



**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION**

IN THE MATTER OF

**FEDERAL-STATE JOINT BOARD ON
UNIVERSAL SERVICE:
PROMOTING DEPLOYMENT AND
SUBSCRIBERSHIP IN UNSERVED AND
UNDERSERVED AREAS, INCLUDING
TRIBAL AND INSULAR AREAS**

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CC DOCKET NO. 96-45

COMMENTS OF

KENNETH GORDON, Ph.D.

ON BEHALF OF

THE VIRGIN ISLANDS TELEPHONE COMPANY

DECEMBER 17, 1999

n/e/r/a

Consulting Economists

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**COMMENTS OF KENNETH GORDON, PH.D.
DECEMBER 17, 1999**

I. QUALIFICATIONS & INTRODUCTION

I am Senior Vice President of National Economic Research Associates, Inc. (NERA), where I specialize in utility regulation and related issues. I was Chairman of the Massachusetts Department of Public Utilities from January 1993 to October of 1995 and came to the Massachusetts Commission from the Maine Public Utilities Commission, where I also held the office of Chairman from 1988 through the end of 1992. Prior to that, I was an Industry Economist at the Federal Communications Commission's Office of Plans and Policies and earlier taught at several colleges since 1965, the most recent position having been at Smith College.

I was an active member of the National Association of Regulatory Utility Commissioners (NARUC) and served as president of that organization in 1992. I was also a member of the Executive Committee, and the Committee on Communications of NARUC. I served as Chairman of the New England Conference of Public Utilities Commissioners Telecommunications Committee, and am a former Chairman of the Power Planning Committee of the New England Governors' Conference. I have authored a number of publications and lecture widely on topics related to utility regulation. I am a graduate of Dartmouth College and

hold a doctorate in economics from the University of Chicago. A copy of my curriculum vitae is attached.

The purpose of my Comments is to demonstrate that the use of an unmodified national proxy cost model to determine the appropriate level of Federal universal service support for the U.S. Virgin Islands is likely to result in significant errors, and lead to adverse consequences for the telecommunications services consumers located there. The U.S. Virgin Islands have sufficiently unique economic, geographic and demographic characteristics that uncritical use of a national proxy cost model simply misses too many important drivers of both capital and operating costs, and likely results in levels of Federal funding that are too low relative to the underlying economic costs of providing service. The results are negative consequences in either the level of telecommunications deployment or subscribership. The harm could be significant and have non-trivial spillover effects because of the important role infrastructure development plays in the development process of small island economies. In my Comments, I:

- Analyze the unique economic and geographic conditions of small island economies (like the U.S. Virgin Islands) and identify how the Virgin Islands is different from the mainland locations upon which the FCC's proxy cost model is based;
- Discuss the importance of infrastructure development (such as telecommunications) to the growth of developing economies;
- Explain why the unique conditions of small island economies make it impossible to use a national proxy cost model to determine universal service costs. A national proxy cost model misses too many important factors;
- Discuss the likely negative consequences that will result if a national proxy cost model is used to determine universal service costs.

Instead of using a national proxy cost model for the U.S. Virgin Islands, the Commission should—until such time as appropriate modifications and refinements in the national model are made that can better reflect underlying cost conditions in the Virgin Islands—institute a hold harmless rule whereby the U.S. Virgin Islands receive the same level of support as currently, and are not harmed by the Commission’s universal service reform. While it is certainly appropriate to adjust universal service payments up or down in response to clearly understood cost characteristics, such adjustments should not be made in the dark. At a minimum, if the Commission insists on basing universal service support in the U.S. Virgin Islands on forward-looking costs (whether based on a national proxy model or a company-specific model), it should simultaneously guarantee that its historic obligation of ensuring that regulated phone companies—like the Virgin Islands Telephone Company (“VITELCO”)—have the opportunity to recover all their prudently-incurred costs is not lost in the process.

II. ECONOMIC PROBLEMS ENCOUNTERED BY SMALL ISLAND ECONOMIES

A. Smallness and Inability to Achieve Economies of Scale

Small island economies suffer from a number of economic characteristics that limit their ability to grow and that make them highly dependent on external factors beyond their control. Small economies are limited on the demand side in their capacity to produce goods and services and their production processes are therefore characterized by higher unit costs than larger economies. The size of the market in small island economies is usually very limited and economic theory suggests that this will negatively affect a host of important economic factors such as:

- the ability to specialize in production (thereby not being as productive as possible);
- the number of enterprises that can coexist in a market (thereby limiting the intensity of competition and resulting in higher unit costs and prices);
- economic self-sufficiency — smallness of the domestic economy increases dependence on movements in external factor and final good prices.

