

Future Potential HAP's Emissions
100% Natural Gas / 0% Fuel Oil Scenario

Pollutants	Emissions From Units 3 and 4 Palo Seco Power Plant	Emissions From Units 7, 8, 9 and 10 San Juan Power Plant	Pollutants	Emissions From Units 1, 2, & 3 Cambalache Power Plant	Emissions From Units 5 and 6 San Juan Power Plant
1,1,1-Trichloroethane	0.02	0.02	1,3-Butadiene	0.00	0.01
1,4-Dichlorobenzene	0.00	0.00	Acetaldehyde	0.45	0.50
Acenaphthene	0.00	0.00	Acrolein	0.07	0.09
Acenaphthylene	0.00	0.00	Benzene	0.13	0.16
Anthracene	0.00	0.00	Ethylbenzene	0.36	0.47
Benzo(a)anthracene	0.00	0.00	Formaldehyde	7.90	10.54
Benzene	0.04	0.04	Naphthalene	0.01	0.02
Benzo(b)fluoranthene	0.00	0.00	PAH	0.02	0.03
Benzo(e)pyrene	0.00	0.00	Propylene Oxide	0.32	0.43
Benzo(g,h)perylene	0.00	0.00	Toluene	1.45	1.93
Dibenz(a,h)anthracene	0.00	0.00	Xylenes	0.71	0.95
Ethylbenzene	0.00	0.00	-----	-----	-----
Fluoranthene	0.00	0.00	Arsenic	0.00	0.00
Fluorene	0.00	0.00	Beryllium	0.00	0.00
Formaldehyde	1.27	1.30	Cadmium	0.00	0.00
Indeno(1,2,3-cd)pyrene	0.00	0.00	Chromium	0.00	0.00
Naphthaleno-PAHs	0.01	0.01	Lead	0.00	0.00
n-Hexane	30.47	31.14	Manganese	0.00	0.00
Phenanthrene	0.00	0.00	Mercury	0.00	0.00
Pyrene	0.00	0.00	Nickel	0.00	0.00
Toluene	0.06	0.06	Selenium	0.00	0.00
Xylene	0.00	0.00			
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Arsenic	0.00	0.00			
Antimony	0.00	0.00			
Beryllium	0.00	0.00			
Cadmium	0.02	0.02			
Chromium	0.02	0.02			
Chromium VI	0.00	0.00			
Cobalt	0.00	0.00			
Lead	0.00	0.00			
Manganese	0.01	0.01			
Mercury	0.00	0.00			
Nickel	0.04	0.04			
Phosphorous	0.00	0.00			
Selenium	0.00	0.00			
Organic Total	31.66	32.57	Organic Total	11.43	15.25
Metallic Total	0.00	0.10	Metallic Total	0.00	0.00
Total HAPs	31.66	32.66	Total HAPs	11.43	15.25

The estimate is based on the maximum emission potential for each power plant. The federal regulation establishes that, an emission source is a major one, in hazardous pollutant emissions, if it has the capacity to emit 10 tons/yr of an individual pollutant or 25 tons/yr in the combination of said pollutants (CAPs). Depending on the emission source, combustion turbines or steam boilers, the corresponding NESHAP (National Emission Standard for Hazardous Air Pollutants) emission standard will be applied, as required by regulation.

For combustion turbines (Cambalache Power Station and Combined Cycle Turbines units 5 and 6 of San Juan Power Station), applies NESHAP for Construction Turbines 40 CFR Part 63, Sub-part YYYY of March 4, 2004, which establishes a limit of emission for the pollutant formaldehyde.

As for the boilers of the San Juan and Palo Seco Power Plants, at present the Environmental Protection Agency is collecting information to establish some emission standards for this type of source by March, 2011 (Air Toxics Standards for Utilities - Utility NESHAP).

Regarding the cumulative affects on air quality due to the operation of the units in the power plants that will use natural gas, the present permits system the Power Plants now have considers each one as a sole Emission Source. Therefore, the cumulative effects are contemplated in the permits in affect, and also in the permits that will be obtained for the changes related to the use of natural gas. The processing of the

corresponding permits will consider the applicability of NSPS, NSR regulations and the Puerto Rico Air Pollution Control Regulation, for the totality of emissions in each one of the power plants individually.

It is important to highlight that the cumulative impact from pollutant emissions will be positive because there will be a reduction of up to 64% in criteria pollutants (over 129,000,000 pounds annually) and up to 30% in carbon dioxide.

- **How the proposed action is in harmony or conflicts with the specific terms and goals of the plans in effect regarding the use of land, applicable public policies and controls of the area to be affected**

The public policy applicable to the activity under study is the following:

- Constitution of Puerto Rico
- Goals and public policy of the Puerto Rico Land Use Plan (JP 1995)
- Law 111 of 1985 (For the Protection of Caves, Caverns and Sinkholes)
- Law 292 of 1999 (For the Protection of the Karst Physiography of Puerto Rico)

We discuss next the concurrence of the proposed action with the applicable public policy:

6.19.1. Constitution of Puerto Rico

The Constitution of Puerto Rico provides in Article VI, Section 19 that: "The public policy of the Commonwealth of Puerto Rico will be the most effective conservation of its natural resources, as well as the greater development and use of the same for the general benefit of the community."

It is clear that this is balancing language between the protection of natural resource and their social and economic use. It's about no part of the relationship becoming exclusive of the other, but rather integrate in the most harmonious way possible; in other words, not to underutilize or overuse the country's natural resources. As discussed in this DIA-P, the proposed action pursues a balance between conservation and environmental protection, as well as the social and economic use of the natural resources. The construction of the proposed action will only impact temporarily a minimal portion of the country's physiography. Such impact will be temporary, because after the project is constructed, the strip of ground will reforest in a natural and assisted form, so there will be no net loss of wildlife habitat. At the end of several years the environmental impact will be nil and negligible when compared with the social and economic benefits such an important infrastructure will bring.

6.19.2. Goals and Public Policy Of Land Use in Puerto Rico

The document Goals and Public Policy of the Land Use Plan establishes among its general goals the following: "To direct the planning process towards the achievement of an integral, sustainable development ensuring the judicious use of the land resource and fostering the conservation of our natural resources for the enjoyment and benefit of present and future generations."

An integral, sustainable development is the balance between economic development and the conservation of natural resources with the goal of achieving a better quality of life. As discussed in this DIA-P, the proposed action is an economic activity that does not compromise the island's natural resources permanently. In this DIA we discuss in quantitative form the temporary impact that will happen in the areas under study. It is clear that such impact will be a temporary one and that the benefits of the action in the short, medium and long term will be essential to favor Puerto Rico's economic situation.

In addition, the project is not incompatible with the municipal land use plans. In fact, said project is contemplated in the Municipality of Arecibo's Land Use Plan.

6.19.3. Law 111 of 1985 (For the Protection of Caves, Caverns and Sinkholes)

Law 111 was adopted with the purpose of protecting the caves, caverns and sinkholes. As discussed in the DIA-P, in the region under study enclosures of caverns and sinkholes were identified, so this law applies. To prevent any effect on these systems, the AEE will carry out a series of studies on the nature of such systems to identify potential effects of the extraction activity and the possible use of explosives. Through the study of potential effects of extraction, we will determine the distances the construction must keep so as to not affect the physical stability of caves and sinkholes. Therefore we conclude that it is possible to carry out the construction without undermining the goal of conservation of the caverns and sinkholes.

6.19.4. Law 292 of 1999 (For the Protection of the Karst Physiography of Puerto Rico)

Law 292 broadened the intent of Law 111 to other physiographic conditions found in the Karst zone. In its main statement it establishes the following: "To protect, conserve and prohibit the destruction of the Karst physiography, its natural formations and natural materials, such as fauna, flora, soils, rocks and minerals; to prevent the transportation and sale of natural materials **without the corresponding permit...**" (emphasis provided).

