly alters the company’s existing requirements: “[U]pon the Board’s adoption of this Stipulation . . . , . . . Verizon NJ’s ONJ requirements will be enforced through Verizon NJ’s compliance with the BFRR process and requirements of this Stipulation.” Stipulation of Settlement at ¶ 4.

for the video-intensive applications and services that constitute the majority of traffic over broadband facilities. The stipulation does not increase over time, and it is a considerable step back from the PAR-1 standard that this Board adopted nearly 20 years ago.

- The standard's required broadband speed does not begin to compare to current broadband standards nationally or globally.⁴¹
- Defining "broadband" to include 4G-based wireless takes no account of the technology's limitations compared to copper or fiber. "4G" is essentially a marketing term, and implies almost nothing, for example, about the speed at which users can upload or download information. Current wireless networks cannot now be a complete and perfect substitute for fixed access broadband, except in the least densely populated areas, where there will be few simultaneous users. Wireless service degrades substantially as the number of users increases, and it is subject to significant usage limitations.⁴²

B. The Stipulation Significantly Downgrades Existing Opportunity New Jersey Requirements.

As the IAE Report further explains, the BFRR is a "significant step back" from the goals and commitments required in PAR-1. The BFRR not only significantly reduces the required speeds from those that the Board mandated *over 20 years ago*,⁴³ but it also materially lessens the required build-out, especially in poorer areas.⁴⁴ Unlike Opportunity New Jersey, the BFRR puts

⁴¹ IAE Report at 8-10.

⁴² *Id.* at 6-7.

⁴³ *Id.* at 3.

⁴⁴ *Id.* at 4.

the onus on potential users to request service, not on the company to deploy throughout its service area.⁴⁵ Verizon need not respond to a request in a timely way: it (or some provider) must provide service *within 9 months*. The BFRR does not constrain the prices that company may charge for such a service offering. And the BFRR does not require Verizon itself to do anything. It can “contract [] with another provider (including wireless, cable, or satellite provider) [to] arrange to have Broadband service provided to such BFRR consumer’s home or business.” This presents considerable questions about price, service quality, and about the company’s incentives to deploy.⁴⁶ Allowing Verizon to carve up service areas with another major broadband provider also raises serious antitrust concerns.⁴⁷

C. The Stipulation Effectively Imposes No Requirement To Serve Public Entities.

As inadequate as the BFRR is for addressing service to private entities, it is “even weaker and less defensible” with respect to public entities.⁴⁸ All the BFRR requires Verizon to do is to “establish a single point of contact” and then to propose whatever broadband terms it prefers. This “obligation”—if it can be called that—does not apply where a cable-service provider or 4G-wireless provider offers service. This is entirely inadequate.⁴⁹

* * *

The stipulation is not in the public interest, because it would adversely affect residences, small businesses, and local governments, and abandon specific and more substantial

⁴⁵ *Id.*

⁴⁶ *Id.* at 5.

⁴⁷ *Id.*

⁴⁸ *Id.*

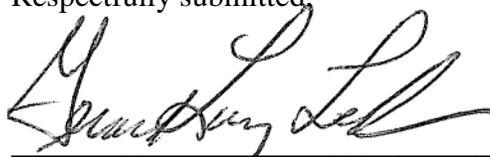
⁴⁹ *Id.*

requirements under the Board’s PAR-1 order. Adopting the stipulation would have major adverse economic impacts in Newark and across the state.⁵⁰ The City cannot fully realize its goals if many parts of the City would have “at best, access to the minimum level of broadband (that very soon will come to be recognized as at most ‘medium-band’ and not true broadband).”⁵¹ The stipulation would “not enhance economic development in the state” but instead lead to substantial underserved areas.⁵² And the stipulation would advantage Verizon over its competitors, while at the same time creating opportunities for Verizon to work with those competitors to divide markets and engage in anticompetitive conduct.

CONCLUSION

The Board should reject the proposed stipulation—which, if adopted, would represent a considerable step backward for Newark and for all communities in New Jersey.

Respectfully submitted,



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⁵⁰ *Id.* at 10-15.

⁵¹ *Id.* at 12.

⁵² *Id.* at 15.

ATTACHMENT A



Analysis of the Proposed Stipulation of Settlement Between Verizon and the New Jersey Board of Public Utilities

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Introduction

Information Age Economics (IAE)¹ has reviewed the proposed Stipulation of Settlement (“Stipulation”) between Verizon and the New Jersey Board of Public Utilities in the matter of broadband deployment and capability in the state². The Board described Opportunity New Jersey as requiring “a ubiquitous public switched network” that will “provide opportunities for new services providers to offer their products utilizing the transmission capabilities on New Jersey Bell’s advanced network.” Verizon’s proposed Settlement is presented as a resolution to the question of whether the company was in compliance, or not, with “Opportunity New Jersey” and the Plan for Alternative Regulation (“PAR”) Order in providing “full” broadband capability in the state by 2010.

IAE addresses two integrally related questions, namely:

- What would be the economic and social value of more extensive, and in particular, fiber-based broadband infrastructure in New Jersey in order to meet New Jerseyites' current and future economic and social needs and aspirations, taking into account constituencies that include residents, businesses, and municipal and other government and non-government institutions?
- Is the proposed Stipulation of Settlement based on a Bona Fide Retail Request (BFRR) procedure, as agreed to by Verizon, adequate to realize these values, and if not, what alternatives should be implemented?

The Summary Section below presents our findings, while the remainder of this document provides supporting analyses and evidence.