Most importantly, a limited market prevents firms from capturing economies of scale associated with increases in production and thus negatively affects how cheaply goods and services can be produced, and decreases the competitiveness of domestic producers in world markets.¹ The fact that small island economies are unable to generate the necessary economies of scale affects a host of economic factors, not just the ability to successfully compete in broader markets. For purposes of the main theme of this paper—that a national proxy cost model simply ignores too many unique conditions in the Virgin Islands—a particularly important effect of the inability to achieve significant economies of scale is the impact it has on unit transport costs. Transport costs to small island economies are likely to be unusually high and, as described below, use of a national proxy cost model fails to account for those higher transport costs. In fact, the model that is currently being considered by the Commission fails to account for transport costs in general.

There are several important reasons why small island economies suffer from high unit transport costs. First, smallness and lack of economies of scale cause unit transport costs to be higher. The costs associated with transporting goods are mainly invariant to the size of the

¹ Economies of scale are resource savings arising from increases in production. Economies of scale are possible because of the existence of fixed costs and being able to recover fixed costs over greater levels of output, resulting in lower average fixed costs.

cargo (i.e., they are fixed). Once the size of the ship has been chosen, the machinery put in place and the fuel purchased, the marginal cost to transport an additional container is small (assuming, of course, there is no constraint on capacity). As a result, unit transport costs decrease as the number of containers being shipped increases. Small island economies (like the U.S. Virgin Islands) are unable to reap large economies in transport because they simply do not import or export sufficient volumes of goods. In addition, newer transport technologies that make it possible to transport greater volumes of goods (such as new and improved very large container ships and jumbo long-range aircraft) have marginalized small island economies because these economies are too small to justify the high start-up costs involved with using these newer technologies. Small island economies simply lack the requisite demand to make the use of these technologies cost-effective. As a result, small island economies tend to remain outside the dominant trade networks that these technological trends have brought about.²

Second, small island economies are usually net importers of physical goods, which causes an imbalance between inbound and outbound movements of goods. As such, there is an under-utilization of transport capacities in outbound transport that causes high unit costs for inbound flows. A shipper will require a higher price to ship to the U.S. Virgin Islands if there are fewer goods on the return trip. The end result is higher unit transport costs because since containers often leave with few goods the high opportunity costs of such trips will be reflected in higher inbound unit freight rates.

² "The Economic Disadvantage of Island Developing Countries: Problems of Smallness, Remoteness and Economies of Scale," Gerard Fischer and Pierre Encontre in *Competition Strategies of Socio-Economic Development For Small Islands*, Volume 2, Edited by Godfrey Baldacchino & Robert Greenwood, Institute of Island Studies, University of Prince Edward Islands, 1998.

Lastly, remoteness obviously directly increases transport costs. Many small islands are located at significant distances from the economies and markets that are the source of their imports and exports. For example, the U.S. Virgin Islands are located in the middle of the Caribbean Sea some 1200 miles off the coast of Florida. Transport costs (such as fuel and other expenses) increase with the length of the trip. Long distances from these markets and reliance on less advanced and more uncertain regular transport technologies increase transport costs disproportionately, in particular, and increase the likelihood of delays, thus further adding to costs.

The deleterious consequences of an inability to achieve economies of scale in a variety of economic activities extend to the infrastructure sectors, including telecommunications. This, in turn, increases the costs of transporting goods and services within island economies. A lack of sufficient demand makes projects in infrastructure more costly and, in some instances, uneconomical. Investments in roads, airports, port facilities and telecommunications are at levels below those that achieve significant economies of scale and unit costs are therefore higher. As a result, the costs to VITELCO of providing service is raised because the infrastructure needed to move supplies within and among the islands and provide for basic needs such as water and electricity is not fully developed and is poor in quality. Thus, Vitelco must provide a greater capability for itself in this area than most telephone companies have to. For example, it must in some cases provide double backup generators to ensure an appropriate level of reliability. This is particularly problematic because the U.S. Virgin Islands is not one island but consists of several islands. And, as discussed below, in the U.S. Virgin Islands there

are high maintenance expenses because of the harsh weather conditions. However, it is precisely the infrastructure sector that is indispensable to the development process. As a result, many small island economies are dependent on grants and other external sources of financing.³

