



**PUBLIC UTILITIES
COMMISSION
BELIZE**

DECISION

CONSENT TO PURCHASE

ONE REFURBISHED 21 MW MOBILE GAS TURBINE

AT THE COST OF APPROXIMATELY \$30 MILLION BELIZE DOLLARS

for

Belize Electricity Limited

22 DECEMBER 2023

PUBLIC UTILITIES COMMISSION

IN THE MATTER OF A REQUEST FOR PERMISSION BY BELIZE ELECTRICITY LIMITED TO PURCHASE ONE REFURBISHED 21 MW MOBILE GAS TURBINE AT THE COST OF APPROXIMATELY \$30 MILLION BELIZE DOLLARS, TO BE DEPLOYED ON A SHORT-TERM BASIS AND PENDING THE INSTALLATION OF A SECOND SUBMARINE CABLE IN SAN PEDRO, AMBERGRIS CAYE, BELIZE

DECEMBER 22, 2023

INTRODUCTION

1. By way of letter dated September 19, 2023, Belize Electricity Limited ("BEL" or the "Licensee") seeks permission from the Public Utilities Commission ("Commission") to contract with General Electric ("GE") for the purchase of one (1) refurbished 21 MW mobile gas turbine at a total price of approximately \$30 million (the "Plant").
2. Since this application came after an earlier filing by the BEL for approval of its Least Cost Expansion Plan (the "LCEP"), this later filing was combined with the former for the purposes of public consultation and is referred to as "the Subsequent Filing."
3. According to BEL, the Commission is "*aware that there is currently an in-country energy supply shortage due to delays in initiating the process to procure permanent in-country generation capacity. A short-term solution is necessary to secure sufficient in-country generation to meet electricity demand through to the end of 2024. The mobile gas turbine presents an optimal solution in terms of implementation time and value for money.*"
4. BEL's rationale for deployment in San Pedro is that "*The capacity limit of the single submarine cable interconnected to the grid will likely be breached within the next 18 months due to extraordinary growth in demand, and the second submarine cable to the island will not be in place for another 24 months minimally.*"
5. BEL assures the PUC that "*.... contract effectiveness will be contingent on BEL conducting the necessary due diligence, including obtaining environmental clearances and the appropriate warranties from General Electric, and being satisfied that the unit being purchased will be able to perform as intended.*"
6. Between October 13, 2023 and November 24, 2023, the Commission held publicly advertised consultation in an effort to generate commentary on BEL's LCEP and Subsequent filing.

7. At the close of the consultation period, the Commission had received only one (1) comment regarding the Subsequent Filing, in the form of an email dated 28th November 2023 from Mr. Robert Tillett, Engineer (hereinafter referred to as Mr. Tillett).
8. Given the urgency of the matter according to BEL, the Commission decided to bifurcate the issue and render a decision on the Subsequent Filing first.

OVERVIEW OF THE APPLICATION

9. BEL claims that the in-country generation capacity shortage situation continues to worsen due to higher-than-expected growth in demand for electricity and extended delays with bringing online key generation and transmission projects. As such, the most optimal solution, at this point, is to deploy a 21 MW mobile gas turbine to supplement in-country generation capacity until the pending generation and transmission projects are brought online. The mobile gas turbine will be deployed in San Pedro, Ambergris Caye at an estimated capital cost of \$30 million.

The Licensee indicates that “Based on the generation plan over the next three years, in-country firm capacity will not be able to meet the projected demand through to the end of 2024. Moreover, if there are any delays in rolling out the plan, there will be further shortages beyond 2024. Additionally, demand on the island of San Pedro is growing much faster than expected, and the capacity limit of the single submarine cable interconnection from the grid will likely be breached within the next 18 months unless an additional supply is installed. The second submarine cable interconnection to the island will not be in place before the next 24 months. Therefore, the only other solution is to install firm generation capacity on-island to supplement the grid supply from the single interconnection. This will also serve as backup in case the interconnection is lost at any time.”

10. BEL indicates that the decision to deploy the Plant in San Pedro, Ambergris Caye is because the supply concerns are most critical in that service area. The site location will be near the southern tip of the island on a property that has already been earmarked for this purpose with interconnection to the 34.5 KV grid network.
11. BEL holds the view that the most optimal solution, at this point, is to deploy this Plant to supplement in-country generation capacity until the pending generation and transmission projects are brought online.