Notice that the law establishes the condition of a permit in order to carry out activities in the Karst zone. Although the DRNA has not developed a system of special permits for this zone, through the earth crust permits carrying out activities in is authorized. In the case at hand, the proponent will handle the permit to extract earth crust for the installation of the proposed infrastructure. Through this permit the DRNA will authorize

the action in an orderly fashion in this important zone. To achieve this, the proponent will avoid, minimize and compensate the potential impacts, as discussed in this DIA-P.

6.20. Change of land use through zoning

The proposed action does not contemplate prohibiting changes in land use through zoning. The action proposes that there are no changes in the use of land in the area it occupies; that is to say, the action seeks that the agricultural uses as well as the undeveloped areas covered with arborescent vegetation and wetlands remain that way, because in that way human populations are kept away from the alignment. Only one restriction will be established through the constitution of an operation right-of-way in favor of the AEE, in which the planting of deep-rooted trees or the construction of any structures will not be permitted.

6.21. Justification of the proposed use of resources

At present, the land proposed to construct the action are used mostly for agriculture and areas free of anthropogenic developments. A portion of the land sustains vegetation and wildlife. However, a significative portion of the premises have been recently modified in their topography and vegetable cover (for example, the highways rights-of-way). All these zones have varied functional values as wildlife habitats.

No significative economic use will be modified as part of the proposed action. The agricultural uses will return back to normal once the proposed infrastructure is installed. Likewise will happen with the wildlife, once the right-of-way is restored. In the short term, the action on the green zones will mean the temporary loss in both cases. The reforestation of the zones that remain inactive will contribute to reduce the impact on flora and fauna in the premises.

In the short, medium and long terms, the proposed action will have a positive impact on the economy of the regions where it is proposed (investment in construction) and of the island in general.

6.22. Justification of resource commitment

The irreversible commitments of the proposed action will be the temporary modification of floor space and the consumption of non-renewable resources such as fuel for the construction equipment. The impacts regarding water consumption and the occupation of a space of habitat for wildlife are considered temporary and renewable. However, the environmental and natural benefits derived from the action include the improvement of wetlands and wildlife habitats through the mitigation plans, the protection of air quality due to the significative reduction (more than 50%) in emanations in the AEE's power plants and the reduction and stabilization of the cost of electricity in Puerto Rico.

6.23. Environmental monitoring program

As part of the efforts to avoid or minimize the impacts of the construction, the project will have an Environmental Coordinator that will be in charge of the project's environmental impact matters. Among his functions will be:

- Offering talks to employees about the project's environmental impact and how they can help minimize it.
- Supervising and ensuring compliance with all the protection measures required in the permits, certificates, or other authorization documents.
- Coordinate responses to environmental incidents.
- Document incidents and corrective actions and attend to visits from regulatory agencies.

INTRODUCTION

PREPA's Strategic Plan and the Government's Energy Reform are geared to reduce the cost of electricity for end users in Puerto Rico. A number of factors contribute to the high cost of electricity in Puerto Rico. These factors are as follows:

1. The current heavy reliance on oil-derived fuels for the generation of electricity is a major factor in the high cost of electricity.
 - Most of PREPA's electricity requirements are provided using residual fuel in its steam plants.
2. PREPA is an isolated system without interconnections and must maintain greater generating capacity reserve margins to maintain its system reliability than otherwise would be necessary, with the corresponding higher capital, operating and maintenance costs.
3. Most of PREPA's generating capacity is located on the Southern part of the island and many of these units are among PREPA's oldest, least efficient, units with high operating costs and emissions.

PREPA's total generating capacity is 5,840 MW. It self generates approximately 70% of its electrical capacity and purchases the remainder from two co-generators. The Vía Verde project will be an energy complex with two primary components: (i) a 92 miles pipeline to transport the natural gas from Peñuelas to the PREPA's generating plants at Arecibo (Cambalache), Toa Baja (Palo Seco), and San Juan (San Juan) located in the north coast of the island and (ii) the conversion of the existing boilers to a co-firing combustion system at these locations. The project will provide generation capacity to the grid Puerto Rico Electric Power Authority by 2012, and will be an important component of the Puerto Rico's gas infrastructure. As a separate project, Via Verde could also provide natural gas to facilitate the conversion of the 820-MW South Coast Power Plant, which is currently burning liquid fuel (bunker-C).

Environmental Benefits

The project was designed to comply with the Puerto Rico's environmental controls and regulations, especially on air emissions, ambient air quality, wastewater effluent, ambient water quality, and noise. Given the management measures, monitoring by the best available technology, and commitments for the project, including the environmental regulations set by the Environmental Quality Board, the project's impacts on the environment will be manageable. The project will ensure that it meets the Environmental Protection Agency's standards and regulations. This project is indispensable to reduce the air pollution resulting from the use of fuel oil #6 in Puerto Rico.

In view of the move towards cleaner energy sources and the need to diversify the Puerto Rico's energy supply mix, natural gas was considered for the project. Natural Gas meets environmental regulations through the use of proven state-of-the-art low emissions and environmental control technologies. LNG was a superior alternative since it is the cleanest burning fuel, with least emissions per kilowatt-hour of electricity

generated; it is odorless, nontoxic, and has very low level contaminant levels; it requires no environmental cleanup for spills; and there are no procurement problems.

Vía Verde Description:

The Puerto Rico Power Electric Authority (PREPA) proposes the construction of a carbon steel pipeline with the following Specifications:

- API 5L, grade X70,
- Schedule from 0.375 to 0.500 inches, depending in its classification,
- Twenty Four (24) inches in diameter,
- Fusion Bonded Epoxy of, at least, 14 Mils for corrosion protection,
- Cathodic Protection by impressed current for an additional corrosion protection,
- Meets the standards and regulations set for by entities such as: DOT 40 CFR 192, ASME B31.8, ASTM, ANSI, NACE, NFPA, API, OSHA, and the Puerto Rico Public Service Commission,

The transmission pipeline will be used for transferring natural gas from EcoEléctrica, in Peñuelas where the Liquefied Natural Gas storage tank is located, to PREPA's generating plants at Arecibo (Cambalache), Toa Baja (Palo Seco), and San Juan (San Juan). The pipeline will be underground and it will be approximately 92 miles long. The pipeline will require a Maintenance Right of Way (ROW) of 150 feet wide. Out of these 150 feet, the construction process will only impact 100 feet. After construction is finished, 50 out of the 100 feet will be restored to its original state, and only 50 feet will remain as a permanent operational ROW, which will be kept free of deeply rooted vegetation. Total Impacted Area: 1,107.4 acres, approximately, and an additional 32 acres for special situations such as water body crossings. The pipeline will go across 13 municipalities and 48 wards. The municipalities are: Peñuelas, Adjuntas, Utuado, Arecibo, Barceloneta, Manatí, Vega Baja, Vega Alta, Dorado, Toa Baja, Cataño, Bayamón, and Guaynabo. The estimated cost of the project is approximately \$447 millions (design, material acquisition, shipping and delivery, construction, state and local rights and taxes, land acquisition, field studies, environmental documents and permits). An additional \$50 to \$70 million will be required for the conversion of generating units for the use of natural gas. The direct temporary employments are estimated to be between 1,000 y 1,200 and the indirect temporary employments between 4,000 to 4,500.

PREPA has submitted the Preliminary Environmental Impact Statement (P-EIS) to the Environmental Quality Board (EQB) for review and Public Hearings and will adopt any comments or recommendations that are legally binding.

ALTERNATIVES ANALYSIS

Background

Section 404(b)(1) of the Clean Water Act prohibits the discharge of dredged or fill material into waters of the United States unless the proposed discharge is the least environmentally damaging practicable alternative capable of achieving the project purpose. Alternative routes for the pipeline and to the pipeline were evaluated pursuant to 40 CFR 230.10. The National Environmental Policy Act (NEPA) and implementing regulations at 40 CFR 1502.14, together with the Commonwealth Policy Act, require a range of reasonable alternatives including the no action alternative be evaluated. Under these laws and regulations, the no action alternative and action alternatives that meet the project purpose and need of the preferred alternative are considered to be reasonable alternatives. Under the aforementioned laws, these alternatives do not need to be available to the applicant. Though the Corps will evaluate these alternatives, the alternatives selected should be available to the applicant at the time of the permit decision.