Finally, the lack of skilled labor is another important negative effect of smallness and is relevant to the topic at hand because, in many instances, trained personnel will have to be imported to the island to perform essential telecommunications tasks that are not needed on a continuous basis. In small island economies there is a scarcity of effective support services such as professional services (engineering, legal, financial, etc.) and training, transport and marketing services. In many cases, the skills required to perform these tasks are simply not present in the island economies and when the need arises for such services their importation will be necessary and costly.

III. CONDITIONS IN THE U.S. VIRGIN ISLANDS

A. Telecommunications Sector

The telecommunications industry in the U.S. Virgin Islands lags behind the U.S. mainland in a number of important respects. First, penetration is approximately 88 percent compared to the average of 94 percent for the U.S. mainland.⁴ This means that there is a non-trivial portion of the population without phone service, who cannot be reached by current

³ In 1997, for example, the U.S. Federal government spent approximately \$625 million in the U.S. Virgin Islands a good portion of which was non-direct Federal activity such as support for local government as well as territorial business and individuals. "A Report on the State of the Islands 1999," U.S. Department of the Interior, Office of Insular Affairs, at 47 ("*U.S. Department of Interior Report*").

network subscribers. Since penetration rates are close to universal in the U.S. mainland, the benefit to society of an additional telephone network subscriber is entirely composed of the private marginal benefits of a small set of other network subscribers. The value of the positive network externality is very small. In contrast, when penetration rates are lower (as in the case in the U.S. Virgin Islands) the value of the network externality when additional users access the network is likely to be higher, and the justifications for promoting universal service correspondingly larger. As described below, this implies that the loss in positive network externalities resulting from higher residential access prices is likely greater in the U.S. Virgin Islands than in the U.S. mainland.

Second, unlike many states in the mainland, there is no intraLATA toll service and minimal Commercial Mobile Radio Service (“CMRS”) activity, implying that errors in universal service funding for the U.S. Virgin Islands will have to be directly made up through higher local exchange prices. But higher prices for phone service negatively affect demand. Normally, increases in prices to remove price ceilings or subsidies improve economic welfare.⁵ In this case, however, because of the network externalities that are present, the increase in price could actually lower economic welfare if it results in a significant drop in penetration. Moreover, there are significant political uncertainties in attempting to implement toll service between the Virgin Islands. Currently, calls are flat-rated between the major cities (St. Thomas,

⁴ There is a lack of publicly available information on penetration in the U.S. Virgin Islands. The 88 percent figure comes from VITELCO and is an approximation based on company expertise. Data on the U.S. penetration come from the Commission’s 1999 *Monitoring Report*.

⁵ When prices are below economic costs, suppliers react by producing an amount that is less than the economically optimal amount and, as a result, some consumers are denied the good or service in question.

St. Croix and St. John) and a change away from flat to measured service rates would not likely be easy to accomplish politically.

Third, physical geographic conditions impact the costs of deploying telecommunications infrastructure. Parts of the U.S. Virgin Islands were formed from a volcano and are largely volcanic rock, which is very difficult and costly to excavate. The topography of the Island is irregular and mountain-like which increases the costs of most aspects of providing telephone service — e.g., construction, ongoing maintenance, and access to outside plant. And the geographic features in the U.S. Virgin Islands make construction difficult. There are also mountains and bodies of water that separate the population centers, which further increase the costs of deploying telephone service.