¹ Biographies of the authors of this document are provided in Appendix 1.

² State of New Jersey, http://www.state.nj.us/bpu/pdf/telecopdfs/20140129_verizon_notice.pdf



In summary, we find and conclude that the conditions of this Stipulated Settlement are seriously flawed and deficient among other reasons because:

- The “broadband” capability to be provided under the proposed BFRR will be inadequate, given that broadband is defined in the Stipulation as no less than the current minimum speed of Verizon’s DSL (Digital Subscriber Line) services;
- Furthermore, there is no provision for improving the broadband capability that Verizon will provide over time, even though broadband technology, speeds, and demands for increasingly bandwidth-intensive, broadband-dependent services and applications with substantial economic and social value, are increasing rapidly;
- There is also no provision for ensuring that customers of the service provided under BFRR will not be subject to unreasonably restrictive limits on their usage (expressed as the volume of data in GB (gigabytes) they are allowed to consume per month) without incurring additional costs or being subject to some form of deterioration in their service;
- Public Entities, i.e. public schools, municipal police and fire stations, emergency services, rescue squads and/or paramedics are not even subject to the BFRR process. Verizon’s commitment to these entities is limited to making broadband service available on terms, conditions and rates mutually agreeable to the parties only if they do not have access to broadband from a cable company or a 4G-based wireless service. This commitment is fundamentally inadequate for all these public entities and in particular for emergency services – and hence the public - that depend on communications services that include stringent requirements for reliability and availability. Not only are these requirements beyond the capability of typical cable networks designed for residential services and 4G-based wireless services but Verizon’s commitment to “mutually agreeable” broadband terms and conditions for these public entities is so vague as to be meaningless.
- The emphasis or onus in the Stipulation is placed on users to request service from Verizon, with no obligation on Verizon to install broadband infrastructure throughout its authorized service territory so as to be able to meet requests for service in a timely manner. Furthermore Verizon is allowed to satisfy any BFRR request by contracting with another provider. This form of outsourcing may lead to a monopoly broadband infrastructure supplier to some locations, through an agreement that involves carving up a market by geography possibly between the two largest broadband providers in an area, e.g. Verizon and Comcast, who have already established cross-marketing agreements between their services in many areas in the US. This consequence of the Stipulation has significant anti-competitive implications and may even constitute an antitrust violation.

Moreover, the conditions in the Stipulation are a significant step back from the goals and commitments expressed in the Telecommunications Decision and Order of the New Jersey Board of Regulatory Commissioners in 1993 that was the outcome of a petition by the New Jersey Bell Telephone Company (the predecessor of Verizon) that led to the PAR³. As can be

³ State of New Jersey Board of Regulatory Commissioners, Telecommunications Decision and Order, IN THE MATTER OF THE APPLICATION OF NEW JERSEY BELL TELEPHONE COMPANY FOR



seen in Section D⁴ in this Decision and Order (beginning on page 72) the following services were described at that time that are pertinent to an analysis and evaluation of the current Stipulation (the dates on the right refer to the goals that New Jersey Bell would supposedly meet under the PAR):

<u>Wideband Digital Service:</u>	Initial:	1994	1994
	95%:	undetermined but before 2030	2000

Switching technologies matched with transmsision capabilities to support data rates up to 1,500,000 bits per second, which enables services, for example, that will allow students to remotely access multimedia information, including video, from home or school.

<u>Broadband Digital Service:</u>	Initial:	1996	1996
	100%:	2030	2010

Switching technologies matched with transmission capabilities support data rates up to 45,000,000 bits per second and higher, which enables services, for example, that will allow residential and business customers to receive high definition video and to send and receive inter-active (i.e., two way) video signals.

Even speeds of 1.5 Mbps, let alone 45 Mbps, exceed what is now proposed from 2014 onwards as acceptable for Verizon to provide in order to fulfill its broadband obligation in New Jersey. We commend the following statement found in the Decision and Order on p.93 that is even more relevant today than it was more than 20 years ago, and demonstrates the retrograde nature of the Stipulation:

The increasing role of telecommunications in business can be traced to fundamental forces in the business environment, including the increasing intensity with which businesses use information and communications, and the increasing importance of telecommunications-intensive industries in New Jersey and the nation's economy. Advanced telecommunications capabilities are now widely recognized as a "competitive weapon" in economic development and business retention.

Setting aside the very significant difference between the speeds that Verizon now asks the State to approve as adequate, there is a significant difference in the build-out requirement. Under PAR-1 and PAR-2⁵, the company was obligated to build an advanced network so that it passed

APPROVAL OF ITS PLAN FOR AN ALTERNATIVE FORM OF REGULATION, Docket Number TO92030358

⁴ The title of Section D is: " WILL THE PLAN ENHANCE ECONOMIC DEVELOPMENT IN NEW JERSEY WHILE MAINTAINING AFFORDABLE RATES?"