The Government of Puerto Rico's 1993 Energy Policy acknowledged the island's high dependency on oil, which at the time was 99%, and the high environmental cost this caused. The policy directs the Puerto Rico Electric Power Authority (PREPA) diversification of fuel sources for power generation to reduce the volatility of oil prices and overall power generation costs and to introduce environmental criteria for the selection of new power plants. Following is a detailed discussion of alternatives to the proposed Via Verde project that meet the project purpose and need. Each alternative discussed addresses logistics, technology, cost and environmental consequences and is followed by a statement indicating whether or not we consider the alternative to be practicable. Among alternatives considered were: the construction of a natural gas import terminal on the north coast of the island, three tanker and buoys systems (Deepwater Port) for receipt of natural gas at Palo Seco, San Juan and Cambalache plants, and several terrestrial alignments for a natural gas pipeline system. The alternative of no action was also analyzed.

EVALUATION CRITERIA

To evaluate the data on each of the alternatives discussed, a set of criteria was defined and rated. Also, weight was given to each criterion according to its importance. Each alternative will be discussed separately and at the end, a table will be presented where the criteria is applied and the rating is multiplied by the weight to obtain a numerical value for each alternative. The alternative with the highest value is deemed the best alternative for construction.

Criteria used for site evaluation

Criterion number	Criterion	Consideration
1	Land Use	Avoid land targeted for high density developments. Favorable land uses considered to be public, commercial, agricultural, industrial
2	Bodies of water	Reduce number, complexity and width of crossings
3	Forests and nature reserves	Avoid or minimized to the maximum extent possible impact to known sites
4	Endangered species	Avoid or minimize to the maximum extent possible impact to the species and their habitat
5	Architectural and Archaeological findings	Avoid or minimized to the maximum extent possible impact to known sites
6	Road crossings	Reduce number of road crossings
7	Zoning	Favorable zoning designations: non residential, public, industrial, agricultural, commercial and non-zoned.
8	Topography	Seek route with smallest number of abrupt topographic changes
9	Community	Maximize safety to residents, avoid or minimize number of dwellings directly impacted by the project (expropriation)
10	Pipeline length	Reduce pipeline length to minimize impacts. Place pipeline parallel to or along existing linear disturbances (ROW's)
11	Impacts to jurisdictional areas	Avoid or minimized to the maximum extent possible, impact to jurisdictional areas
12	Pipeline security	Ideally the pipeline is located on private property where public access is limited. The pipeline is ideally suited to rural land uses unlikely to be targeted for high density

Criterion number	Criterion	Consideration
		uses.
13	Impact on transportation or traffic	Avoid or minimize to the maximum extent possible, impact to transportation and terrestrial or maritime traffic
14	Water Quality	Avoid or minimize to the maximum extent possible, impact to water quality, especially permanent effects
15	Aquatic resources	Avoid or minimize to the maximum extent possible, impact to aquatic resources
16	Cost	Develop project that is within the company's financial possibilities
17	Noise impact to communities and species	Minimize noise impact during construction and operation
18	Essential fish habitat	Avoid or minimize impact to this resource
19	Corals	Avoid or minimize impact to this resource
20	Ease of access	The location needs to provide safe access for routine maintenance and integrity monitoring.
21	Exclusion zone	Project location must comply with regulatory requirements on exclusion zones. A special exclusion zone could also be defined by the owner to avoid impact to certain resources.

Rating assigned to each criterion

Criterion number	Criterion	Comment	Condition	Rating
1	Land Use	Per cent of the project in land favorable to construction	0-10	5
			11-100	10
2	Bodies of water	Number of points where the project intercepts a body of water	0-25 crossings	10
			25-100	5
3	Forests and nature reserves	Per cent of the project in forest and nature reserves	0-10	10
			11-20	5

Criterion number	Criterion	Comment	Condition	Rating
4	Endangered species	Per cent of project in areas where these species are found	0-5	10
			5-10	5
5	Architectural and Archaeological findings	Number of sites impacted by the project	0-5	10
			5-10	5
6	Road crossings	Number of crossings	0-40	10
			41-100	5
7	Zoning	Per cent of the project in favorable zoning	0-20	5
			21-100	10
8	Topography	Number of abrupt topographic changes	0-60	10
			60-100	5
9	Community	Number of residences impacted by expropriation	0-15	10
			16-100	5
10	Pipeline length	Covers less miles from point A to point B	Less than 50 miles	10
			More than 50 miles	5
11	Impacts to jurisdictional areas	Percentage of project in jurisdictional areas	0-20	10
			21-50	5
12	Pipeline security	Percentage of auxiliary equipment exposed and accessible to public	0-5	10
			6-10	5
13	Impact on transportation or traffic	Has potential to affect land or marine traffic	Minimum or no impact	10
			Significant	5
14	Water Quality	Turbidity Sedimentation	Permanent	5
			Temporary	10
15	Aquatic resources	General impact to species	Permanent	5
			Temporary	10
16	Cost	Cost efficient	Less than 1 billion	10
			Greater than 1 billion	5
17	Noise impact to communities and species	Produces noise during construction or operation that impacts quality of life or harasses species	Yes	5
			No	10
18	Essential fish habitat	Per cent of the project in	Less or equal to 5	10

Criterion number	Criterion	Comment	Condition	Rating
		designated areas	Greater than 5	5
19	Corals	Per cent of the project in designated areas	Less or equal to 5	10
			Greater than 5	5
20	Ease of access	Safe access for maintenance and inspections	Yes	10
			No	5
21	Exclusion zone	Project location complies with regulatory requirements on exclusion zones	Yes	10
			No	5

Weight assigned to each criterion

1. Important

2. Mid importance

3. More important

Criterion number	Criterion	Weight
1	Land Use	3
2	Bodies of water	2
3	Forests and nature reserves	2
4	Endangered species	3
5	Architectural and Archaeological findings	2
6	Road crossings	2
7	Zoning	3
8	Topography	2
9	Community	3
10	Pipeline length	2
11	Impacts to jurisdictional areas	3
12	Pipeline security	3
13	Impacts on transportation or traffic	3
14	Water quality	3
15	Aquatic resources	3
16	Cost	3
17	Noise impact on communities an species	2
18	Essential fish habitat	2
19	Corals	2
20	Ease of access	2

Criterion number	Criterion	Weight
21	Exclusion zone	3

DESCRIPTION OF ALTERNATIVES CONSIDERED

No Action

The alternative of no action, although considered, was found not feasible given the transcendence, importance; and public welfare pursued by the project.

Preliminary environmental impacts and direct/indirect impacts associated with construction of a natural gas pipeline are considered. If the project is not built the following impacts would be avoided:

- Impacts from moving earth that could result in erosion and sedimentation in bodies of water
- Temporary increases in noise levels
- Impacts to forest reserves
- Temporary impacts to wetlands and other bodies of surface water
- Impacts to farmland
- Temporary impacts to infrastructure such as waterlines, buildings and (possible) phone lines
- Temporary impacts to traffic and roads, i.e. detours
- Potential impacts to archaeological sites
- Acquisition of land by expropriation

However, if the project is built most of these impacts, if not avoided completely, could be minimized and mitigated using engineering design options and support from agencies and municipalities the project would cross through.

