Offshore Utilities, LLC
Innovative Solutions For A Changing World

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Bermuda IRP Consultation Responses

Monique Lister
Regulatory Authority
1st Floor, Craig Appin House
8 Wesley Street
Hamilton, Bermuda

Subject: Response to Consultation Document: Comments on Integrated Resource Plan Proposal Consultation

Dear Ms. Lister,

Pursuant to discussions with the Department of Energy and the Regulatory Authority of Bermuda, Offshore Utilities, LLC (OU) proposes to develop a Floating, Storage, Regasification, Power-Generation (FSRP) unit producing up to 100 MW of clean power through Liquified Natural Gas (LNG) onboard a converted tanker moored offshore to help meet the supply needs of Bermuda with the proposed terms and conditions described in this document to be used as a starting point for negotiations. In addition to producing wholesale power, OU is also capable to regasify LNG to natural gas and distributing it to the North Power Station along with producing fresh water for the local communities while taking up zero footprint onshore and offering a number of other environmental, and economical advantages. Our proposal is a direct path toward more efficient technologies, low cost of operation and sound environmental practices. Further our response shows irrefutable consistencies with the RA mandate and the Bermuda Government in the future direction of energy responsibility.

Our desalination and power plants are capable of adding a low cost, safe and reliable source of potable water and electricity for years to come. The offshore solution offers a number of benefits when compared to a traditional shore-based facility. Please see OU's presentation for further details on the benefits.

The Front End Engineering Design (FEED) study is complete for our FSRP and OU is ready to complete the balance. OU would need to complete the remaining FEED - which is specific to the topography, subsea construction, infrastructure and needs of Bermuda. Please see our responses as per the IRP consultation document listed on the following pages:

1. Are there any provisions in the IRP Proposal that should be modified? Please include any reasoning and evidence in your answers.

The IRP Proposal should allow all alternative proposals submitted prior the revised due date of August 17th to be explored before the Regulatory Authority grants any approval for future projects, such as the North Power Station. OU focuses on the effectiveness of Liquified Natural Gas (LNG). This particular type of fuel is cost effective, abundant, safe and proven as a bulk power generating system. The IRP lists LNG as a competitive feedstock and OU would request for the Regulatory Authority to give alternative proposals a serious look to provide the Island of Bermuda a competitive, safe and reliable electricity rate for its citizens.

After careful review of Oxera's report of the IRP Proposals compliance with guidelines noted, we would like to mention items 4.9, 5.1-5.11. There are several concerns the Regulatory Authority have highlighted (Methodological Concerns, Replacement Generation and Qualitative Assessment). These sections highlight that the recent approval of the North Power Station was not one of the scenarios given to the Regulatory Authority and that accurate pricing detail still has to be provided. The IRP proposes that the conversion to LNG in Scenario 3 to be the most preferred. One of the largest questions remaining is the investment in a LNG terminal - which would greatly impact the cost of electricity. OU's solution has the advantage to offer commercial scale power generation without the need to build a LNG terminal, thus cutting the cost of infrastructure and reducing the footprint on shore.

There are several factors that allow for the island to take part of the LNG savings. Bermuda has an active maritime industry that will allow OU to fully develop, insure, finance and operate this power facility under the Bermudian flag. OU has explored these savings in capital and operational costs that allow for the island to create more jobs. The IRP should be able to co-explore other scenarios that strive to cut down on the CAPEX and OPEX for the greater good of the island.

2. Do you think that the procurement strategy outlined in the IRP Proposal is appropriate?

The procurement plan illustrated a number of broad steps within the resource basis using the levelized cost of energy condition. As an independent power producer, our fuel source for generating electricity is Liquified Natural Gas (LNG). Our solution provides a seamless transition for the procurement process in several areas. First, the bidding process needed in section 2.7.2 is eliminated. Using our platform as a regasification facility, the entire process for storage, transport and regasification to be used for fuel is done entirely on the vessel. As the plans state, BELCO is undertaking a RFP process for third party contractors to engineer a regasification and distribution pipeline on the island. This requires not only valuable real estate but increases the scope of financing from the licensee's position.

A response is warranted for section 2.7.4. The IRP procurement plan identifies that no additional thermal resources are being pursued until 2031. OU is working with partners in the geothermal energy market along with new Solar PV technology onboard the vessel. Our focus is to incorporate clean and renewable technologies so that we remain environmentally relevant and maintain compliance with internationally set standards for emissions control and electricity output.