⁵ PAR-1: *In the Matter of the Application of New Jersey Bell Telephone Company for Approval of Its Plan for an Alternative Form of Regulation*, Docket No. TO92030358, Decision and Order (May 6,



essentially 100% of the businesses and residences in the State; the PAR-1 (as well as contemporaneous reports) describe the order as requiring fiber-to-the-curb so that the costs of extending advanced networks to each user would be relatively small (and indeed, it might be possible to provide the required capacity via other technologies). This differs from the normal model, where users requiring advanced networks must pay an incumbent (or where there is an alternative, a competitor) to build a system to the end user, at the end users' cost – a system that can be expected to leave poorer areas, including poorer areas with small businesses, underserved, and which can certainly be expected to result in infrastructure being deployed under a business as usual model. The advantage of the PAR-1/PAR-2 approach is at least two-fold: first, it should help encourage the network owner to take advantage of network capabilities in order to recover costs of infrastructure build-out (particularly if coupled with other regulatory techniques), and second, it may encourage other market participants to upgrade their own networks to ensure that they are in a position to compete effectively. The BFRR approach actually is a significant step backward in this report, and a return to a model that can be expected to result in disadvantaging businesses in poorer neighborhoods, and making it more difficult to revitalize neighborhoods. The fact that some parts of New Jersey and Newark may be passed by fiber installed pursuant to the ONJ, or under the franchise authorizing provision of cable services via FiOS does not mitigate the problem that other areas are underserved (and in the case of FiOS, which is a residential service, does not mitigate the fact that some small businesses can be expected to be substantially worse off under the proposed Stipulation).

Furthermore the BFRR process places the onus and initiative for obtaining broadband service on users and does not require Verizon to take steps to deploy infrastructure throughout its authorized service territory so as to be able to provide broadband service on request in a timely and responsive manner. Verizon is given up to 9 months to satisfy a BFRR, which implies that there may be significant areas within which it will not be possible for Verizon to meet a BFRR promptly, for example by having only to connect a location to a nearby cabinet. This commitment by Verizon is a major retreat from the obligations placed on it more than 10 and even 20 years ago in PAR-2 and PAR-1 respectively as described above. Yet during this period, progress in broadband technology and growth in usage have developed exponentially. It is inexplicable and indefensible, given these conditions of profound technological and market evolution, to propose, as the Stipulation does, to dramatically reduce Verizon's commitments and obligations from their levels of 10 and 20 years ago.

Moreover, Verizon enjoys the option of outsourcing even this reduced commitment to other services providers including satellite, cable and wireless providers. Verizon refers to new satellite broadband technology with much higher speeds than its minimum DSL service, presumably to try to indicate the merits of this option, but omits to mention other concerns such as the higher latency of satellite compared to terrestrial connections, and the price of the satellite service. Will Verizon guarantee that the price will be the same whether or not it

1993); PAR-2: *In the Matter of the Application of Verizon New Jersey Inc. for Approval Of a New Plan for an Alternative Form of Regulation and (ii) To Reclassify Multi-Line Rate Regulated Business Services as Competitive Services, and Compliance Filing*, Docket No. 1001020095, Decision and Order (Aug. 19, 2003).



provides the service itself or via an outsourcing agreement? The question or uncertainty about price also applies to cable- and wireless-based outsourced services. Furthermore the proposed outsourcing option for Verizon with other providers gives it an incentive or excuse not to deploy its own infrastructure, especially since as noted above it is given up to 9 months to fulfill a BFRR. Outsourcing arrangements between Verizon and another major broadband provider (e.g. Comcast) within an area, effectively carving up a market by geography, also raise concerns about anti-competitive collusion and possible antitrust violations.

Verizon's commitment to serve public entities is even weaker and less defensible than its commitment to residences and commercial businesses, as set forth on p. 10 of the Stipulation:

"Public Entities: Public schools, municipal police and fire stations, emergency services, rescue squads and/or paramedics shall not be subject to the BFRR process described in section 1 above. With regard to any such public school, municipal police, fire station, emergency service, rescue squad and/or paramedic in Verizon NJ's authorized service territory that does not have access to Broadband from a cable service provider or access to 4G-based wireless service, Verizon NJ shall: (i) establish a single point of contact to handle inquiries about Broadband service options and (ii) shall make Broadband service available on terms, conditions and rates mutually agreeable to the parties."

In other words, Verizon has no commitment even to provide the obsolescent (as demonstrated in the following Section) minimum DSL service to public entities. Moreover it does not have ANY obligation to these users if either a cable network or a 4G-based wireless service is available (as noted 4G is a marketing term not one that is defined in terms of unequivocal broadband performance) at their location. As Verizon must know, neither of these other networks can meet the stringent reliability requirements of emergency services, while the idea that the capacity needs of schools and other multi-user public buildings can be met with 4G-based wireless services is ludicrous.

Continuing deficiencies, or gaps, in the availability and accessibility of full, adequate, and competitive broadband access services to all residents and locations within New Jersey, which the conditions of this Stipulation will permit, will have significant adverse economic and other consequences for New Jersey and for the City of Newark.

The current terms and conditions of the Stipulation must be substantially strengthened in terms of broadband performance targets and other parameters of Verizon's obligations. Certainly, all residents, businesses, and other institutions in Newark deserve and must have access to affordable broadband services of sufficient quality and capacity so that they can exploit and reap the benefits of broadband-dependent services and applications, from enhancements in productivity and quality-of-life, to job creation, and improved access to education and health care, among others.

The current Stipulation falls well short of meeting this goal.

Definition of Broadband

Broadband is defined in the Stipulation as follows (in its section 1(c)):



For the purposes of this Stipulation, Broadband is defined as delivering, through the use of any technology medium (including 4G-based wireless, fiber, copper, or cable), data transmission service at speeds no less than the minimum speed of Verizon NJ's Digital Subscriber Line Services ("DSL") that is provided by Verizon NJ as of today's date.