No action is not indicative of no impact, since with this alternative PREPA will be forced to continue to produce electricity by burning petroleum products that generate greater amount of pollutants emitted to the air. While some of these emissions can be controlled by using technology that requires, in many cases, an investment of millions of dollars, modern emission reduction highlights that the emissions of these derivatives of petroleum would be greater if related to the burning of natural gas. In addition, maintenance of petroleum burning units has to take place more frequently and with higher costs to guarantee

optimal operation. Continuing to burn petroleum derivatives has other implications, such as an increased frequency of deliveries of these fuels to our ports which increases erosion of the seabed and the likelihood of spills. The continued use of fuels derived from petroleum increases the cost of electricity, which negatively impacts the Puerto Rican economy and results in a lower quality of life for its citizens. Finally, liquid fuels expose PREPA to fluctuations in the market value creating instability in the costs of energy production and invoices. Recognizing that the Puerto Rico economy is directly linked to PREPA's stability, it is important for the company to meet its strategic development plans and maintain a fixed cost structure to avoid sudden peaks of variations in the cost of purchased fuel. Compliance with this plan demonstrates vision, stability and commitment to customers, the ability to assess complex situations of world character and the ability to develop strategies to minimize adverse impacts making it easier to expand options to obtain fuels in the future.

After evaluating local and global dynamics, PREPA developed a strategic plan to guide future development of the company and Puerto Rico. This plan includes the following parameters:

- Diversification of energy sources
- Reduction in costs
- Geographic diversification of generating electricity
- Environmental considerations
- Expansion of electrical generation
- Diversification of revenue

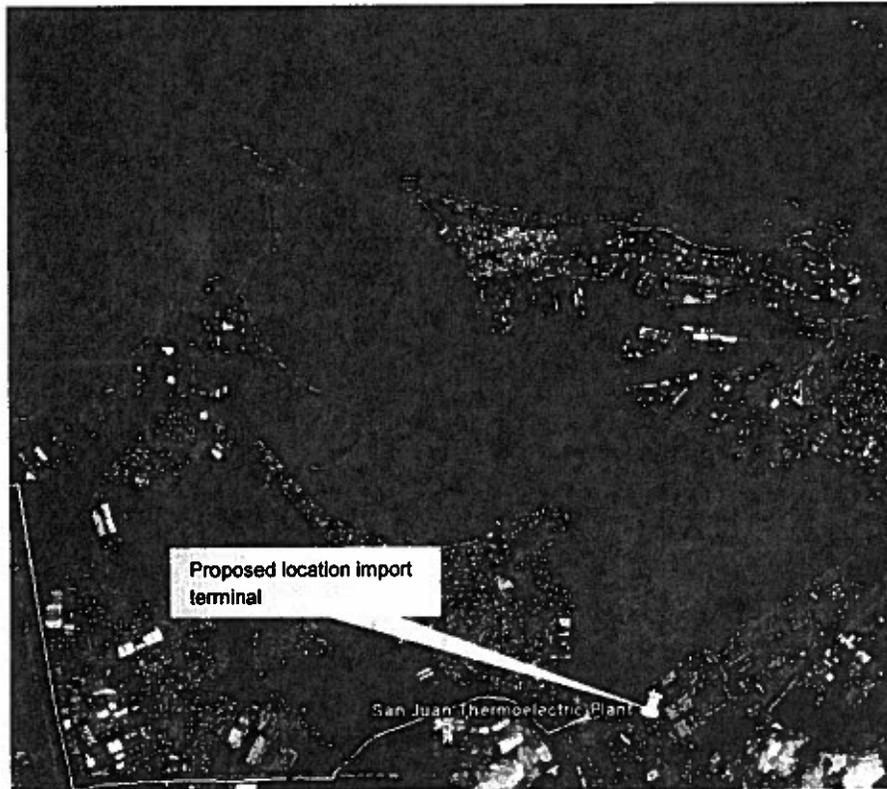
The Via Verde project is part of the plan to diversify fuels which can make PREPA better. In addition, there are important environmental considerations to help AEE to more effectively manage their energy costs. A significant percent of Puerto Rico's generated electrical power depends on oil. At the moment, AEE uses only No. 2 fuel (light distillate) and No. 6 (bunker C) its generator units and it buys electricity, in turn, from the AES co-generators in the municipality of Guayama (coal) and EcoElectrica in the municipality of Penuelas (natural gas). With the introduction of the co-generators AEE began to buy electricity generated from NG or coal but internally AEE still depends exclusively on oil.

PREPA aims to reduce its dependence on the use of oil, which currently is approximately 68%, to approximately 12% by 2014. To do this PREPA must identify alternative fuels that can meet their customers demand for power. Lack of action would only aggravate the current dependence on oil, and at a time of seizure or high global demand, Puerto Rico would have no viable alternatives to generate electricity. In addition, no action exposes PREPA to sudden changes in the cost of oil which reduces the economic capacity of PREPA and, consequently, the Puerto Rican economy. It is important to highlight that PREPA is limited by regulations to the type of fuel it can burn. The greatest limitation is the amount of sulfur contained in fuel. Low sulfur fuel is more expensive than fuel with higher sulfur content. If there are shortages in this type of fuel, or if PREPA cannot set contracts with the suppliers, there are only two options left: reduce the production of electricity, which is not feasible, or burn a cheaper fuel with higher sulfur content in violation of established environmental permits, with subsequent exposure to fines and sanctions from regulatory agencies. The use of natural gas significantly decreases emissions of pollutants to the environment. No action means PREPA must expend significant capital to reduce emissions that result from burning oil and to maintain their units, instead of using that capital to develop a more efficient system that uses cleaner fuel with lower maintenance costs.

The No Action Alternative would not meet the project purpose and will not be considered further.

Construction of a Liquefied Natural Gas Import Terminal

Currently Puerto Rico has the EcoElectrica Cogeneradora in the municipality of Peñuelas, to receive LNG (and meet PREPA's needs). Still, the alternative of building a new terminal closer to PREPA's power facilities was evaluated in consideration of environmental impacts potentially associated with the construction of a delivery pipeline from the EcoElectrica terminal. A location between the three power plants on the northern coast selected to convert to Natural Gas (NG) was identified next to the Central Thermoelectric San Juan (CTSJ) unit. Currently, an existing pier has infrastructure to transport diesel and Bunker C Fuel to two of the three plants, San Juan and Palo Seco.



A new LNG import terminal must be able to receive, download, and store up to 3.0 Bcf/d (3 trillion cubic feet) of liquid natural gas imported by sea. In addition, facilities to gasify and handle the natural gas would also need to be built. The construction of the terminal would result in an environmental impact associated with the different stages of the construction and operation, which include:

- Build, repair, or expand (depending on the case), a pier for receipt of liquid natural gas.
- Increase in the transit of ships.
- Construction of a tank for liquid natural gas storage and gasification - this plant would require an area of approximately 25 acres.
- Constructing navigation channels to support transit tankers, which would mean dredging and disposing dredged material.

Selecting a place to construct a terminal to receive liquid natural gas requires a deep port to minimize the environmental impacts associated with the development and operation of the terminal. In addition, a relatively low population density area with industrial development is necessary.

Three (3) criteria were used to determine whether building close to PREPA's installation import terminal was a viable alternative. These were: 1) specific factors at the workplace, 2) maritime operations and, 3) environmental issues.

1. Factors specific to the workplace

Availability of land

A suitable location must have enough space available to accommodate the proposed installation and all safety components required by the Federal Department of transportation regulations (49 CFR part 193), the U.S. Coast Guard (33 CFR part 127) and the National Fire Protection Association (NFPA). In addition, a site must comply with the regulatory distance required between structures used to gasify LNG and the LNG storage tank. Facilities would need to occupy an area of approximately 25 acres. Structures would include, among other components, a dual containment tank 167 feet in height and diameter with the ability to store 1,000,000 barrels of liquid natural gas at a temperature of minus 260 degrees Fahrenheit and a pressure of 2.0269 psig; vaporization or gasification systems to gasify liquid natural gas, and pipes to transport the natural gas to the power stations. Other factors to be considered would include activities outside and adjacent to the terminal and the distance or separation needed between the terminal to occupied areas of activity and/or populated areas (49 CFR parts 193.2055, 193.2057 and/or populated areas.

