

GOVERNMENT OF PUERTO RICO
PUBLIC SERVICE REGULATORY BOARD
PUERTO RICO ENERGY BUREAU

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JRSP - SECRETARIA
NEGOCIADO DE ENERGIA
DE PUERTO RICO

IN RE: REVIEW OF THE PUERTO
RICO ELECTRIC POWER
AUTHORITY INTEGRATED
RESOURCES PLAN

CASE Number: CEPR-AP-2018-0001

Matter: Empire Gas Companies' Motion to
Intervene

PETITION TO INTERVENE

To the Honorable Energy Bureau ("Bureau")

NOW COMES, EMPIRE GAS COMPANY, INC. ("Empire") through its undersigned legal representation and respectfully STATES, PRAYS AND REQUESTS:

I. INTRODUCTION:

1. The Bureau issued an order granting any party desiring to intervene in this proceeding until August 2, 2019, to submit a Petition for intervention pursuant to Sections 5.05 of Regulation 8543 of the Bureau.

2. Empire, is a domestic corporation, currently the largest importer and distributor of Liquefied Petroleum Gas ("LPG" or "propane") in Puerto Rico.

3. The existing draft Integrated Resources Plan ("IRP") acknowledges that Propane or LPG may constitutes a viable alternative fuel to be used by the Puerto Rico Electric Power Authority ("PREPA") for electric energy generation. The IRP further indicates that: *"Siemens believes that LPG fuel will remain cost-competitive compared to diesel*

and residual fuel oil.” Furthermore, it also states that Propane fired units use a clean fuel that will help meet MATS standards, and which is typically cheaper than diesel or residual fuel oil and has a fast start time.” Section **7.1.2.13 Alternative Fuels.**

4. It should be noted that the proposed IRP calls for the conversion of existing “Peaking Units” from diesel fuel to natural gas, as well as building other such units up to a total of 18 units. **Section 10.1.5 Install New Resources, Mobile Gas Turbine Peaking Units (MGTPU’s).** According to the IRP, this will be of 23 MW capacity each, distributed at five different plant locations around the island. It indicates that these new units will be capable of burning containerized natural gas delivered by truck with onsite tankage.

5. It is Empire’s contention that such Peaking Units could be better fired using either *Propane* or *Synthetic Natural Gas* (“SNG” discussed in Section IV) at a lower cost; taking into account the following factors: a) Propane or SNG is readily available for immediate consumption, whereas a containerized natural gas is not; since its availability in significant numbers depends on the yet to be built natural gas importation and re-gasification facilities; b) capital cost of establishing an *onsite* Propane or SNG storage facilities is minimal compared to containerized natural gas, which might be several times higher and c) containerized natural gas depends on the continuous availability of relatively small capacity self-contained storage trucks and does not provide a high security of supply assurance level.

6. Furthermore, we also believe that LPG or SNG should be considered as a viable alternate fuel for larger generating units since: a) it is readily available, b) import

facilities exist and are readily available and c) capital cost of establishing an onsite Propane or SNG storage facility is minimal compared to natural gas, which might be several times higher.

II. EMPIRE GAS EXISTING INFRASTRUCTURE

1. Since its initial organization in 1967, Empire has been supplying LPG for domestic, commercial and industrial uses within the Commonwealth of Puerto Rico. Empire operates many filling plants in Puerto Rico, employing some 400 persons. Its staff includes engineers, specialized and highly trained personnel, accountants and legal counsel. On April 12, 2019, Mr. Ramón González Sr., Empire's founder and President, was inducted into the *LP Gas* Hall of Fame.

2. Empire has a large and modern fleet of tank trailer transports with an average capacity of 10,000 gallons, ready to access any point within the Commonwealth of Puerto Rico and operates its own repair/maintenance hub in Guaynabo, Puerto Rico.

3. Empire's main port terminal and storage facility in Puerto Rico is a fully refrigerated facility, with a storage capacity of some 23,000 MT or 12.2 MM ("million gallons") of LPG. This storage capacity provides an import potential for hundreds of millions of gallons of fuel per year.

4. Empire is also the leading supplier of LPG for industrial operations; providing LPG not only for conventional heat and steam requirements, but also for Combined Heat and Power ("CHP") and electrical co-generation and electric generation applications. This are able to provide, on a combined basis, energy, steam and cooling for industrial

applications. Empire also provide turn-key power and CHP solutions to local and multi-national manufacturing operations, including the design, purchase of generating machinery, assembly, testing and operations of such solutions.