This definition is clearly inadequate today and going forward with respect to what should and must be the capabilities of available broadband services throughout New Jersey, let alone the much higher performance levels that will characterize broadband in the near future. This inadequacy is easily demonstrated (see below) in analyses of the broadband speeds that are found as a norm within the US and abroad, including in countries that are much poorer and less well developed economically than New Jersey. The glaring deficiency of the broadband obligation expressed in the Stipulation is also demonstrated in Appendix 2. In this Appendix the direct relationship between broadband speed and the quality, and even in some cases the practicality or impracticality, of user experiences is quantified in the context of a range of typical online tasks or activities.

First, the minimum speed of Verizon's DSL services offered today is 0.5-1 Mbps download and 384 kbps upload. This speed is completely and totally inadequate for supporting a reasonable grade and quality of service for the video-intensive applications and services that constitute the majority of, and are currently beginning to dominate traffic over broadband facilities. Verizon should not be permitted to claim and assert that it has satisfied its broadband obligations by providing this low level of capability that is effectively obsolescent today, and will soon be regarded as a dinosaur service in the fast moving world of broadband network technology.

Second, the inclusion of 4G-based wireless as a technology medium for delivering broadband in densely populated areas takes no account of the limitations of WIRELESS-based capacity compared to broadband access based on FIXED access technology media, such as copper or fiber. As an initial matter, it bears emphasizing that "4G" is essentially a marketing term, and implies almost nothing, for example about the speed at which users will actually be able to upload or download information. Hence at most all the stipulation actually does is allow Verizon to abandon wireline DSL and provide DSL-type speeds via wireless devices. Even if there were no other issues with respect to wireless as a substitute for wired connections, this would neither serve the public interest nor ensure that true broadband is available, for reasons discussed above and described in more detail below. **However, in the world of broadband, wireless access cannot now be a complete and perfect substitute for fixed access broadband, except in the least densely populated areas**, within which there will be few simultaneous users. The inherently shared nature of the limited amount of spectrum, and hence transmission capacity – including backhaul - that is available to transmit wireless services, simply cannot satisfy the burgeoning **broadband** demand within an area expressed in terms of Mbps/unit area, even if in terms of capacity but not some other features of traditional copper-based POTS (Plain Old Telephone Service) a significant proportion of US households are now meeting their **narrowband** voice communications needs through subscribing to mobile (wireless) services.



However, the presentation of the statistic of so-called wireless-only households⁶ is highly misleading since it ignores situations in which there is a wire of some kind (copper pair, coaxial cable, or fiber) connected to a location that is not however being used to deliver POTS. The reality is that subscribers to wireless phone services such as Verizon's Voice Link have fewer communications features and capabilities available to them at their locations than they do on POTS⁷, unless they also subscribe to some other services delivered over a fixed or wired connection to their location. Verizon's claim that it can fully satisfy narrowband communications needs for residences and businesses via wireless-only services is at least as retrograde and misleading if not more so than the conditions proposed in the Stipulation for its broadband obligation.

Demand for broadband access in an area is being driven by substantial (and growing) numbers of simultaneous users all making use of applications and services that generate multi-megabit per second streams of traffic. As the number of simultaneous wireless users grow, the speed experienced by any one user decreases substantially to the point where the most valuable and sought after applications and services can become practically unusable.

Furthermore, many wireless service plans are subject to limitations on their usage (volume of data that can be consumed) beyond which additional costs or some other form of restrictions may apply. These limits are typically much more stringent than those which apply, if at all, to fixed broadband subscribers. Therefore wireless services should not be included as equivalent to fixed services in terms either of potential speeds experienced by users and usage limits imposed by broadband services providers.

In contrast to wireless, one fiber to one location in an area, delivers as much dedicated capacity as the entire spectrum available for wireless services, and must be shared by, every location and user within that area. The distinctive characteristics of wireless compared to fixed access networks that are highly prized and convenient, are that it supports connectivity when people are mobile, and provides continuous, contiguous coverage or connectivity throughout an area. By their very nature, fixed access connections lack these two popular communications capabilities. On the other hand, fixed facilities deliver total capacity within an area that is far greater than that of mobile networks. While narrowband voice communications do not strain the capacity of existing wireless networks, broadband services do.

Therefore, in areas as densely populated as Newark, wireless broadband services are complementary to, not substitutes for, fixed broadband availability and affordability. Wireless should not be included as a sole technology medium for providing all

⁶ For example according to the wireless industry association, the CTIA, of which Verizon is the largest member, some 38% of US households are allegedly "wireless-only," <http://www.ctia.org/resource-library/facts-and-infographics/archive/american-households-wireless-only-infographic>

⁷ For example Verizon's wireless-based Voice Link states in its Terms of Service that it is not compatible with "fax machines, DVR services, credit card machines, medical alert or monitoring services or some high speed or DSL Internet services." It is also not necessarily compatible with home security systems, and it does not allow customers to accept collect calls or use calling cards or make other dial-around calls. It is also more vulnerable than POTS to service outages in the event of a failure of electrical power.



broadband to a location in the city, or as a substitute for the fiber build-out now required.

The following section presents evidence of the inadequacy of Verizon’s minimum DSL speed as an acceptable criterion for meeting a broadband obligation.

Cisco reported⁸ in 2013 that:

- Globally, the average fixed broadband speed will increase 3.5-fold from 2012 – 2017, from 11.3 Mbps to 39 Mbps.
- Globally, the average fixed broadband speed grew 30% from 2011 – 2012, from 8.7 Mbps to 11.3 Mbps.