Availability of a coastal area

A site must have an available maritime quay with facilities for tankers 950 feet long, with PIP cubic meters capacity, and a minimum 40-foot boat anchor area. The criteria used to assess whether a port or dock has the capacity for this type of project are the depth of greater than 40 feet, navigation channels with extension airway passage (greater than 180 feet) and proximity to equipment to conduct storage and gasification of liquid natural gas. The quay must be approximately 30 feet wide by 1,700 long and have, among others: teams to tie up the tanker to the dock; a boat platform with two levels at the end (a 40-foot wide by 100 long lower level and 20 wide and 100 long upper level); and a emergency spill collection system.

Disposal of dredged material

Any area under consideration must include the requirement to dredge to create a proper shipping channel for the maritime tanker traffic to deliver the liquid natural gas; also a site must be identified for

dredged material generated during construction and future maintenance operations required for the channel.

2. Maritime Operations

Increase in ships

The transit of tanker ships is subject to more restrictions than general maritime traffic. Federal regulations and restrictions could affect other shipping and increase the risk of affecting other users of the navigation channel.

Access to the navigation channel

The quicker a tanker vessel can arrive at the terminal, unload and return to sea, the more economic the operation is. A shorter channel would reduce possible adverse effects on traffic for other ships from marine transit restrictions. Yaw (amplitude and proximity) area: a typical liquid natural gas tanker ship would require a dock with a minimum turning diameter of 1,200 feet and 40 feet of depth.

3. Environmental issues

Environmental consequences

Minimizing environmental impact by using places previously impacted, including the place for dock, and areas zoned for this type of use.

Compatibility, zoning

The place must be compatible with future developments on adjacent properties.

According to the rating system described above, the import terminal is favorable based on the following criteria:

1. The land to be used for the project is compatible with the uses defined in the criteria (commercial, industrial, public, agricultural).
2. Bodies of water- the number of water bodies to be crossed are reduced, since the length of pipe between Peñuelas and Arecibo is eliminated with this option.
3. Forests and Reserves- the percentage of forests and reserves is considerably reduced because the length of pipe between Peñuelas and Arecibo is eliminated
4. Architectural and Archaeological findings- no findings anticipated in the marine portion of the project. There are no findings in the land portion from San Juan to Arecibo.
5. Road crossings- the number of road crossings is reduced since the length of pipe from Peñuelas to Arecibo is eliminated.
6. Zoning- the zoning in the project area is compatible with the zoning designated in the criteria: non residential, public, industrial, agricultural, commercial and non-zoned.

7. Topography- the number of abrupt topographic changes is significantly reduced since the length of pipe from Peñuelas to Arecibo is eliminated.
8. Community- the number of residences expropriated is reduced.
9. Pipe length- the length of pipe needed is reduced.
10. Pipeline security – the pipe is still underground.
11. Noise impact – the noise levels will be compatible with the noise levels in the area.

The import terminal proved disadvantageous based on the following criteria:

1. Endangered species- to bring the natural gas tanker to the selected location, the navigation channel must be dredged and a disposal site identified. The Estuary of the Bay of San Juan (EBSJ) is composed of several bodies of water. The EBSJ provides food and shelter to eight species of fauna and 17 species of flora in danger of extinction, such as the Antillean Manatee and several species of turtles, including the hawksbill and leatherback; 160 species of birds, such as the Brown Pelican and the Heron; 19 species of reptiles and amphibians, such as the coquí and Puerto Rican boa; 124 species of fish, Tarpon and bass; and 300 species of wetland plants are found on EBSJ.
2. Impact to jurisdictional areas- the San Juan Bay is considered waters of the United States. In addition to this, a disposal site for the dredged material must be identified. A deep water disposal site would also fall under the jurisdiction of the USACE.
3. Cost – the estimated cost to build an import terminal is approximately \$1.2-\$1.5 billion, above the government's financial capability at the moment.
4. Impact to transportation and traffic- the dredging operation to prepare the navigation channel and the gas natural tankers entering the area would have a significant impact on the maritime traffic of San Juan Bay. Also, there would an increase in maritime traffic due to the LNG ships entering the area. The transit of tanker ships is subject to more restrictions than general maritime traffic. Federal regulations and restrictions could affect other shipping and increase the risk of affecting other users of the navigation channel. One example of an effect would be the increase in maritime traffic restrictions which make it difficult, if not impossible, for others to use the navigation channels simultaneously with LNG tankers
5. Water quality and aquatic resources- Dredging operations would degrade the quality of the receiving waters due to suspended fine sediments. Effects from the turbidity plume

could occur daily during working hours and up to two (2) hours after the discharge of dredged material is completed. This would affect water quality and, consequently, water quality parameters required by environmental permits governing the CTSJ, especially turbidity, sedimentation and suspended solids.

6. Essential fish habitat – There are no identified essential fish habitats in the San Juan Bay.
7. Ease of access – the quicker a tanker vessel can arrive at the terminal, unload and return to sea, the more economic and safe is the operation. In order to reach the unloading pier, the LNG tanker must use three channels, Bar, Anegado and Army Terminal, until it reaches the pier at Puerto Nuevo Bay. A shorter channel would reduce possible adverse effects on traffic for other ships from marine transit restrictions.
8. Corals- the entire north coast of Puerto Rico is designated critical habitat for elkhorn and staghorn coral. Species specific studies would have to be performed to determine the status of the species, if dredging is needed in designated areas.
9. Exclusion zone- the regulations establish an exclusion zone of 1-2 mile radius for the storage tank needed to store the LNG. This exclusion zone limitation could not be met.

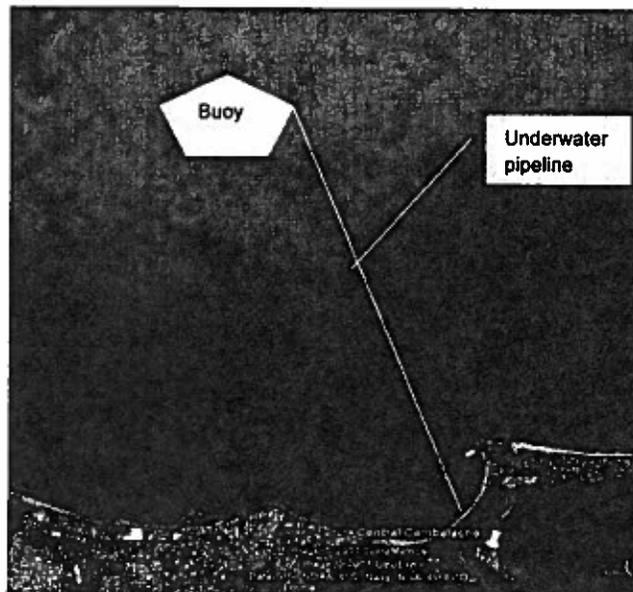
Construction of a system of buoys and tankers (Deep water Port) in San Juan, Palo Seco and Arecibo

As one of the alternatives to the project, the installation and operation of tankers and a buoy for the receipt, storage and regasification to transport natural gas to each area in the north central system was considered. The buoy would be located 5km from the coast in Palo Seco and Arecibo. In San Juan, the buoy will be located 8 km offshore. The infrastructure needed is:

- one submerged turret loading buoy that connects to the vessel and serves as both a mooring for the vessel and a conduit for the discharge of natural gas
- chains, wire rope, and anchors used to secure the buoy to the seabed
- a flexible riser designed to connect the buoy to a seabed pipeline end manifold (PLEM) – allowing tie-in to a subsea pipeline

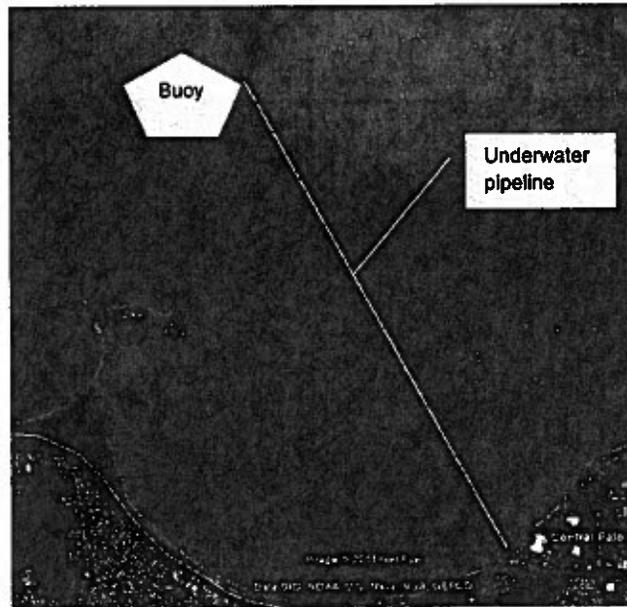
- a subsea PLEM that incorporates necessary control instrumentation and related valving; and,
- an interconnecting subsea pipeline to tie into downstream delivery infrastructure.