Lastly, the telecommunications industry must cope with severe weather conditions as a normal and recurring feature of the Islands. Two major hurricanes hit the U.S. Virgin Islands within a span of six years, hurricane Hugo in 1989 and hurricane Marilyn in 1995. The combined economic costs of these two hurricanes to the U.S. Virgin Islands was in the range of \$3 – 4 billion in damage to homes, businesses, utilities, and commercial buildings.⁶ Within the past month, the U.S. Virgin Islands were hit by hurricane Lenny, a magnitude 4 hurricane that caused damage similar to that caused by hurricanes Hugo and Marilyn. Prior to that, the U.S. Virgin Islands were hit with hurricane Jose, a magnitude 3 hurricane. The costs to VITELCO of these hurricanes are significant. According to VITELCO, Hurricanes Hugo and Marilyn cost the company \$124.4 million and the continued threat of other hurricanes caused VITELCO to

⁶ *U.S. Department of Interior Report* at 46.

incur additional costs such as costs associated with preparing for potential hurricanes, and non-productive time spent for mobilizing manpower and material.⁷ As discussed below in greater detail, extreme weather conditions routinely increase the costs of providing telecommunications services and do so in ways that are unlikely to be accounted for in a national proxy cost model.

B. Economic Conditions

Economic conditions in the U.S. Virgin Islands are also relevant for purposes of this paper because the Islands have been hit hard by a number of economic factors and only recently are showing signs of recovery. The Commission should recognize that any changes in Federal universal service funding would impact the economy for better or worse. Contrary to popular perception, the U.S. Virgin Islands are by no means wealthy; about a quarter of the population live in poverty, severe economic problems persist, and reductions in Federal universal service support cannot easily be absorbed domestically without significant costs to the economy.

The key industries in the U.S. Virgin Islands are tourism, watch assembly, rum production, oil refining and construction; Hess Oil is the island's largest private sector firm employing approximately 2,000 workers (10% of the labor force) while the government sector is the largest single source of jobs employing over 13,000 workers.⁸ The per capita income of the islands is approximately \$12,000 (80% of the U.S. mainland level).⁹

⁷ In addition to Hurricane Hugo and Marilyn, VITELCO used resources for preparing for the following hurricanes: Louis in 1995, Bertha in 1996, Georges in 1998, Jose and Lenny in 1999.

⁸ *Ibid* at 46.

⁹ *Ibid* at 46.

The U.S. Virgin Islands have been immune to the strong economic growth experienced in the U.S. mainland during the 1990s. Throughout the 1990s, the Virgin Islands economy has been nearly stagnant as measured by a number of important statistics. Table 1 below presents some important economic statistics on the U.S. Virgin Island since the early 1990s. As the Table shows, even tourism—one of the main industries in the Virgin Islands—has fared poorly in the last six years. The civilian labor force, income tax receipts, the number of tourists, cruise ships, occupancy rates in hotels, the number of hotels, and the total expenditures by tourists have all actually dropped during the last six years.

Table 1: U.S. Virgin Islands economic statistics

Variable	1993	1994	1995	1996	1997	1998	% change¹
Civilian Labor Force (thous)	53.5	50.4	47.8	45.4	45.7	45.9	-2.37
Total Exports (\$ mil)	2191.4	2487.7	3026.3	3651.5	3453.5	2640.1	3.41
Individual Inc. Taxes (\$ mil)	213.7	182.6	174.7	177.5	183.7	187.5	-2.04
Real Property Taxes (\$ mil)	52.3	37.1	49.7	23.6	45.6	38.6	-4.37
Hotel Room Taxes (\$ mil)	10.2	10.8	11.6	5.1	12.0	9.5	-1.14
Tourists	549.5	540.5	454.0	372.6	392.9	422.3	-3.86
Tourist Expenditures	615.0	621.1	534.7	446.3	487.0	509.8	-2.85
# of Cruise Ships	1035	1045	904	917	987	953	-1.32
Hotels/Lodging Places	4260	4250	3910	2580	3380	3840	-1.64
Total Rooms/Units	5406	5461	5154	4087	4401	4929	-1.47
Occupancy Rate	60.9	57.4	59	51.6	53.3	52.5	-2.30

[1] Average annual percent change, 1993-98. Source: U.S. Virgin Islands Government Development Bank, *Annual Economic Indicators* and *Annual Tourism Indicators*.

IV. IMPORTANCE OF TELECOMMUNICATIONS TO SMALL ISLAND ECONOMIES

The Commission's decision on universal service—specifically, the calculation of the costs of universal service—will have an important impact on the telecommunications sector in the U.S. Virgin Islands. While this is certainly the case in the U.S. mainland as well, the effects—both positive and negative—of any decision will be more pronounced in the U.S. Virgin Islands because of the importance of the telecommunications sector (and other infrastructure industries) to developing economies. The growth of a modern, adequate telecommunications sector is vital to economic development and is a prerequisite to achieving a vibrant and diversified economic structure. Therefore, any changes in Federal universal service policy must clearly recognize this reality, and the Commission should be cautious when or if it contemplates applying any changes in universal service to the Virgin Islands.