III. LPG AS A FUEL FOR GENERATING ELECTRIC POWER

1. As of 2013, at least 56 Peak Shaving facilities operated in the United States using Propane-Air (SNG as discussed further). Several countries operate propane fired power plants, including Pakistan, Ghana, El Salvador and the USVI. The largest, the Bridge Power Plant, in Ghana, will ultimately have an electricity generating capacity of 400 MWe, using gas turbine generator sets with steam turbines in a CCGT (Combined Cycle Gas Turbine) configuration. Once completed, it will represent over 15% of the country's power generation capacity.

2. As a matter of economics, propane based generation may be an ideal alternative for island enclosed systems with no natural gas access. As explained by a leading author on the subject:

"Compared to LNG, the infrastructure required to make the switch to propane power is far less challenging. Though generation with propane results in slightly lower output and efficiency compared to natural gas, **propane is much easier and less expensive to compress, ship, and store than LNG** (propane liquefies at -42°C compared to -260°C for natural gas) or compressed natural gas (which must be stored at far higher pressures: about 3,000 psi versus 100 psi to 150 psi for propane).

Propane-powered turbines can be used for the same simple cycle, combined cycle, or co-generation applications as natural gas-fired turbines." Overtone, Thomas, *"Propane Power Is Grabbing Growing Share of Gas-Fired Market"* www.powermag.com/propane-power-is-grabbing-growing-share-of-gas-fired-market.

The author further noticed in relation to the case of the USVI, as follows:

“For island grids dependent on imported fuel oil, propane power is especially attractive. Though it’s not as clean as solar or wind, it’s far cleaner than diesel while still being dispatchable.

The U.S. Virgin Islands Water and Power Authority (WAPA) is in the middle of a \$150 million transition from fuel oil to propane. **The project is expected to cut WAPA’s fuel costs by 30%**, amounting to annual savings of around \$90 million. The seven GE turbines at the 198-MW plant on St. Thomas and the 118-MW plant on St. Croix that previously ran on No. 2 fuel oil are being converted to dual-fuel operation by Dutch firm Vitol.” Thomas, *supra*.

3. According to the World LPG Association, in its *“Global LPG Power Generation Market Development & Recommendations for Future Growth”* study:

“There is growing evidence to suggest that LPG will have an important role to play within the global Power Generation sector in the next 10 to 20+ years. As the trend towards renewables continues throughout many parts of the world, and with coal increasingly seen as a power generation source of the past rather than the future, the role of gaseous fuels as a lower carbon, flexible way to generate electricity has never been more important. The International Energy Agency (IEA) anticipates a 50% growth in the demand for natural gas in the period 2016 to 2040 – with much of this growth associated with electricity generation, and a continuation of the trend away from using coal-fired power plants. Where pipeline infrastructure exists in close proximity to the demand, natural gas is clearly the gaseous fuel of choice.

However, many countries do not have an established network of natural gas pipelines. In countries where these do exist, infrastructure is often reserved for areas of high population density and/or centers of industrial activity, leaving more remote areas with little or no access to natural gas. In such cases, there is a clear opportunity for LPG to provide a solution for power generation – especially when new power plants are necessary to meet increasing electricity demand.”

See <https://www.wlpga.org/wp-content/uploads/2017/06/Global-LPG-Power-Generation-Market-Development-and-Recommendations-for-Future-Growth.pdf>:

4. The same scenario exists in Puerto Rico today. Except for the Ecoeléctrica operation, we do not produce or import natural gas in large quantities. It should be noted, that PREPA has pursued many natural-gas conversion projects, at a costs of millions of dollars, since the turn of the last century. PREPA has tried North and South pipeline projects, gas ports, gas barges based storage and other ideas; to no

avail. The problem remains: as much as natural gas is a very desirable fuel; the cost of building new import and storage facilities is astronomically high and we still have no access to U.S. natural gas transported in large vessels due to existing Jones's Act limitations. As the indicated study illustrates:

"Over time, we expect natural gas grid infrastructure to expand in many regions throughout the world. However, in some countries, power shortages are becoming critical issues today and governments cannot afford to wait for five to ten years before natural gas pipelines are in place to fuel new-build power plants.

Therefore, in a bid to provide security of electricity supplies, governments are increasingly considering the potential for using LPG as a 'bridging' fuel. In these cases, power plants fueled by LPG are built – often with short one to two year lead times - but with a longer-term plan to convert to natural gas once the pipeline infrastructure is in place." World LPG Association, *supra*.

Once natural gas is available, a LPG fired power plant may easily be converted to natural gas at a minimal cost. If it ran on SNG, at no cost at all. As a matter of fact, Ecoeléctrica, connected via pipeline to Empire's LPG import terminal and main storage facility, is capable of running on LPG; and it did, during the first months after its construction and for short periods of time while the natural gas storage facilities undergo maintenance or repair operations.