The delivery tanker will have a regasification system. This tanker will dock at the buoy which keeps afloat lines connecting the tanker to a pipeline on the seabed. This pipeline will transport compressed gas to a receiving terminal near the central power unit.

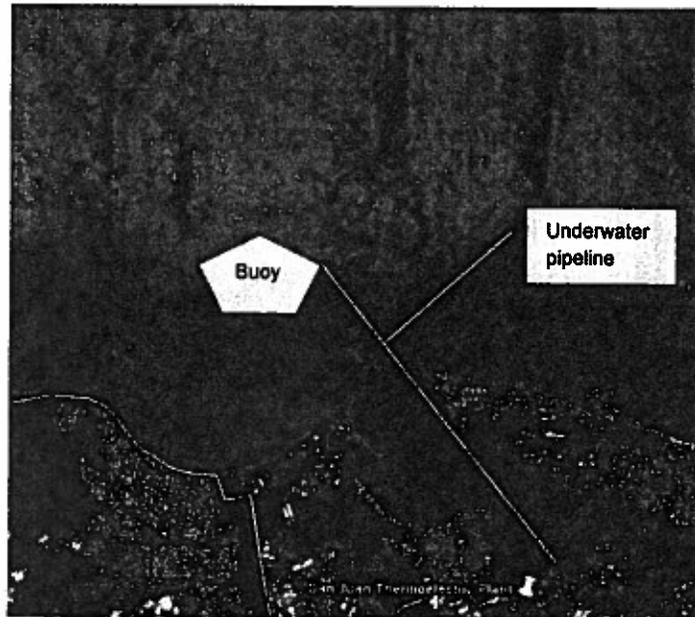


Proposed location LNG receiving buoy

Cambalache, Arecibo



**Proposed location LNG receiving buoy
Palo Seco, Toa Baja**



**Proposed location LNG receiving buoy
San Juan**

According to the ranking system described above, the buoy and barge system is favorable based on the following criteria:

1. Forests and Reserves- no forests and reserves are affected by this alternative
2. Architectural and Archaeological findings- no findings anticipated in the marine portion of the project, but required studies will be performed.
3. Road crossings- no road crossings
4. Topography- it is assumed that the seabed in the area is flat, but a bathymetric study will be performed
5. Community- no residences will be expropriated due to the projects construction.
6. Pipe length- the length of pipe needed is reduced
7. Pipeline security – the pipe is still underground

The import terminal proved disadvantageous based on the following criteria:

1. Bodies of water- although only one body of water is affected by the project, there are no alternatives to avoid its impact. Directional drilling is not an option in this case. The pipe to transport the gas must be buried in a trench of approximately 3 ft deep and 4 ft wide

for a length of ocean between 5-8 miles, per buoy. Also, there will be impact on the sea floor during the installation of the anchors and other equipment related to the buoys.

2. Endangered species- a number of endangered species of sea turtles, whales and others could be affected by the project's construction.
3. Impact to jurisdictional areas- waters affected by the project in San Juan, Palo Seco and Arecibo are jurisdictional.
4. Cost – The AEE would request a private company with expertise in the design, construction, and operating system of a Deepwater Port. This could cost AEE between \$70 and \$80 million per year, subject to signing a contract with that company for a period of not less than 20 years. At the end of the 20 year period the total cost would be approximately \$1.6 billion dollars, per buoy system.
5. Impact to transportation and traffic- As in other cases, the Coast Guard may impose safety zones restrictions extending at least 500 meters in all directions from the buoy to protect vessels and mariners from potential safety hazards associated with the construction of the deepwater port facilities, and to protect the port's infrastructure. All vessels will be prohibited from entering into, remaining or moving within the safety zone.
6. Water quality and aquatic resources- The primary physical impact of construction on water quality would occur as a direct or indirect result of the sediment plume that will be created from setting the buoy anchors, installing the flowlines, and temporarily laying the mooring chain on the seafloor. Although temporary, plumes resulting from disturbance to the seafloor would be exposed to currents with the potential to carry them into the surrounding environment and strip nutrients and/or contaminants from the sediments and release them to the water column. The extent and duration of the turbidity plumes would be based on the strength of the currents at the location of the specific activity. Sediment re-suspension could release sediment bound contaminants, but this is an assumption that need to be validated by chemical analysis of the sediments.

Withdrawal of ballast and cooling water at the port as the regasification vessel unloads cargo (approximately 1 million gallons per day) could potentially entrain zooplankton and ichthyoplankton that serve as prey for other species.

7. Noise impact - During port operations, sound will be generated by the regasification of the LNG aboard the regasification vessel and the use of thrusters by vessels maneuvering and maintaining position at the port. Another potential sound source would be sound generated from large construction-type dynamic positioning (DP) vessels used for a major repair of the subsea pipeline or unloading facility. Of these potential operations and maintenance/repair sound sources, thruster use for DP is the most significant. The National Marine Fisheries Service recognizes three kinds of sound: continuous, intermittent (or transient), and pulsive. The project will not cause pulsive noise activities. Rather, the sound sources of potential concern will be continuous and intermittent sound sources, including underwater sound generated by regasification/offloading (continuous) and dynamic positioning of vessels (regasification and large repair vessels) using thrusters (intermittent). Both continuous and intermittent sound sources are subject to the National Marine Fisheries Service's 120 dB re 1 μ Pa threshold for determining levels of underwater sound that may result in the disturbance of marine mammals. Potential effects of noise on marine mammals include masking, disturbance (behavioral), hearing impairment (temporary threshold shift [TTS] and permanent threshold shift [PTS]), and non-auditory physiological effects.
8. Essential fish habitat - Withdrawal of ballast and cooling water at the port as the regasification vessel unloads cargo (approximately 1 million gallons per day) could potentially entrain plankton and fish larvae .
9. Ease of access – although the delivery tankers will have easy access to the buoys, on shore personnel will have to travel 5-8 miles in case emergency situations arise.
10. Corals- the entire north coast of Puerto Rico is designated critical habitat for elkhorn and staghorn coral. Species specific studies would have to be performed to determine the status of the species. The species could be affected by trenching done to install the underwater pipeline.

11. The land to be used for the project is not compatible with the uses defined in the criteria (commercial, industrial, public, agricultural).
12. Exclusion zone- the Coast Guard will determine the exclusion zone during construction and operation of the project
13. Zoning- the zoning in the project area is not compatible with the zoning designated in the criteria: non residential, public, industrial, agricultural, commercial and non-zoned

Construction of a Natural Gas Pipeline (Terrestrial routes)

The purpose of this analysis is to select the best terrestrial route for a pipeline to deliver natural gas from the Ecoelectrica facility in Peñuelas to the Cambalache, Palo Seco and San Juan plants. Other works and studies contracted by PREPA were used during the Alternative Routes Selection effort. Part of the study conducted by *Power Technologies Corporation (PTC)* in 2006 was used for this analysis (*Corridor and Alternative Routes Selection Study*). The PTC study was inclusive since it took into consideration the entire island. Corridors were evaluated every 1,000 meters and used the following criteria for such evaluation; topography, land use, existing corridors, and sensitive areas. Options were refined with other factors such as: individual residences, minor topographic variations, sensitive habitats identified during field visits, and methodology of construction in areas of greatest difficulty, such as: steep slopes, bridges and densely populated areas. Finally, the study selected multiple routes to bring natural gas to various points of the island. These included the PREPA facilities at Arecibo, San Juan and Palo Seco, which are the focal points of this Via Verde project.