There are a number of reasons why the telecommunications sector is particularly vital to the development process. At low levels of economic development, when the economy is not diversified and is highly dependent on only a few key sectors, economic development is generally characterized by growth in sectors that confer broad benefits throughout the economy. These sectors produce what are known as “high external economies” because they establish the prerequisites for subsequent economic growth in other sectors through economies of scale, localization and urbanization.¹⁰ For example, before attempting to attract foreign direct investment into an economy, there should be in place a minimally acceptable level of urban

¹⁰ “Planning for Sustainable Development: Guidelines for Island Developing Countries,” United Nations Department for Development Support and Management Services, Division of Economic Policy and Planning Branch, New York, 1994, at 36, (“UN Report”).

infrastructure, communications facilities, electricity generation, water distribution, etc. Stated a bit differently a minimum threshold in the high external economies is required to attain an economic structure that will enable the more broadly diversified growth of domestic private entrepreneurial activities.

Without the existence of a minimally acceptable level of telecommunications infrastructure, the development of small island economies suffers. Telecommunications is vital to the economic development process because it confers broad external benefits, and as the telecommunications sector grows in quantity and quality, significant positive spillovers into other sectors occur. Telecommunications makes all markets work better because it reduces asymmetries in information between buyers and sellers and is a vital input into the production process of most businesses. The World Bank has identified important benefits to the development process from improved telecommunications infrastructure.¹¹ They include: increased market information for buying and selling goods and services; increased transport efficiency and regional development; providing critical information during emergencies in isolated areas; and coordination of international activity.

A particularly important benefit of telecommunications in the development process is the role it plays in creating linkages between rural and urban areas. According to a United Nations Report:

The importance of creating linkages between rural and urban area economies and that of fostering rural-urban area integration is recognized by many

¹¹ *Telecommunications & Economic Development*, Robert J. Saunders, Jeremy J. Warford and Björn Wellenius, World Bank, 1994.

developing and developed countries as a major strategy element in national development.¹²

Creating linkages between rural-urban areas is important for increasing the overall rate of growth of an economy. Economic activity in small island economies is usually polarized because there is a concentration of market activity in the predominantly urban areas, while in more rural areas the dominant characteristic is subsistence-oriented economic activity that is largely unlinked to the rest of the economy. The end result is an under-utilization of resources for economic development. Creating closer linkages helps reduce the inefficiencies arising out of this dichotomy by providing valuable information to market participants that helps them make efficient production decisions. And it is the development of efficient and high quality infrastructure sectors, including telecommunications, that is a prerequisite in order for small island economies to obtain the benefits of linkages between rural-urban areas.

In Section III above, I discussed some basic features of the telecommunications sector in the Virgin Islands and concluded that it lags behind the mainland in some important respects and is unique from both a cost perspective (e.g., the difficulties involved in building and constructing) and a demand perspective (e.g., low-income population, no intraLATA toll service). Nevertheless, compared to other developing economies where penetration rates are much lower, the telecommunications sector in the Virgin Islands fares reasonably well. But, an important reason why this is the case is the significant role played by the Federal government in universal service. With the assistance of a host of Federal universal service programs (such as the high cost fund, lifeline, linkup, and DEM weighting) the telecommunications sector in the

¹² UN Report at 72.

Virgin Islands is fairly well developed and approaches a quality high enough to fulfill the vital tasks described in this section.

More needs to be done, however, if the U.S. Virgin Islands economy is to be diversified and economic performance improved, and the role of telecommunications is as necessary as ever to ensure that the U.S. Virgin Islands meet these important goals. For these reasons, any changes to the Commission's universal service policy with respect to the U.S. Virgin Islands must be carefully weighed and considered because the impact of errors will be felt more profoundly in the Islands than in the U.S. mainland. One of the changes that should not be made is to apply a national proxy cost model to determine the costs of universal service in the U.S. Virgin Islands. The unique conditions in the U.S. Virgin Islands make the use of a proxy cost model to estimate forward-looking economic costs fraught with danger. For the reasons described below in Section V, such a change will likely result in errors and harm the telecommunications sector in the U.S. Virgin Islands and, as a result, impede both universal service and economic development in the Islands.