CURRENT IN-COUNTRY DEMAND AND SUPPLY

12. According to BEL’s 2023 data, the total existing in-country firm capacity is 113.5 MW during the first half of the year and 93.5 MW during the second half of the year.
13. Based on the latest trends, BEL says the peak demand is projected to grow to 130 MW in 2024 and by 10 MW for each year thereafter up to 2026.
14. Regarding BEL’s forecast, Mr. Tillett questions its accuracy by stating that “*BEL is presenting that*

it has 113.5 MW of incountry generation in its generation planning. This figure incorporates BECOL being fully available at 52 MW during the months of March to June when the expected load is high. They should have instead expected that BECOL will not be fully available incase of maintenance issues and or water issues. BEL should therefore use the N-1 secure principle allowing for normal operations to be possible even if one generation unit at BECOL is down. It's possible that an inadequate planning matrix has led to inadequate foresight of potential problems. Again that omission, how they will fix their planning going forward is important! BEL might argue that they are utilizing N-1 secure in that they are looking at Mexico being down in this scenario. A unit out at BECOL is therefore possible from their standpoint an N-2 secure. However, I am sure BEL and BECOL have the date as to the 52 MW availability of BECOL during those months and it is very unlikely to be 100% available for that complete period!!!”

15. Mr. Tillett goes on to say that:

*“1. BEL should have added to this proposal what they will do to ensure they are not again in such a crisis! This omission is one that cannot be overlooked and therefore should be included in the PUC's decision on this matter.
a. BEL should have known that its demand would outstrip supply at the grid level
b. BEL should have known that the Submarine cable limit would have been exceeded and the second submarine cable should have already been installed”*

BEL’S ASSESSMENT OF OPTIONS AND RECOMMENDATION

16. BEL asserts that given the need for a short turnaround time, rental of diesel generation units was initially considered as the best generation solution but due to delays in delivery, the alternative solution is therefore to purchase the Plant instead, and that GE has confirmed that it will be able to source a 21 MW unit for around \$15 million USD within a 60-day window.
17. BEL projects that over a 15-year period, the purchase-to-own option is around three to four times less costly than the rental option and close to two times less costly than the current cost of the Bapcol supply (on a per KW capacity cost basis). Additionally, according to BEL, the purchase-to-own (GE) mobile gas turbine is a single unit that can run on natural gas, LPG, or distillate fuels.
18. The Commission was unable to substantiate BEL’s claims as the requisite spreadsheet(s) detailing assumptions, inputs, resource adequacy analysis and outputs have not been filed.
19. In relation to the purchase price, Mr. Tillett, in his comments says that *“the \$30 million expenditure is not cheap and for a short term solution it's enormous.”* Additionally, Mr. Tillett says that *“Whether or not BEL put in the second line to San Pedro in time or not, their argument and rationale for grid supply at San Pedro is prudent in my view. San Pedro and Caye caulker are critical tourist destinations and whenever the submarine cable to Caye Caulker is completed a generation at San Pedro would provide significant reliability to this area. It should be noted that in Drought years such as 2018 when BECOL was not dispatchable except for BWS requirements, this unit would still add to overall grid supply up to the load of Caye Caulker and San Pedro which presently is about 13 MW. The remaining 8 MW might not necessarily add to the Grid but primarily displace Mexico.*
- a. The difficulty here is that BEL solicited offers (or had a closed bidding) for its emergency consideration without going to an open tender to see what other options were available. This posture might suggest that BEL sees itself competing in the generation space which, if that is their posture, is questionable if not misguided.*

THE COMMISSION'S DECISION PROCESS

20. In assessing the application for permission made by BEL, the Commission observed that BEL has fused two separate issues in their application. The first is a longer-term issue of in-country capacity and second is a short-term need in San Pedro, Ambergris Caye, due in part to the delay in the deployment of the second submarine cable.

To come to its decision, the Commission contemplated the following questions:

Question 1: Is there a need for additional short-term capacity in San Pedro, Ambergris Caye?

Question 2: Is the size of the Plant consistent with the long-term expansion plans proposed by BEL?

Question 3: Did BEL explore all alternatives available to resolve this both the short-term and long-term situations?

Question 4: What will be the impact on tariffs if the Plant is approved?

Question 5: Does the proposed construction of the Plant meet with government policy?

Question 6: Does the proposed Plant provide the optimal solution for San Pedro, Ambergris Caye and for the in-country needs of Belize?

In relation to **Question 1**, the Commission needs only to repeat its previous Determinations and Decisions regarding the importance of the second submarine cable to San Pedro, Ambergris Caye as detailed in Annex 2.

The Commission considered the second submarine cable to be so important that it approved the capital expenditure as far back as 2020, with anticipation that the infrastructure will come into service within the 2020|24 horizon. Eventually the Commission imposed a penalty scheme to ensure it was installed by 2024.