5. Advantages of LPG over other fuel types should also be considered. This include, lower emission profiles, (as stated in the IRP) lower full life-cycle costs (versus natural gas for example), and quicker lead-times.

6. As for smaller *Peaking Units*, Propane or SNG are ideal fuels. As stated earlier, they are readily available, (import facilities exist and are ready) and capital cost of

establishing an onsite Propane or SNG storage facility is minimal compared to natural gas; which might be several times higher.

7. Constructing an adequate natural gas storage facility make take years and cost several million dollars. On the other hand a 120,000 gallon Propane storage facility consisting of four 30,000 gallon tanks and may be established in a matter of days.

8. The lower fuel storage costs will enable the Propane supplier to deliver the same amount of BTU's at a similar or perhaps a lower cost. The cost should be lower however, if we factor in the *opportunity cost* related to the time from an order to proceed to operations. See, Eaton, D. Gary, "PEAK SHAWNG WITH SNG" LP Gas Global Technology Conference, 2006; Propane Education and Research Council (PERC) World LP Gas Association (WLPGA).

9. The proposed Peaking Units in the IRP, could be immediately converted to Propane or SNG, achieving a 30% reduction in fuel costs, as the USVI experience shows. The USVI plants operated entirely on diesel fuel, and their capacity was similar to those currently in use by PREPA's Peaking Units.

10. According to General Electric, switching from a diesel engine and electric generator (diesel genset) to one of their a TM2500 units, (a mobile 36 MW gas turbine power plant) burning liquefied petroleum gas (LPG) can save \$7 million per year in operating costs. Furthermore, it states that in a typical scenario a 250 MW installation, 8 x TM2500 vs. 156 x diesel reciprocating engines, it could save between 12-44 million dollars a year in fuel savings. www.ge.com.

IV. SYNTHETIC NATURAL GAS ("SNG")

1. SNG is Propane mixed with air, in exact proportions as to replicate the characteristics of natural gas. To ensure the greatest certainty and clarity when discussing the issue of interchangeability between LPG ("propane") and liquefied natural gas ("LNG"), the technically correct and globally accepted definition must be incorporated.

2. The most common specific method to mediate the exchange of combustible gases is the so-called "*Wobbe Index*". It is an indicator of the interchangeability of fuels such as liquefied petroleum gas (LPG), liquefied natural gas (LNG), natural gas (NG) and synthetic natural gas or propane air. (SNG) See <https://sciencing.com/calculate-wobbe-index-5147506.html>. LPG can easily be converted into SNG by a simple air dosing process, in which approximately 45% of atmospheric air is mixed with 55% LPG vapor. It is also known as "*propane air*" in Spain and Latin America, particularly in Argentina, where it is widely used to generate electricity.

3. SNG and natural gas are fully interchangeable according to the aforementioned index. SNG REPLACES natural gas; FOR ALL TYPES OF USE FROM RESIDENTIAL TO INDUSTRIAL. See, Eaton, D. Gary, "*PEAK SHAWNG WITH SNG*" LP Gas Global Technology Conference, 2006; Propane Education and Research Council (PERC) World LP Gas Association (WLPGA). Schedule "A". The author indicates that:

"If the natural gas and the SNG have an identical or nearly identical Wobbe Index, they produce an equivalent amount of energy and require the same amount of combustion air. **Burners operating on SNG Will not require pressure adjustments and the**

measured and observed combustion characteristics show essentially complete acceptance."

As indicated, with the simple production of SNG at site; natural gas can be fully replicated, making absolutely no changes to the burners of equipment designed for natural gas. This only requires the installation of the dosing device at the place of use.

4. It must be remembered and reiterated that, to be used in Puerto Rico, natural gas is transported and shipped as liquefied natural gas (LNG) and must be re-gasified and converted into liquefied natural gas through a process that transforms it back into a gaseous state. Therefore, if SNG requires some auxiliary dosing equipment to achieve the desired air blend; LNG needs a more complex and costlier re-gasification equipment, plus the required and extremely costly natural gas storage equipment.

5. As an alternative fuel, Empire's Propane or SNG may also replace any natural gas application, including serving as a power generating fuel. By adding the relatively low cost and readily available air dosification equipment, LPG may immediately become natural gas. This would enable immediate conversion to LPG from units whose burners were originally designed and calibrated for natural gas.