V. APPLYING A NATIONAL PROXY COST MODEL IS INAPPROPRIATE TO SMALL ISLAND ECONOMIES

The Commission has finalized a cost model that estimates the forward-looking economic costs of constructing and operating the network facilities and functions used to provide the services supported by the federal universal service support mechanism. In October 1998, the Commission adopted the model's platform which describes how the aspects of the network that are essentially fixed are modeled—such as the assumption about the design of the

network and network engineering and fixed characteristics such as soil and terrain.¹³ Last month, the Commission completed the process by selecting input values for the synthesis model that was previously adopted.¹⁴ The input values include such things as the costs of cables and switches, in addition to various capital cost parameters.

At this time, the Commission's proxy cost model is to be applied to non-rural carriers; however, there is some debate as to whether it will eventually be used to estimate the costs of universal service for rural carriers. The purpose of this section is to explain why a national proxy cost model should not be used to estimate the costs of universal service for the U.S. Virgin Islands and that, if it is, significant errors are likely to occur and the eventual loser will be the telecommunications sector in the U.S. Virgin Islands and, as a result, the economy of the U.S. Virgin Islands.

The design and development of the Commission's proxy cost model is greatly influenced by and based upon the BCPM and HAI models.¹⁵ These models were not developed (nor do they do an adequate job of estimating forward-looking economic costs) for insular areas or Island economies. While the use of a national proxy cost model to estimate forward-looking economic costs will always be somewhat problematic regardless of the company that is being

¹³ In the Matter of Federal-State Joint Board on Universal Service and Forward-Looking Mechanism for High Cost Support for Non-Rural LECs, CC Docket No. 96-45, 97-160, Adopted October 22, 1998.

¹⁴ In the Matter of Federal-State Joint Board on Universal Service and Forward-Looking Mechanism for High Cost Support for Non-Rural LECs, CC Docket No. 96-45, 97-160, Adopted October 21, 1999.

¹⁵ As stated in the Platform Order, the Commission currently has three models before it: (1) the Benchmark Cost Proxy Model, Version 3.0 (BCPM) developed by BellSouth, U S WEST, and Sprint; (2) the HAI Model, Version 5.0a (HAI) developed by HAI Consulting, Inc.; and (3) the Hybrid Cost Proxy Model, Version 2.5 (HCPM) developed by Commission staff members.

modeled, it is particularly problematic when it is used to estimate the forward-looking economic costs of VITELCO.

In Section II above, I described some of the economic factors that distinguish the U.S. Virgin Islands from the mainland. The unique characteristics of small island economies like the U.S. Virgin Islands makes it virtually impossible to use a national proxy cost model to determine the size of a universal service fund. For the following reasons, a national proxy cost model will fail to take into account (or adequately control for) a host of important cost drivers that are likely to result in significantly higher costs.

One of the important conclusions contained in Section II above is that the costs to transport goods and services to the U.S. Virgin Islands are likely to be quite high for two reasons: (i) the Islands are remotely located from their main supply source – the U.S. mainland – and transport costs increase with the distance shipped, and (ii) the lack of economies of scale implies that unit transport costs are likely to be high. The Commission’s model (and the other proxy cost models of which we are aware) fails to take into account the fact that the costs to transport equipment to the Virgin Islands are so high. For example, the dollar investment in switches, copper cables, fiber optic, etc in the Virgin Islands must include the costs to transport the equipment from the mainland market. While investment in most models include an amount for engineering, refurbishing and installation, (“EFI”) the costs to transport the equipment is likely left out or is wholly inadequate to adequately compensate a firm like the Virgin Islands Telephone Company.

The magnitude of the error caused by omitting the costs of transporting equipment to the U.S. Virgin Islands is significant. VITELCO's review of its work orders reveals that for every dollar of material used in operations, \$1.10 of freight cost was incurred.