Akamai has reported⁹ that as of Q3 2013:

- Global average Internet speeds have hit a new high, rising 29 percent year-over-year to 3.6 Mbps;
- 122 countries/regions have seen an increase in their average connection speeds year-over-year, ranging from 0.5 percent in Namibia (to 1.1 Mbps) to a 76 percent increase in Nepal (to 3.6 Mbps).

The speeds reported by Akamai refer to those encountered in actual usage, while Cisco reports the nominal speeds of the services offered by providers.

The following Table from this Akamai report demonstrates the average connection speeds and growth in these speeds in 10 countries including the US.

⁸ <http://newsroom.cisco.com/release/1197391/>

⁹ Akamai, “The State of the Internet,” Volume 6, Number 3.



Country/Region	Q3 '13 Avg. Mbps	QoQ Change	YoY Change
– Global	3.6	10%	29%
1 South Korea	22.1	66%	51%
2 Japan	13.3	12%	27%
3 Hong Kong	12.5	16%	39%
4 Netherlands	12.5	23%	46%
5 Switzerland	11.6	5.3%	33%
6 Czech Republic	11.3	16%	49%
7 Latvia	11.1	4.6%	28%
8 United States	9.8	13%	31%
9 Belgium	9.7	16%	46%
10 Ireland	9.6	19%	43%

Figure 14: Average Connection Speed by Country/Region

Source: Akamai

Other targets for broadband speeds worth noting to put the criterion established for Verizon in perspective include the: (i) FCC’s National Broadband Availability Target of 4 Mbps for actual download speeds and 1 Mbps for actual upload speeds (actual speeds of DSL services are typically lower than their advertised speeds), and (ii) the European Union’s target of making 30 Mbps download speeds universally available throughout its territory by 2020.

The Stipulation permits delivery of a broadband connection in New Jersey as an adequate resolution for Verizon to fulfill its broadband obligation that is slower than the average speed in Namibia and Nepal, and provides less than one tenth of the average speed exploited today in the US.

In addition, there is no provision for an increase in this minimum speed over time, despite evidence of substantial increases in the broadband speeds that are available, experienced and exploited over the past few years, and are forecast almost universally in the near future.

This agreement also implicitly accepts a level of inequality between the broadband services available to different segments of the population and locations of up to two orders of magnitude in the next few years, as speeds of many tens of Mbps become well established.



The terms and conditions of the Stipulation are manifestly unacceptable and are grossly unfair to the people of New Jersey, including Newark, who are to be offered a Verizon version of broadband that is significantly inferior to several emerging Third World countries. The role of Newark within the nation and the New York metropolitan area (as discussed later) makes these terms and conditions especially unacceptable, given the vital role of broadband as an element of the infrastructure needed to support the economic vigor and enhance the social well-being of a diverse and commercially important community such as Newark.

Impact of Broadband

There is a widely, if not universally, accepted position that broadband has a significant positive impact on socio-economic and political development, and furthermore that increased broadband speeds will also deliver even more positive and increasingly essential socio-economic benefits. A significant amount of research has been undertaken to analyze, and attempt to quantify, the socio-economic impact of broadband in countries around the world at different stages of development. The U.S. Government Accountability Office (GAO) has just released a report that delineated the value of broadband to small businesses in the U.S.¹⁰ Also recently, researchers in Sweden¹¹ analyzed the impact of increased broadband speeds, classifying them according to the groups shown in the following Table. It can be seen that the minimum Verizon speed falls into the lowest ranking. Users exploiting all the speed levels identified in this Table have been included in surveys carried out in several countries, including the US. The extent of the analyses of the economic impact of broadband that have been undertaken over several years is indicated in Appendix 3 (References), reproduced from Chalmers University in Sweden.

Table 1: Grouping of Broadband Speeds

Source: Chalmers University, *ibid*

Group	Level of Speed (Download)
LOW (< 1024 kbps)	Up to 256 kbps
	Up to 512 kbps*
	Up to 1024 kbps*
MEDIUM-LOW (1024kbps<=4Mbps)	Up to 2 Mbps
	Up to 4 Mbps
MEDIUM-HIGH (4Mbps<=12Mbps)	Up to 8 Mbps
	Up to 12 Mbps
HIGH (>12 Mbps)	Up to 24 Mbps
	Up to 50 Mbps
	50 Mbps +

* Range of speeds in Verizon's current minimum DSL Service

¹⁰ "Federal Broadband Deployment Programs and Small Business," <http://www.gao.gov/assets/670/660734.pdf>

¹¹ Chalmers University, "Need for Speed," <http://publications.lib.chalmers.se/records/fulltext/183080/183080.pdf>; "New Study quantifies the impact of broadband speed on GDP," <http://www.ericsson.com/news/1550083>



Examples of the findings of this body of research include:

- Availability and use of broadband and speed are significant enablers in an economy - various studies have concluded that an increase of 10 percentage points in broadband penetration can lead to an increase in GDP (Gross Domestic Product) of 1%¹².
- Doubling the broadband speed for an economy increases GDP by 0.3%; additional doublings of speed can yield growth in excess of 0.3 percent (e.g. quadrupling of speed stimulates GDP growth by 0.6%)¹³;
- These positive effects arise thanks to automated and simplified processes that increase productivity as well as provide better access to basic services such as education and health.

Broadband-enabled growth results from a combination of direct, indirect and induced effects. Direct and indirect effects provide a short to medium term economic stimulus. The induced effect, which includes the creation of new services and businesses, is the most sustainable dimension and could contribute as much as one third of the GDP growth. This last observation is relevant to Newark, where the service sector, or service activities that are dependent on high quality broadband services, has been growing rapidly, replacing the manufacturing industry that was once Newark's primary source of employment.