V. LEGAL BASIS AND ANALYSIS FOR INTERVENTION

1. Sections 5.05 of Regulation 8543 refers to the Puerto Rico Uniform Administrative Procedure Act for the purpose of determining if a petition for intervention may be granted by the Bureau. Section 3.5, 2155 of Title 3 (app.) of the Laws of Puerto Rico states as follows:

§ 2155. Intervention—Application

“Any person having a legitimate interest in an adjudicatory procedure before an agency may file a written, duly grounded application in order to be allowed to intervene or participate in said procedure. The agency may grant or deny the petition at its discretion taking the following factors into consideration, among others:

- (a) Whether the petitioner’s interests may be adversely affected by the adjudicatory procedure.
- (b) Whether there are no other legal means for the petitioner to adequately protect his interests.
- (c) Whether the petitioner’s interests are already adequately represented by the parties to the procedure.
- (d) Whether the petitioner’s participation may help, within reason, to prepare a more complete record of the procedure.
- (e) Whether the petitioner’s participation may extend or delay the procedure excessively.
- (f) Whether the petitioner represents or is the spokesperson of other groups or entities in the community.
- (g) Whether the petitioner can contribute information, expertise, specialized knowledge or technical advice which is otherwise not available in the procedure.

The agency shall apply the above criteria liberally, and may require that additional evidence be submitted to it in order to issue the corresponding determination with regard to the application to intervene.” 3 LPRA § 2155.

2. We shall consider each factor:

- (a) Whether the petitioner’s interests may be adversely affected by the adjudicatory procedure.

As stated in our previous discussion, the petitioner is the largest importer and distributor of LPG-Propane in Puerto Rico. Since we are proposing that the Bureau should enhance the possibility of LPG-Propane or SNG as a viable alternative fuel

particularly for Peaking Units; its interests are obviously tied to such consideration and would be adversely affected if the petition for intervention is denied.

(b) Whether there are no other legal means for the petitioner to adequately protect his interests

There are no other legal means for the petitioner to adequately protect his interests. Since according to law, the Bureau is the sole governmental agency with the capacity and jurisdiction to consider and approve the IRP; only through participation in this process may Empire present its case for the above mentioned purpose and to illustrate the Bureau regarding the benefits of LPG-Propane-SNG as a viable and use full alternative fuel for PREPA.

(c) Whether the petitioner's interests are already adequately represented by the parties to the procedure

No. We have no knowledge of any other person or entity who has presented qualitatively and quantitative similar arguments relating to the enhanced use of Propane-LPG-SNG in the IRP.

(d) Whether the petitioner's participation may help, within reason, to prepare a more complete record of the procedure

Yes. Empire's extensive experience with the importation, distribution, storage and use of LPG-Propane-SNG enables it to present extensive technical, operational and market related data and experiences related to such activities.

(e) Whether the petitioner's participation may extend or delay the procedure excessively

No. Empire's intervention will be presented within the Bureau's timetable for this administrative process and will not adversely affect or delay these procedures.

(f) Whether the petitioner represents or is the spokesperson of other groups or entities in the community.

Although not officially named as a spokesperson for the industry; Empire's positions are compatible with the interests of other members of the LPG-Propane-SNG industry.

(g) Whether the petitioner can contribute information, expertise, specialized knowledge or technical advice which is otherwise not available in the procedure

Yes. As stated, Empire's extensive experience with the importation, distribution, storage and use of LPG-Propane-SNG enables it to present extensive technical, operational and market related data and experiences related to such activities. Its experienced personnel and expertise enables Empire to contribute information, expertise, specialized knowledge or technical advice which would be otherwise not available in this procedure. We will present expert witness testimony in relation to our presentation. Such knowledge and advice would otherwise not be available in these procedures.

VI. CONCLUSION

Since the appearing parties' Petition fully complies with all of the criteria included Section 2155 of Title 3 (app.) of the Laws of Puerto Rico, and taking into effect that the agency shall apply the above criteria liberally, Empire respectfully requests this Bureau to approve its intervention in this proceeding.

Respectfully submitted,

In San Juan Puerto Rico, this 1 day of August, 2019.

Electronically Filed <https://radicacion.energia.pr.gov>

I CERTIFY: that I have sent a copy of this motion via e mail to: Lic Nelida Ayala n-ayala@aeep.com, Lic. Carlos Aquino, c-aquino@prepa.com, Lic. Astrid Rodríguez Astrid.rodriguez@prepa.com; Lic. Nidsa Vázquez n-vazquez@aeep.com; Lic Jorge Ruiz Pabón; jorge.ruiz@prepa.com; Agustín Carbó; acarbo@edf.org, Secretaria del Negociado de Energía, secretaria@energia.pr.gov; Lic. Javier Rúa, Javier.ruajovet@sunrun.com; Bureau's Office of Legal Affairs, legal@energia.pr.gov; Wanda Cordero, wcordero@energia.pr.gov.



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