In the Commission's Final Decision in ARP 2022, it stated that in relation to the redundant submarine cable from mainland to Ambergris Caye:

"BEL is forecasting that by 2024, the current 17 MVA capacity of the submarine cable will be breached. The PUC approved the project given the clear business case. The Commission viewed this project as having the highest priority and made a determination for a penalty regime if the Licensee failed to meet its previous commitment for a redundant submarine cable in 2023. Given proposed plans for 15 MW of BESS at the San Pedro Substation the Commission has decided to remove this project from the FTP 2020|2024 CAPEX and suspend the penalty regime, provided that the Licensee installs the BESS within the timeline determined by the Commission."

The Commission has therefore always been fully supportive of long-term permanent solution to address the (capacity/energy) needs for all the northern islands via Ambergris Caye. The Commission cannot, now or in the future, take responsibility for any shortfall that may occur in San Pedro due to the delays in deploying the second submarine cable.

In relation to **Question 2**, the Commission refers to a forecast dated July 4, 2023 and prepared by BEL as a part of a presentation to the Prime Minister of Belize. In this document, entitled **Short Term Energy Supply Plan Updated**, BEL projected that it will need 20 MW of energy to address a short fall of supply from the first quarter of 2024 to second quarter of 2026 as shown below:

Demand vs In-Country Available Capacity Projection – Q1 2024 to Q4 2025

Units of MW	Q1 2024	Q2 2024	Q3&4 2024	Q1&2 2025	Q3&4 2025
Peak Demand	120.0	130.0	125.0	135.0	130.0
Energy Supply	116.5	152.0	130.0	167.0	145.0
<i>Fortis Belize</i>	52.0	52.0	52.0	52.0	52.0
<i>Bapcol Fossil Fuel</i>	22.5	22.5	22.5	22.5	22.5
<i>Belcogen</i>	12.0	12.0	0.0	12.0	0.0
<i>Santander</i>	10.0	10.0	0.0	10.0	0.0
<i>BEL GT</i>	0.0	31.0	31.0	31.0	31.0
<i>CCK Power Station</i>	0.0	4.5	4.5	4.5	4.5
<i>Solar (Firm)</i>	0.0	0.0	0.0	5.0	5.0
<i>NGC Rice</i>	0.0	0.0	0.0	0.0	0.0
<i>BEL BESS (Battery)</i>	0.0	0.0	0.0	10.0	10.0
<i>Rental (20 MW)</i>	20.0	20.0	20.0	20.0	20.0
Reserve Margin (In-Country)	-3.5	22.0	5.0	32.0	15.0

 Short Term Generation Plan

Demand vs In-Country Available Capacity Projection – Q1 2026 to Q4 2027

Units of MW	Q1&2 2026	Q3&4 2026	Q1&2 2027	Q3&4 2027
Peak Demand	140.0	135.0	145.0	140.0
Energy Supply	208.0	186.0	214.0	192.0
<i>Fortis Belize</i>	52.0	52.0	52.0	52.0
<i>Bapcol Fossil Fuel</i>	22.5	22.5	22.5	22.5
<i>Belcogen</i>	12.0	0.0	12.0	0.0
<i>Santander</i>	10.0	0.0	10.0	0.0
<i>BEL GT</i>	31.0	31.0	31.0	31.0
<i>CCK Power Station</i>	4.5	4.5	4.5	4.5
<i>Solar (Firm)</i>	11.0	11.0	17.0	17.0
<i>NGC Rice</i>	25.0	25.0	25.0	25.0
<i>BEL BESS (Battery)</i>	20.0	20.0	40.0	40.0
<i>Rental (20 MW)</i>	20.0	0.0	0.0	0.0
Reserve Margin (In-Country)	68.0	31.0	69.0	52.0

 Short Term Generation Plan

The Commission notes that this forecast is without consideration for the energy purchased from Mexico, which has the contractual capacity of 55 MW. Mr. Tillett has hypothesized, as well, that BEL's modeling assumes, incorrectly, that 52MW will be available from BECOL during the dry season, thus the capacity needs for BEL is higher than the forecast above.

In an N-2 secured situation, where there is a reduction in production from BECOL coupled with the unavailability of CFE, the PUC can envision the need for the addition of 20 MW, **for the country generally and not for San Pedro specifically**, and the Commission is prepared to contemplate such a scenario.

In relation to **Question 3**, BEL asserts that given the need for a short turnaround time, the rental of diesel generation units was initially considered as the best generation solution. All providers have quoted supplying 12 to 18 small diesel fuel mobile units with a total capacity of 16 MW and capacity costs in the vicinity of \$10.5 million USD for a two-year period and with delivery times of around 60 days.