Implications for Newark

Newark covers an area of 27.1 square miles, and has a population of some 277,000, giving it a population density of about 11,460 per square mile. It is the largest city by population in New Jersey, and is the county seat of Essex County. Newark is one of the nation's major air, shipping, and rail hubs.

Newark is located in the heart of New Jersey's Gateway Region. It is the second largest city in the New York metropolitan area, approximately 8 miles west of Manhattan. Port Newark is the major container shipping terminal in the Port of New York and New Jersey, and is the largest such terminal on the East Coast.

Newark Liberty International Airport was the first municipal commercial airport in the US and is today one of its busiest.

Newark includes a diversity of neighborhoods among its five geographical wards. They range from busy urban and industrial districts to quieter residential areas. Newark also includes Branch Brook Park, the oldest county park in the US.

¹² IAE does not believe that this result, which is among the most optimistic of similar findings, will be achieved from all levels of existing broadband penetration. Nevertheless it does indicate the kind of economic benefit that may be achieved if broadband, along with other essential initiatives, is made available to segments of the population that are currently un- or under-served.

¹³ IAE does not believe this effect will continue indefinitely as broadband speeds continue to rise, however it should apply when considering increases in speeds above the minimum level of Verizon's DSL service.



Newark is racially and ethnically diverse (the second most diverse city in the state in this regard after neighboring Jersey City). According to the 2010 Census, Latinos and African-Americans account for about 85% of its population. Poverty remains a consistent problem in Newark, despite its revitalization in recent years.

Newark is selected as the headquarters for numerous national corporations, such as Prudential Financial and the utility PSEG. It is also home to several universities, such as Rutgers-Newark (including its Law School), the New Jersey Institute of Technology, and Seton Hall University Law School. Newark also contains several cultural and sports venues, including the New Jersey Performing Arts Center, the Prudential Center, and the Bears and Eagles Riverfront Baseball Stadium.

As demonstrated by the preceding overview, historically and today, Newark is an important city in its own right, as well as within regional, national and global contexts. Its future and further revitalization depend on having a world-class infrastructure, which in this century must include broadband as a key component, and as important and essential as transport, e.g., roads, bridges, rail, water, and air.

Universally accessible and affordable high quality broadband to residences and to business, subject to conditions at least consistent with those reflected under PAR-1 and PAR-2 is an essential and necessary component of infrastructure for Newark, and is especially true going forward, if it is to achieve its full economic potential, in its own urban context as well as in regional, national and global contexts, while also increasing its attractiveness as a place to live. The economic growth of Newark is integrally linked to its attractiveness to current and potential future residents who, with the help of broadband and the applications and services delivered via broadband networks, will be more likely to find employment or even to found new productive business operations within the city's boundaries, and to enjoy effective social and other services from education and broadband to cultural and other activities.

These legitimate aspirations of Newark as a community will not be fully realized if there are pockets or locations within the city that have, at best, access to the minimum level of broadband (that very soon will come to be recognized as at most "medium-band" and not true broadband).

Nor can one ignore these impacts merely because Verizon, in its role as a cable franchisee, would be required to build out a FiOS network in Newark pursuant to N.J. Stat. Ann. § 48:5A-25.2 (West), which requires, among other things, that Verizon "make *cable television service* available throughout the *residential areas* of any such municipalities *within six years* of the date the CATV company first provides cable television service on a commercial basis directly to multiple subscribers within such central office area, subject to the CATV company's line extension policy; provided, however, that such provision of service shall not be required in: (a) areas where developments or buildings are subject to claimed exclusive arrangements with other CATV companies; (b) developments or buildings that the CATV company cannot access, using its standard technical solutions, under commercially reasonable terms and conditions after good faith negotiation; or (c) areas in which the CATV company is unable to access the public rights-of-way under reasonable terms and conditions." The company, as a cable provider, is not required to provide the sort of public switched network that would allow others to use the



system to provide services; it need not serve small businesses; its obligation to build is subject to important exceptions; and it need not provide 45 Mbps upstream and downstream to residences, or any data services at all.

If the Stipulation is all that Verizon is prepared to offer, the Stipulation should be deemed unacceptable. The adverse consequences of the shortfalls outlined above will include:

- A smaller tax base for the city, since property values will be lower and fewer businesses (e.g., home-based businesses among others) can be started, operated, or will be willing to move to where broadband is inadequate:
 - *Consequently the resources available to maintain and improve municipal services will be more limited.*
- Fewer new residents will be attracted to Newark while a greater number of current residents may move to locations in other areas with better broadband services.

One example of the damage from inadequate broadband speeds illustrates these problems. A school child of a low-income family may have access to broadband applications and services at school and in a public library, but not at home where it is also needed. As a result he/she may find it almost impossible to keep up with other more fortunate classmates who enjoy adequate residential broadband and can continue or pursue online research for their schoolwork at home.

A passage in the Telecommunications Decision Order is remarkably prescient about the value of the deployment of broadband infrastructure and the firm nature of and need to monitor the commitment made in this regard by New Jersey Bell Telephone, i.e., today's Verizon, as follows:¹⁴

¹⁴ Telecommunications Decision and Order, *ibid*, page 86.