Section 2.7.7 references energy efficiency and demand side management of the bulk generation arm. OU is eager to work with the TD&R utility to maintain an operationally cohesive relationship, relying on a foundation of communication and teamwork. The method of power generation onboard the vessel is very simple as the TD&R utility and the bulk generator can measure consumption of electricity constantly, using a series of energy efficient generators to "load share" or "load shed" with respect to the local demand of electricity. In so doing, this limits the amount of generators to be used continuously to adequately power the island, greatly reducing operational costs while saving fuel. The generators on board the vessel are powerful enough to meet Bermuda's entire electricity needs or contribute electricity in parallel with BELCO's North Power Station. If requested, our vessel can be fitted to power the country during its peak demand periods for bulk electricity.

3. Which generation resources should the TD&R Licensee procure using competitive bidding, if any?

The OU team feels strongly that private companies should work with the TD&R Licensee in order to offer the most competitive bidding so that the consumers of the Island can enjoy a low fixed rate of electricity for years to come. Not only would a new bulk power producer offer unique and proven competitive methods of generating power, but they would bring in other means of financing that would avoid having the consumers pay for any new infrastructure. This would effectively save the ratepayers from being forced to pay out millions of dollars for the new bulk power station.

OU's goal is to fully finance the infrastructure and to use Liquified Natural Gas (LNG) to power the bulk generation system. We are at a turning point in this world of oil and gas where the technology for producing LNG has never been cheaper and more accessible. Bermuda is easily accessible from the continental United States - which puts it in an excellent position to have LNG delivered at a fixed rate for 10, 20 or even 30 years.

Working with the TD&R is vital to protect the rate payers from overcharges, price hikes and constant fluctuations in the commodity markets. OU has no intention to compete with the TD&R but to only complement the delivery of electricity so that other funds within the Government and the Utilities sector can be repurposed for the Island's other necessary improvements such as the new airport and other infrastructure projects.

4. Are there alternative proposals not considered in the IRP proposal, which may provide for an energy generation mix that is more consistent with the purposes of the EA (e.g. least-cost provision of reliable electricity)?

In a word; definitely. The incumbent proposal includes the laborious process of replacing its Heavy Fuel Oil (HFO) turbines with similar turbines one or two at a time. On the surface this is the most cost effective means to replace BELCO's power generating infrastructure; all of which is beyond its useful lifetime. However, there is a bigger story to tell here. The fact remains that when the last of the HFO turbines are replaced, Bermuda is still acquiring the plurality of its energy needs from one of the two most environmentally damaging methods; coal being the other.

Offshore Utilities proposes a complete swap of the base and peak-load power generating capacity on the same time frame that BELCO plans to complete its North Power Station – replacing only 56MW in the

process whereas OU can provide upwards of 100MW of cleaner energy within the same time window. Offshore Utilities will revolutionize the energy infrastructure in Bermuda; eschewing the piecemeal approach favored by the incumbent. Further, OU will be using LNG as its power source for the 100 MW of electricity it produces. This means a step change in terms of the carbon footprint for the island nation in 2020 – thrusting it onto the world stage as, arguably, one of the most energy-advanced nations on earth.

On top of converting 100% of the core energy production from HFO to LNG in one motion, Bermuda achieves its vision as laid out in the Electricity Act of 2016 of committing to an energy source which not only ensures the long-term health of its business and tourism industries but also achieves its stated of goal of moving towards a cleaner source(s) of energy.

5. ***Do you have any additional views on the assumptions, assessment methodology, and conclusions set out in the IRP?***

The assessment methodology within the PROMOD® software is credible based on its implementation from the client. However, the tools used and the agreements on what should be reported are solely based on the four scenarios addressed by the incumbent TD&R licensee. Once the factors of reduced project costs and use of 100% natural gas are implemented, we are confident that the results using our scenario would prove to be the most feasible for Bermudians environmentally by drastically reducing greenhouse gas emissions and financially by greatly reducing the cost of living.

While we find the assumptions, assessment methodology and conclusions set out in the IRP and its appendices fair and accurate they omit more advanced technologies such as ours. The net effect is that opportunities to realize the vision set out in the Electricity Act of 2016 may not be realized in the near-term due the continuing dependence on high-polluting hydrocarbons such as Heavy Fuel Oil.

Offshore Utilities' approach - using LNG to generate cleaner energy which can, in turn, be shipped ashore as electricity, water and/or natural gas solves multiple energy and utility issues. Our solution provides cleaner base energy for Bermudians, it enables the development of demand-side renewable energy installations, it eliminates the dependency on rain water and the island's fresh water lenses as the primary sources of potable water and supports the further development of natural gas as a primary source of energy on the island. Our water even enables the condensers on the existing equipment to be converted to water-cooling - improving their efficiency.