Transport costs are incurred not just for shipping in equipment from the mainland. As discussed above, a lack of readily available skilled labor is another important negative effect of smallness and is relevant to the topic at hand because, in many instances, trained personnel will have to be imported to the island to perform essential telecommunications tasks. In order to install copper and fiber optic cable, digital switches, digital loop carriers and SONET interoffice transmission equipment, VITELCO must import skilled labor (usually on a temporary basis). This means paying for transportation, lodging, meals and other ancillary expenses. Since VITELCO competes for skilled labor in a national labor market, it must pay wages that are relatively similar to the wages that are paid by other U.S. telecommunications firms. VITELCO's mainland United States counterparts do not, however, have to import labor from far away and therefore do not have to pay for transportation, lodging and other expenses. A national proxy cost model simply does not capture this phenomenon.

The high costs of transporting both equipment and personnel to the U.S. Virgin Island indicate that it is optimal to minimize the number of trips that occur. However, this in turn implies that there will be a need to maintain higher than typical levels of inventory, thus lowering the average utilization level of equipment. For example, if a new switch is needed today and it is forecasted that another one is needed two years hence, it may make economic sense to obtain the two switches today thus lowering transport costs. Likewise, it may make

sense to maintain skilled personnel on the Islands for longer periods in order to minimize travel expenses.

The costs VITELCO incurs for installing equipment (especially burying cable, installing telephone poles, etc) are also unlikely to be adequately taken into account by the Commission's model. As discussed above, the islands' volcanic soil conditions make digging and trenching difficult. Furthermore, the Islands suffer from an irregular and mountain-like topology. These aspects make the provision of telephone service including construction, ongoing maintenance, and access to outside plant difficult and costly. While the Commission's proxy cost model does take into account terrain factors in the outside plant algorithms, volcanic rock is not a soil type that is adequately accounted for in the model. To account for the steep terrain and volcanic rock of the Islands, additional guying and anchoring is required.

Another important factor that will not be adequately accounted for in the Commission's proxy cost model is customer location. The first task accomplished by the Commission's model is to locate customers. The design of outside plant (and the investment and expenses incurred) crucially depends on the location of customers relative to the wire center. The Commission's model uses "geocode data" (actual precise latitude and longitude data) to identify customer locations. In the U.S. Virgin Islands, geocoding is not available and adequate Census data are lacking. Where actual customer locations information is unavailable, the model uses other, less precise, means to identify customer locations. Specifically, it estimates costs by distributing customers throughout an area using a theoretical construct in the absence

of geocoded data.¹⁶ Since the U.S. Virgin Islands are separated by water, the absurd end result of applying the Commission's model could be to "place" customers in the bodies of water separating the islands and thereby underestimate the real cost of providing service.

Finally, the extreme weather conditions in the U.S. Virgin Islands increase the costs of providing telecommunications services and are unlikely to be fully or accurately reflected in the Commission's model. Located in the middle of the Caribbean, the Virgin Islands suffer from two important weather characteristics that are unique and that significantly increase costs: (i) corrosive air quality from the sea, and (ii) hurricanes, which are a frequently occurring feature of the Islands.

As mentioned above, the Virgin Islands suffered from two major hurricanes, Marilyn and Hugo, within the last ten years, and the costs to VITELCO of these hurricanes ran into hundreds of millions of dollars. Furthermore, in order to prepare for other hurricanes that turn out to not be as devastating as Hugo or Marilyn, VITELCO incurs costs associated with preparing the infrastructure and mobilizing manpower. Recently, hurricanes Lenny and Jose have struck the Islands causing significant damage. Corrosive air quality from the sea means that the asset life of telecommunications equipment is lower than in the mainland. The same, of course, applies with respect to the effects that hurricanes have on costs. Moreover, additional investments and expenses are normally incurred to minimize the impact of the extreme weather conditions and these costs are unlikely to be reflected in the Commission's model.

¹⁶ According to the Platform Order, in the absence of geocoded data, the Commission's model uses BCPM's approach of associating road networks and customer locations provided. However, BCPM uses Census Bureau data and a grid approach to accomplish this task and Census Bureau data is lacking in the Virgin Islands.

For example, hurricanes and extreme weather conditions affect VITELCO's costs in two specific ways. First, significant resources are required to prepare the infrastructure to minimize the damage from a hurricane. And second, the fact that hurricanes are a part of life in the U.S. Virgin Islands has an impact on the amount of material that is needed to quickly restore service in the event of hurricanes. In general, the level of spare manpower as well as other resources needed to operate in the U.S. Virgin Islands is higher than in other geographic areas.