Staff indicates it is satisfied that the analysis submitted by NJ Bell, which quantifies certain benefits such as the potential new employment and increased tax revenues due to the accelerated infrastructure deployment, appears reasonable (STb138). However, noting that these calculations have been predicated on the projected deployment of the network and are therefore wholly dependent upon the timely completion of ONJ, and accordingly, that any drastic deviation from the schedule as submitted by NJ Bell would have a direct and likely negative impact on the employment and tax revenue projections, Staff submits that it is, therefore, important for the Board to monitor ONJ and require NJ Bell to commit to achieving the entire plan, including fiber to the curb, so the projected benefits become a reality (STb138 to STb139). Thus, in exchange for permitting NJ Bell to be governed by an alternative form of regulation, Staff recommends that it is critical that the deployment scheme described in ONJ be considered a firm commitment on NJ Bell's part (STb140). While it recognizes that certain elements of ONJ are based upon projections in technology development, Staff submits that the record clearly establishes that the technology is being developed and NJ Bell's projections are reasonable; therefore, Staff recommends that NJ Bell be required to meet or exceed the schedules set forth in ONJ (STb140). Further, Staff recommends that the Board closely monitor NJ Bell's deployment on an ongoing basis and reserve the right to seek a further acceleration of the benefits of ONJ if the technology and/or costs of actual deployment become more advantageous than projected.

Furthermore, the existing extent of poverty in Newark, noted above, provides a broader reason for concern about ensuring that adequate broadband is made available to substantial segments of the population that Verizon appears inclined not to serve within its authorized service territory. Broadband is one element in providing lower income residents with the means to improve their lot, specifically and especially opportunities for their children. No one – including small businesses serving poorer neighborhoods - should be written off or dismissed, with no or inadequate and inferior broadband service, just as it is now unthinkable not to bring reliable electricity capable of powering multiple appliances and devices to all US households and businesses.

In its networks, Verizon depends on the use of significant public assets (such as rights-of-way and spectrum). While Verizon is entitled to an opportunity to receive a reasonable return on its investments, provided it operates efficiently and responsively to the needs and expectations of its customers, this dependence also puts Verizon under the obligation to serve the public interest, i.e., the “owners” of these valuable assets – particularly where rate structures and public obligations have been centered around obligations to build an advanced network. A basic obligation is to provide service to all customers, which in the 21st century includes affordable access to adequate broadband that minimum-level DSL no longer provides.



In its PAR-1 Order and PAR-2 Orders approving an alternative regulatory model, the Board noted that in order to approve an alternative form of regulation, or modify an approved alternative form of regulation, the “Board must find that the plan:

- (1) will ensure the affordability of protected telephone services;
- (2) will produce just and reasonable rates for telecommunications services;
- (3) will not unduly or unreasonably prejudice or disadvantage a customer class or providers of competitive services;
- (4) will reduce regulatory delay and costs;
- (5) is in the public interest;
- (6) will enhance economic development in the State while maintaining affordable rates;
- (7) contains a comprehensive program of service quality standards, with procedures for Board monitoring and review; and
- (8) specifically identifies the benefits to be derived from the alternative form of regulation.”

The proposed Stipulation fails this test. There is certainly no evidence or findings that address any of the points above, and based on our analysis of the stipulation:

- One can fairly conclude that it will not enhance economic development in the state, and would in fact likely lead to New Jersey and pockets of Newark remaining underserved.
- One can fairly conclude it is not in the public interest, because of the impact on small businesses and residences of the BFRR model, and the abandonment of the much more specific PAR-1 and PAR-2 requirements.
- To the extent it allows Verizon to maintain the benefits it obtained in return for alternative regulation, while avoiding the obligations, it advantages Verizon over its competitors; it also encourages Verizon to engage in anticompetitive behavior by working with its competitors to carve up a market by geography; and for reasons suggested above, it will prejudice classes of customers in poorer, or more-expensive-to-serve areas by making it difficult or impossible to obtain affordable access to its networks.



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Dr. Alan Pearce founded Information Age Economics in 1979 after a senior-level policy career in the U.S. Government from 1971 to 1979.

As one of the prime architects of public policy at the Federal Communications Commission in the 1970s, Dr. Pearce helped lay the foundation of a new information era. Beginning in 1971, Dr. Pearce was chief economist and special assistant to FCC Chairman Dean Burch and later to his successor, Richard Wiley.

Dr. Pearce next became chief economist, Subcommittee on Telecommunications, U.S. House of Representatives, where he was responsible for developing legislation and monitoring the telecommunications-information-entertainment industry via hearings, consultations, and reports.

After leaving the House, Dr. Pearce joined the Office of Telecommunications Policy in the Executive Office of the President, as chief economist and senior policy adviser. He was responsible for coordinating policy research and developments emanating from the many federal departments and agencies that hold industry regulatory authority.

Since leaving the government, Dr. Pearce has provided professional services to telecommunications, wireless, satellite, cable TV, movie and program production companies, and broadcasting corporations, along with software and equipment manufacturers. He has also consulted with a wide variety of government organizations at the international, federal, state, and local levels.

Dr. Pearce has assisted clients in the United States and overseas with negotiations on privatizations and appropriate regulatory structures (The European Union, Britain, France, South Korea, Australia, Mexico, among others), spectrum auctions, antitrust issues and actions, mergers and acquisitions, appraisals and valuations, franchises, and service rates.

Dr. Pearce holds bachelor and master degrees from the London School of Economics and Political Science, University of London, and a doctorate in business and telecommunications from Indiana University.