In short, our solution is beyond the scope of the assumptions set out in the IRP and its appendices. It represents a significant step forward in terms of Bermuda's energy infrastructure and can be implemented in as little time as it will take to design, engineer and build the North Power Station. We strongly encourage the Regulatory Authority of Bermuda to consider revisiting its four potential scenarios in favor of a fifth which will shift the base load to LNG and use the existing HFO generators as peak load capacity, instead, and better enable the adoption of renewable energy; exceeding the targets set out in the Electricity Act of 2016.

6. ***Do you have any alternative proposals for bulk generation or demand side resources that should be considered in the IRP?***

What follows is not an alternative to what is outlined in question 4 (above) but an addendum to the same. On top of the ability to produce 100 MW of cleaner base and peak-load power for the citizens of Bermuda the Offshore Utilities approach accomplishes yet another means of achieving the Electricity Act of 2016's goal of a cleaner mix of energy for the island nation. Offshore Utilities Floating Storage Regasification Power vessel (FSRP) has a variant known as the FRSWP – where the 'W' stands for water. Offshore Utilities can produce millions of gallons of potable water using excess energy not sent ashore as electricity.

Potable water production onboard Offshore Utilities' FSRWP accomplishes two goals simultaneously for Bermuda. First, it affords the country a safe, secure and consistent source of potable water for the life of the vessel. Water can be sent ashore to provide drinking water and enough water to promote the growth of tourism and business on the island. Further, any water which is not sent directly to the citizens, business and hotels on the island can be stored onboard the ship or in water reservoirs on land for emergency purposes. This water supply ensures that Bermuda never has to envision turning away tourists or businesses looking to come to Bermuda for fear of exhausting its water supply.

The other way Offshore Utilities' water production can satisfy the needs of Bermuda is through renewable power. Without that consistent source of water homeowners and businesses, alike, must dedicate 100% of their roof space to rainwater catchment. Demand-side resources such as rooftop solar PV units come at the risk of eliminating significant percentages of that individual household catchment. With millions of gallons of water available south-facing roof tops can be repurposed to catch energy instead of water – greatly enhancing Bermuda's ability to meet – and possibly exceed – its stated goal of 38% share of renewable energy by 2035 as per the Bermuda Electricity Policy 2016.

Finally, OU is fully capable of installing larger LNG tanks onboard to accommodate the North Power Station once it converts to natural gas. The vessel will store, regasify and transmit the natural gas through a buried subsea pipeline to BELCO's station. This solution has been proven around the world, is one of the safest solutions and saves the island from having to dispose valuable land for LNG infrastructure with storage tanks and regasification terminals.

OU is ready to fully finance the subsea FEED in order to place a highly competitive bid for the future of Bermuda's electricity. Based upon our feasibility study, we believe that we can deliver power to Bermuda's shore for a lower cost than what Bermudians currently pay today all the while modernizing the country's energy generation fleet. Over the past few months, OU has worked with the Department of Energy to obtain a license from the Department of Planning and Building to conduct a FEED study of the seabed. The study will comply with all environmental regulations and so far we have not received any negative opposition from the DOE, Department of Planning and Building and the Department of Environmental and Natural Resources. We anticipate the license to be approved by the end of this month and would greatly appreciate your support to conduct this FEED to provide a very thorough proposal for the island of Bermuda.

After completing the FEED study, we will be able to offer a firm and attractive price agreed between all parties. That price would be adjusted for inflation annually on January 1st of each year with the adjustment being three percent per year or the previous year's change in the CPI, whichever is greater. Deliveries of electricity would begin on a mutually-agreed date or upon successful testing of the FSRP once it is

on-site. OU takes full financial responsibility for the cost of construction of the vessel and subsea cable, thus not relying on federal funding that can be used for other needed infrastructure projects.

Finally, OU has been tentatively approved for a multi-billion dollar bond to construct a number of these vessels. To facilitate this work, OU would fund the Authority's costs for consultants to complete the environmental analysis of the offshore alternative. OU's environmental consultants and engineers would coordinate data and information-transfer with your consultants and are happy to share with you all the details.

Bermuda is in a position to take control of the energy sector by modernizing the infrastructure and secure it's rightful place as an energy leader for the world to follow.

Thank you for your consideration.

Sincerely yours,

Jim Rand, Chairman
Offshore Utilities, LLC

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