In sum, the economic, geographic and topological conditions in the U.S. Virgin Islands are such that the costs incurred to provide telecommunications services are significantly different than the costs incurred by the average company in the mainland even when the cost characteristics included in the Commission's model have similar values. Application of the Commission's model to estimate forward-looking economic costs of universal service is virtually guaranteed to result in significant errors. Specifically, it is likely to result in an underestimation of costs. The end result is that the Virgin Islands would be in a worse position in terms of federal funding of universal service than they should be, given the goals specified both in TA-96 and by the Commission itself. As I describe in the next section of this paper, this will likely have a significant negative impact on the telecommunications sector in the Virgin Islands and, consequently, on the development process as well.

VI. HARMFUL IMPACT ON THE VIRGIN ISLANDS FROM USE OF A NATIONAL PROXY COST MODEL

For the reasons discussed above, the use of a national proxy cost model to estimate the forward-looking costs of universal service in the U.S. Virgin Islands would result in a significant underestimation of costs. There are simply too many unique economic, geological and topographical factors in the U.S. Virgin Islands that warrant against the use of such a model. If a national proxy cost model is used, there would be harmful economic effects that would likely result. The level of Federal universal service support that the U.S. Virgin Island currently receives would likely decrease which means that VITELCO would face two choices: (i) recover the shortfall directly from end users, or (ii) decrease the level of investment. I discuss each in turn.

I have long been an advocate of having the cost-causer pay for the costs that her actions cause to be incurred. And, as such, the fact that end users may face a price increase for services that have historically been priced below economically efficient levels would, at first blush, seem like a step in the right direction. However, there are legitimate reasons why the Commission should view price increases for telecommunications services in the U.S. Virgin Islands somewhat differently than in the U.S. mainland.

First, universal service has not been achieved in the U.S. Virgin Islands, penetration rates are approximately 88% compared to about 94% in the U.S. mainland. Approximately a quarter of the island population lives below the poverty line and these are the individuals least likely to have a telephone. Since there is no intraLATA toll service and minimal CMRS

activity, any increase in telephone prices to make up for the shortfall in Federal funding means that basic service rates will increase, thus making it harder for those not already on the network to subscribe to the network.

And second, as mentioned above the magnitude of the positive network externality is likely greater in the U.S. Virgin Islands than in the U.S. mainland because penetration rates are lower in the former. The first, second, or third friend or colleague an end user can reach provides a lot of value to the end user. However, the marginal value of the positive network externality decreases as more and more friends or colleagues are added to the network. The existence of higher network externalities in the U.S. Virgin Islands implies that policymakers should be more cautious about price increases in the U.S. Virgin Islands than in the U.S. mainland.¹⁷

Given the likelihood that rates will not fully make up for the loss in Federal universal service support, investment in telecommunications infrastructure will likely suffer. Any firm that cannot fully recover its costs of doing business will scale back on operations and look for opportunities in more profitable areas. The end result is that there will likely be a decrease in the growth and development of telecommunications infrastructure in the U.S. Virgin Islands. And, as discussed above in detail, since telecommunications is essential to the growth of developing economies, the economy of the U.S. Virgin Island will suffer.

¹⁷ The existence of positive network externalities has been used throughout the 20th Century as the reason behind pricing basic residential service below economically-efficient levels that would prevail but for the externalities (i.e., marginal costs).

VII. CONCLUSIONS

For the reasons discussed, the use of a national proxy cost model to determine the forward-looking costs to provide universal service in the U.S. Virgin Islands will likely result in significant errors in achieving the Commission's overall goals due to the unique economic, geographic and demographic factors present in the U.S. Virgin Islands. As a result, because telecommunications is particularly crucial to developing economies, the economy of the U.S. Virgin Islands will be harmed. Instead of using a national proxy cost model for the U.S. Virgin Island, the Commission should institute a hold harmless rule whereby the U.S. Virgin Island receives the same level of support as it currently does and is not harmed by the Commission's universal service reform. At a minimum, if the Commission insists on basing universal service support in the U.S. Virgin Islands on forward-looking costs it should do so based on a company-specific model that takes into account the unique characteristics of the Virgin Islands territories. And, of course, the Commission should continue to make sure that its historic obligation of ensuring that regulated phone companies (like VITELCO) have the opportunity to recover all their prudently-incurred costs is not lost in the process.

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