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Martyn Roetter is a management consultant & advisor to high technology business executives, regulators, and investors on matters involving products, markets, competitors, sales channels, and technology. His work frequently involves the application of global perspectives in dealing with the complexities of challenges whose outcomes depend upon the interactions between business and market dynamics, technologies, finance, and public policy. He has extensive business experience in Europe, the Americas, Asia and elsewhere. Over the course of his career he has initiated or contributed to the foundation and growth of several new services businesses. He has over 30 years of consulting experience with Arthur D. Little, PA Consulting and others as well as his own firm - MFRConsulting. He is also associated as a Senior Adviser with Information Age Economics (Washington DC), the South Africa-based BMI-TechKnowledge (see for example www.bmi-t.co.za/?q=content/bmi-t-navigator) and with the Pacomm Consulting Group (www.pacomm.com) in Whitby, Ontario, Canada.

Representative engagements dealing with broadband covering fixed network and wireless-related issues include:

- Technical, market, and business assessment and comparison of the likely roles and relative advantages and disadvantages of HSPA, mobile WiMax and other broadband mobile wireless technologies in a global context on behalf of the GSM Association (GSMA)
- Analysis of the validity of AT&T's assertions claims filed with the FCC and presented in other forums to obtain approval of its now abandoned proposal to acquire T-Mobile USA and development of evidence to refute them from both U.S. and international (especially German) sources
- Development of recommendations for public policy and regulation in the ICT Sector for the Department of Communications in South Africa, including assessments of recent developments in policy and regulation in selected benchmarking countries in Latin America and Asia
- Preparation of a policy paper for submission to the President of Brazil on "Accelerating Broadband Access in Brazil"
- Elaboration of a strategy for the Palestinian Authority to secure additional spectrum for mobile broadband communication for Palestinian operators from Israel
- Due diligence (market and technology) of a multiple cable TV system operator in Korea on behalf of a U.S.-based investment bank. The bank made an investment of about \$140 million in this business.

Martyn was a Vice President and Partner at Arthur D. Little, Inc., based in Cambridge, Massachusetts. He founded the European arm of the company's TIME (Telecommunications, Information, Media, and Electronics) practice in Europe from a base in Paris, and later led this



practice at various times in North America and at the global level. He served as a member of the Board of Directors and Chairman of the Compensation Committee of Allen Telecom (a leading global supplier of wireless subsystems) from 1998 until its acquisition by Andrew Corp. in 2003.

He has published and been frequently quoted in the business, financial, and trade press on issues affecting the communications and information industries, and has co-authored several books on the uses of information technology. He is a member of the IEEE and the IEEE Communications Society.

He was educated in England, Germany, and the U.S., and holds a doctorate in physics from the University of Oxford. A U.S. citizen, he speaks French and German in addition to English.

Appendix 2: Comparison of Speeds in Verizon’s Broadband Service Plans

Table A2: Comparison of Verizon’s Broadband Services¹⁵

COMPARISON OF VERIZON’S SERVICE PLANS	DSL- DL: 0.5-1 Mbps; UL: 384kbps	DSL- DL: 1.1-3 Mbps UL: 384kbps	DSL- DL: 3.1-7 Mbps; UL: 768kbps	DSL- DL: 7.1-15 Mbps; UL: 768kbps	FiOS- DL: 15 Mbps; UL: 5 Mbps	FiOS- DL: 50 Mbps; UL: 25Mbps
Download E-Book (1 -5 MB)	8-40 seconds	2.7-13.3 seconds	1.1 -5.7 seconds	0.5-2.7 seconds	0.32-1.6 seconds	0.16-0.8 seconds
Download 10 songs (50 MB)	6.7 minutes	2.2 minutes	1 minute	26.7 seconds	26.7 seconds	8 seconds
Upload 10 Photos (25 MB)	8.7 minutes	8.7 minutes	4.3 minutes	4.3 minutes	40 seconds	40 seconds
Upload 200 Photos (250MB)	86.8 minutes	86.8 minutes	43.4 minutes	43.4 minutes	6.7 minutes	1.3 minutes
Download Standard Definition (SD) Video (1.5 GB)	3.3 hours	1.1 hours	28.6 minutes	13.3 minutes	13.3 minutes	2.7 minutes
Download 1 HD Video (5GB)	11.1 hours	3.7 hours	1.6 hours	44.4 minutes	44.4 minutes	13.3 minutes
Wi-Fi Hotspot Access	No	Yes	Yes	Yes	Yes	Yes

Notes: The 3.1–7 Mbps and 7.1–15 Mbps DSL Service tiers and FiOS (fiber-based) services are available in select locations only. Availability is subject to final confirmation by Verizon. These times are all overly optimistic since they assume the user enjoys the maximum advertised speed of each service that is usually not the case. Effective throughput is also bound to be lower than the actual transmission speed as a result of communications overhead and other factors.

¹⁵ Source: Adapted from Verizon: <http://www.verizon.com/home/highspeedinternet/high-speed-internet-plans/#plans> and <http://www.verizon.com/home/fios-fastest-internet/> (both accessed March 16, 2014), and IAE calculations



Furthermore, the lowest levels of Verizon's DSL services are incapable of supporting reasonable quality symmetric traffic streams such as those in video conferencing applications, like FaceTime or Skype video, that require at least 0.5-1Mbps capacity in both upload and download channels. The absence of access to Verizon's hot spots in its lowest tier of DSL services is another severe practical limitation on the usefulness of this service to its subscribers as the proportion of broadband use that takes place via Wi-Fi access outside home or employer locations continues to grow.

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