Mr. Tillett suggested that BEL had other alternatives to explore and that:

- a. *A "Bapcol" arrangement would have been much more prudent to consider in my view and I am aware that such engines can be supplied in short order to Belize. The PUC then should see if this option is viable and what would be the cost. The operational cost for Bapcol is SIGNIFICANTLY lower than the existing Gas Turbine (though the intended gas turbine to be purchased may have a better operational cost)*
- b. *While not necessarily in BEL's best interest, to mitigate the load increases it might be wise to mandate or incentivize distributed generation such as solar"*

The Commission holds the view that BEL should in fact have explored all reasonable alternatives to address the projected capacity shortfall. Potential options that could have been explored include the following:

For the San Pedro Shortfall

1. By completing the San Pedro-Caye Caulker interconnection could BEL make use of existing generation plant, which has a capacity of 4.5 MW, of which up to 2.7 MW of that capacity is currently being consumed by Caye Caulker. This would automatically give BEL an additional capacity of at least 1.8MW to mitigate any existing submarine cable headroom contraction.
2. The additional capacity from Caye Caulker could potentially be augmented by containerized units located at Ambergris Caye or Caye Caulker via the interconnection that would add up (if so required) to the additional capacity demands for that locality. An addition of 5MW, in the Commission's view, would ensure BEL is below the rated capacity of the cable.

Importantly, the deployment of smaller units would be faster and require less intensive capitalization, but still provide benefits to ratepayers.

For the In-country capacity shortfall

1. BEL gave no indication whether or not they have attempted to secure more reliable supply including capacity, in the short-term, from CFE.
2. The Commission recently approved two power purchase agreements between BEL and BAPCOL that would supply 15 MW of the anticipated shortfall. In BEL's submission it has not accounted for this additional input into the grid.

3. BEL's LCEP called for Battery Storage as an immediate solution to the anticipated shortfall in San Pedro. BEL has not indicated whether any attempts were made to source batteries.

Generally, the Commission is concerned that BEL's proposal to build the Plant will result in excess capacity when "solar + storage" supply infrastructures are deployed and likely result in that Plant becoming a stranded asset.

In relation to the **Question 4**, the Commission cannot in fact calculate the total impact on ratepayers as BEL only provided the cost of purchasing the equipment.

In order to fully assess the impact of such a Plant on tariffs, the Commission would have required additional information such as the cost of leasing/purchasing the property in San Pedro, the cost of transporting fuel from the mainland to San Pedro, the cost of building out the infrastructure such as a substation, storage facilities for the fuel, transmission facilities, the period of time in which BEL proposes to recover its costs and in general, the fixed operating and maintenance costs associated with this Plant.

This position is supported by Mr. Tillett, who observed that "No where in BEL's presentation were the expected O&M cost or the expected price of energy from this unit. In a sense, what is the payback on this investment or how does it affect the overall price of energy in Belize. It seems this very critical consideration, by its omission, is not deemed to be of public interest or was not developed sufficiently to be made public. Either way it is a serious misstep and betrays some underlying issues that BEL has to say how it will correct for the future otherwise it could be costly in the long term to the Belizean public."

The Commission has consistently indicated to BEL that it is necessary to provide all pertinent information and modeling analysis so that the Commission can fully assess the impact on cost which eventually falls to the consumer to pay. Such analysis should include a comparison with the cost of the various alternative options that were explored prior to making a submission for the purchase of the said Plant.

In relation to **Question 5**, BEL must overcome several local environmental hurdles prior to the installation of the proposed Plant. Significantly, however, at the recently concluded COP 28 in Dubai, the Government of Belize pledged to take actions towards achieving a tripling of renewable energy capacity and doubling energy efficiency improvements by 2030. The construction of the Plant would go contrary to the commitments made by the Government of Belize.

In relation to **Question 6**, the Commission holds the view that a long-lived power plant investment and the concurrent regulatory assurance that BEL will recover its investment will no doubt create fixed costs that customers will be required to pay several years into the future, perhaps as long as fifteen years or more years.

Given the rapid change in technology, particularly surrounding a global call to reduce the consumption of fossil fuel, an investment in this Plant may become uneconomic over the long-term.

This further leads the Commission to believe that a combination of smaller units might offer greater resource diversity, flexibility, and cost efficiencies than reliance on the acquisition of a single large Plant.