The study carried out by PTC identified two viable alignments to transport natural gas from EcoElectrica to Central Cambalache and two segments from San Juan to Cambalache.

Ecoelectrica to Cambalache Segments

1. Alignment South to North "A"

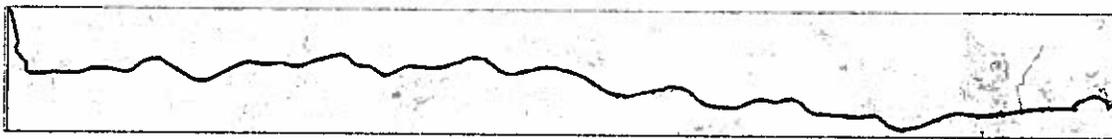
Starting at EcoElectrica, take a Northeast route overland to Ponce and then follow the State Road 10 road easement. The route follows State Road 10 through Adjuntas and Utuado. At Utuado the pipeline moves away from but parallel to the State Road 10 corridor until it reaches Arecibo. At Arecibo the route follows Northern plains until it reaches Central Cambalache. This route runs a total of 45.1 miles and the study labeled this alignment "*Overland*".

2. Alignment South to North "B"

Starting at EcoElectrica, take one of two options to get to State Road 10. The first is to follow the right-of-way of the southern gas pipeline to Ponce and the second option is to take the State Road 10 right-of-way from Guayanilla. Both go to the west of Ponce where the pipeline route follows the State Road 10 right-of-way State Road 10 until it reaches Central Cambalache. This route runs a total of 36.8 miles and the study labeled this alignment "*DOT Route*". The study also identified two viable alignments for the proposed natural gas pipeline, from Central Cambalache to San Juan and Palo Seco.

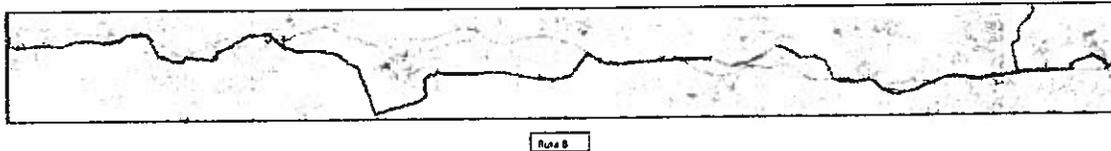
San Juan to Cambalache Segments (East to West)

3. Alignment East to West "A" (Include drawing)



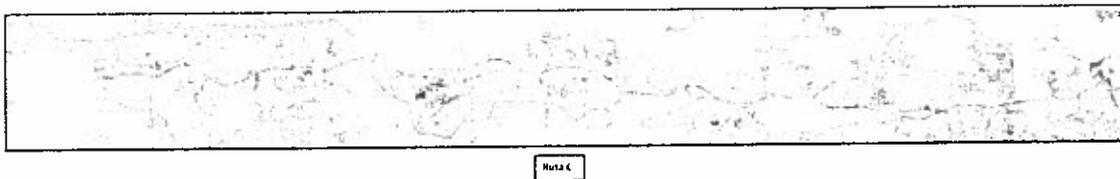
From San Juan, in Levittown, take a path west and cross the Municipalities, of Toa Baja, Dorado, Vega Alta, Vega Baja, Manati and Barceloneta to Arecibo. This route runs a total of 44.6 miles. The study labeled this alignment "*Overland Corridor*".

4. Alignment East to West "B"



From Cataño, follow the PR-22 right-of-way to Arecibo. This route crosses the Municipalities of Toa Baja, Dorado, Vega Alta, Vega Baja, Manati and Barceloneta. This route would necessitate an investigation to determine if the pipeline would interfere with the right-of-way of the Superacueducto (Super Aqueduct). This alignment runs a total of 45.6 miles and the study called this alignment "DOT Corridor".

5. Alignment "C" segments



A third alignment, which was not contemplated in any of the previous studies contracted by PREPA, was also considered for the Via Verde project that ran near both of the other two alternative routes but avoided more residential areas. In summary, three (3) routes were considered for the pipeline corridor from EcoElectrica to Arecibo and then from Arecibo to San Juan. These were: alignment South-North A (SNA), alignment South-North B (SNB), alignment South-North C (SNC); alignment West-East A (OEA), West-East B (OEB), West-East C (OEC).

Evaluation criteria for terrestrial route comparison

The following environmental criteria were used to evaluate the six alignment segments and determine which segments met the criteria as explained below:

- **Use of land** - The different uses of land were analyzed in each alignment. A route was defined as favorable for pipeline construction if existing land use was currently used for public, industrial, agricultural and commercial applications. A route was defined as not favorable for construction if land was currently in residential use and/or environmentally-sensitive. The percentage of the alignment with favorable uses and

then the percentage not favorable were compared to obtain a final value. The route which had the largest value received the positive (+) value.

- **Impacted water bodies** - The number of crossings of bodies of water increases the difficulty to construct the pipeline. Crossing a large body of water would need special construction methods to avoid adverse impacts. These construction methods increase the cost of the project. All bodies of water which were intercepted by an alignment were counted. The route with the fewest water body crossings received a positive (+) value.
- **Forests or nature reserves** - Forests and nature reserves were areas considered important public resources due to their high ecological value. For selection of a positive (+) value the criteria considered avoidance or minimization of impacts to these areas. The percentage of forested/nature reserves impacted was measured against the total length of each route alternative. The route with the smallest percentage of forests and nature reserves received the positive (+) value.
- **Endangered Species** - This criterion measured the extent of the alignment alternative that was considered protected habitat and/or had listed species present. The route alternative with the smallest percentage of impact in protected habitat received the positive (+) value.
- **Archaeological sites** - All identified architectural and archaeological sites that would be intercepted by an alignment alternative were marked. The route with the fewest sites received the positive (+) value.
- **Highway crossings** - Road crossings increase the difficulty of pipeline construction since special construction methods are needed to avoid affecting the integrity of the infrastructure and vehicle congestion. All roads intercepted by an alignment alternative were identified. The route with the fewest road crossings received the positive (+) value.
- **Zoning** - The different zonings were identified for each alignment alternative. Favorable zonings were considered to be non residential, public, industrial, agricultural, commercial and non-zoned. Not favorable was considered to be areas zoned residential, or areas identified as forests, historical sites and conservation lands. We measured the extent of alignment with terrain for favorable zoning against not-favorable zoning to obtain a final value. The route which had the largest value (favorable vs. not-favorable) received the positive (+) value.

- **Topography** - Puerto Rico has a variety of topographical areas within its limited geographical scope. The Cordillera Central area is characterized by its rugged topography. We analyzed different levels and steepness of topography and types of soils within each alignment. Abrupt changes in the topographic levels were marked. The route which had the smallest number of abrupt topographic changes received the positive (+) value.
- **Residential areas** - Due to its limited geography and high population density, Puerto Rico has abundant residential areas, especially in the coastal plains. Distance from Residential Areas, as part of the general public safety factors was considered to be a very important factor in identifying the best, practicable alternative. For this reason, greater weight was given in the project planning criterion to minimize the number of homes in the vicinity of an alignment. Any residence which would be within 150 feet from the center of an alignment was identified and counted. The route with the fewest number of residences received the positive (++) value.

To determine the best terrestrial alternative, the three (3) segment alternatives for the South-North section were compared to each other based on the results obtained once the criteria was applied. The three (3) segment alternatives for the East- West section were also compared. The route option with the least impact to each criterion received a positive value (+). Then the total number of positive values for each route alternative was added and tabulated. The route option with the largest number of criteria in its favor was selected. The analysis is summarized in the Table 1.

Table 1: Route Selection Matrix for Terrestrial Route

Criteria	South North A		South North B		South North C		West East A		West East B		West East C	
Use of land	3.09		8.68		14.35	+	1.32		14.38		18.89	+
Bodies of water	23		25		20	+	15		12	+	13	
Forests or nature reserves	1.39	+	2.50		3.04		0.59		0.03	+	2.79	
Endangered Species	6.49		11.69		6.01	+	7.03		1.53	+	10.43	
Architectural and archaeological findings	1		0	+	0	+	0	+	0	+	0	+
Highway crossings	40		28		21	+	64		47		30	+
Zoning	24.21		30.61		33.41	+	4.28		0.44		32.42	+
Topography	86		78		59	+	15		12	+	13	
Residences	17		2	+	2	++	29		22		1	++
Total Positive criteria		1		3		9		1		5		6

Of the three south-north segments, the South-North C (SNC) segment was the most favorable with nine positive points, while South-North B had three positive points and South-North A only one positive point. Minimal direct impact to residential areas also favored segment SNC.

Of the three west-east (east-west) segments, the West East C (OEC) segment was the most favorable with six positive points while, West-East B had five positive points and West-East A only

one positive point. Again, direct impact to residences strongly supported segment OEC since only one residence would be directly impacted while the other two segments potentially directly impact over twenty residences each.

Based on this analysis, together, segment South North C and segment West East C were selected as the best option for a pipeline route.

EVALUATION OF ALTERNATIVES USING RATING AND WEIGHT – Table 2

Criteria	Terrestrial Route			Buoys			Import Terminal		
	Rating	Weight	Total	Rating	Weight	Total	Rating	Weight	Total
Land use	10	3	30	5	3	15	10	3	30
Bodies of water	5	2	10	5	2	10	10	2	20
Forests and nature reserves	5	2	10	10	2	20	10	2	20
Endangered species	5	3	15	5	3	15	5	3	15
Architectural and archaeological findings	10	2	20	10	2	20	10	2	20
Road crossings	5	2	10	10	2	20	10	2	20
Zoning	10	3	30	10	3	30	10	3	30
Topography	5	2	10	10	2	20	10	2	20
Community	10	3	30	10	3	30	10	3	30
Pipe length	5	2	10	5	2	10	10	2	20
Impact to jurisdictional areas	5	3	15	5	3	15	5	3	15
Pipe security	10	3	30	10	3	30	10	3	30
Impact on transportation and traffic	10	2	20	5	2	10	5	2	10
Water quality	10	3	30	5	3	15	5	3	15
Aquatic Resources	10	3	30	5	5	25	5	5	25
Cost	10	3	30	10	3	30	5	3	15
Noise impact	10	2	20	5	2	10	10	2	20
Essential fish habitat	10	2	20	10	2	20	5	2	10
Ease of access	10	2	20	5	2	10	5	2	10
Corals	10	2	20	5	2	10	5	2	10

TOTAL

410

365

385

CONCLUSIONS

1. The alternative of building a terminal at or near the CTSJ is not feasible, nor practicable, when comparing potential environmental impacts associated with the construction of a natural gas pipeline to service AEE's power stations. It must be considered that the process of constructing and operating an LNG import terminal is complex. Permits and endorsements are regulated by the Federal Energy Regulatory Commission (FERC). In comparison, the EcoElectrica studies and permit process to construct an import terminal and start of the operation took between 7 to 10 years. This timeline would not satisfy AEE's need to begin a project to facilitate the transition from oil to a renewable source of energy. The cost of the existing EcoElectrica terminal fluctuated around \$570 million in 1995. Considering inflation, the construction of a similar terminal today would be too onerous as it would be beyond \$1 billion. As a project of the Government of Puerto Rico, it would require funding through bond issues, limiting savings on electrical bills.

Although an area of maritime use, the CTSJ (as well as the other two stations in the northern area) does not comply with depth criteria or the anchor capacity for the necessary tankers. This alternative lacks a dredged material disposal area and necessary dredging activity would adversely impact the benthic community in the area. Maritime traffic would be highly compromised by the existence of only one entrance channel to San Juan Bay. It is believed that locating a receiving terminal here would adversely impact the local economy, as well as the tourism industry.

2. The system of mono buoy and tanker would cost approximately \$70 to \$80 million per year. The plants (Cambalache, Palo Seco and San Juan) have a small footprint and do not have space to locate the terminal facility to receive the CNG. The period of time required to put the system into operation, in compliance with all applicable federal and State legislation is estimated between 5 to 8 years. Although this project is not viable at this time, PREPA will continue to study this possibility since multiple projects using two buoys a natural gas without compression have been constructed in the US Mainland and are operating successfully.

3. Although the terrestrial route is not without impacts, it is the best alternative to deliver natural gas to PREPA's plants in northern Puerto Rico. Impacts to human and other resources can be avoided, minimized or mitigated. There is extensive knowledge about the resources affected by the project and PREPA will work following the regulatory agencies recommendations and strict construction codes.

ELECTRIC POWER AUTHORITY
Puerto Rico's Via Verde Project
Preliminary Environmental Impact Statement (DIA-P)

Summary

This project is one of the tools needed to address the emergency regarding the infrastructure for generating electric power decreed by the Hon. Luis G. Fortuño Bursat in Executive Order OE-2010-034, under Law 76 of May 5, 2000. In addition, it is essential to comply with the commitment of his work program aimed to reduce the energy cost and to strengthen Puerto Rico's economy.

What is proposed is the construction of a 24" diameter steel pipeline to transport natural gas from the facilities of EcoEléctrica to the Cambalache, San Juan and Palo Seco Power Plants. The pipeline will be underground, it extends for some 92 miles and it will run through the municipalities of Peñuelas, Adjuntas, Utuado, Arecibo, Barceloneta, Manatí, Vega Baja, Vega Alta, Dorado, Toa Baja, Cataño, Bayamón and Guaynabo. The works will include clearing the right of way, excavation of trenches and installation and testing of the pipeline. In addition, they include modifications to units of the Cambalache, Palo Seco and San Juan power plants to enable them to burn natural gas as well as liquid fuels. The estimated cost of the project will be \$447,000,000 dollars which includes the cost of design, purchase, conveyance of and delivery of materials, construction, payment of municipal licenses and taxes, if applicable, purchase of land, studies and permits. The cost for the conversion of the units to natural gas is estimated to be between \$50 to \$70 million dollars. Approximately between 1,000 and 1,200 temporary direct and 4,000 to 5,000 indirect jobs will be generated.

A. Project Rationale

Currently, 99% of the electricity generated by the Electric Power Authority (Autoridad de Energía Eléctrica or AEE, in Spanish) is obtained from petroleum. The excessive and unpredictable increase in the cost of liquid fuels makes us less competitive in a global economy. To control and reduce the high cost of electricity the AEE's Governing Board approved a General Strategic Plan for the Development and Expansion of Generating Capacity. This Plan established, as a quicker, more viable and environmentally safe alternative, that generating capacity would be added using natural gas as the main fuel, as part of the strategy to diversify fuel that would allow us to reduce the operating costs and to maintain sustained environmental compliance.

The main reasons for this determination are the following: in Puerto Rico there already is a Liquefied Natural Gas Terminal; the historical and projected price of natural gas is lower than the distillate fuels and it will be cheaper than residual No. 6 fuel oil; reduces the maintenance cost of the units, which are prepared, or can be modified, for its use; the technology is developed and tested; and there exist confirmed reserves of natural gas in different parts of the world. The use of natural gas for the production of electric