CONCLUSION

The Commission after examining the application filed by Belize Electricity Limited as per the provisions of section 51 of the Electricity Act, Chapter 221 of the Laws of Belize and other relevant facts and documents, hereby orders the following;

ORDER

1. In relation to the potential shortfall for San Pedro, Ambergris Caye, the Commission hereby ORDERS the following:
 - a. Within sixty (60) days of this Order, BEL is to use an open competitive method to **lease or purchase** appropriately sized containerized units, amounting to no more than 5 MW, that can be deployed in San Pedro, Ambergris Caye.
 - b. Within sixty (60) days of this Order, BEL shall furnish the Commission with originals of offers so received at the close of this procurement process, so that the PUC can independently verify the various bids.
 - c. Within five (5) days of this Order, BEL shall provide an implementation plan, including all costs, for the completion of the San Pedro to Caye Caulker submarine cable.
 - d. Within five (5) days of this Order, BEL shall provide a plan, including all costs, for the installation of the second submarine cable to San Pedro.

2. In relation to the potential shortfall in capacity for in-country generation, the Commission hereby ORDERS the following:
 - a. Within one (1) week from this Order, BEL is to formally write CFE to request a short-term increase of capacity beyond the 55MW or improve supply reliability for the period where in-country generation is expected to decrease.
 - b. BEL shall submit the official response from CFE to the PUC immediately upon receiving such response from CFE.
 - c. Within thirty (30) days of this Order, BEL is to finalize the negotiation with BAPCOL for the addition of 15 MW of solar.

3. BEL shall submit the details of additional costs that shall be incurred by ratepayers in relation to resolving the anticipated shortfalls in San Pedro, Ambergris Caye specifically and the country of Belize generally, which it intends to recover through tariffs.

BY ORDER dated this 22 day of December, 2023


DEAN MOLINA
CHAIRMAN

ANNEX 1: Feedback from Public Consultations

From: Robert Tillett <rtillett@gmail.com>
Sent: Tuesday, 28 November 2023 22:09
To: info@puc.bz
Subject: BEL emergency request - Comment

Please allow me to comment on Bel's proposition:

1. BEL should have added to this proposal what they will do to ensure they are not again in such a crisis! This omission is one that cannot be overlooked and therefore should be included in the PUC's decision on this matter.
 - a. BEL should have known that its demand would outstrip supply at the grid level
 - b. BEL should have known that the Submarine cable limit would have been exceeded and the second submarine cable should have already been installed
2. BEL is presenting that it has 113.5 MW of incountry generation in its generation planning. This figure incorporates BECOL being fully available at 52 MW during the months of March to June when the expected load is high. They should have instead expected that BECOL will not be fully available incase of maintenance issues and or water issues. BEL should therefore use the N-1 secure principle allowing for normal operations to be possible even if one generation unit at BECOL is down. It's possible that an inadequate planning matrix has led to inadequate foresight of potential problems. Again that omission, how they will fix their planning going forward is important! BEL might argue that they are utilizing N-1 secure in that they are looking at Mexico being down in this scenario. A unit out at BECOL is therefore possible from their standpoint an N-2 secure. However, I am sure BEL and BECOL have the date as to the 52 MW availability of BECOL during those months and it is very unlikely to be 100% available for that complete period!!!
3. Whether or not BEL put in the second line to San Pedro in time or not, their argument and rationale for grid supply at San Pedro is prudent in my view. San Pedro and Caye caulker are critical tourist destinations and whenever the submarine cable to Caye Caulker is completed a generation at San Pedro would provide significant reliability to this area. It should be noted that in Drought years such as 2018 when BECOL was not dispatchable except for BWS requirements, this unit would still add to overall grid supply up to the load of Caye Caulker and San Pedro which presently is about 13 MW. The remaining 8 MW might not necessarily add to the Grid but primarily displace Mexico.
 - a. The difficulty here is that BEL solicited offers (or had a closed bidding) for its emergency consideration without going to an open tender to see what other options were available. This posture might suggest that BEL sees itself competing in the generation space which, if that is their posture, is questionable if not misguided. A "Bapcol" arrangement would have been much more prudent to consider in my view and I am aware that such engines can be supplied in short order to Belize. The PUC then should see if this option is viable and what would be the cost. The operational cost for Bapcol is SIGNIFICANTLY lower than the existing Gas Turbine (though the intended gas turbine to be purchased may have a better operational cost)
 - b. While not necessarily in BEL's best interest, to mitigate the load increases it might be wise to mandate or incentivize distributed generation such as solar
4. Another Omission: \$30 million expenditure is not cheap and for a short term solution it's enormous. No where in BEL's presentation were the expected O&M cost or the expected price of energy from this unit. In a sense, what is the payback on this investment or how does it affect the overall price of energy in Belize. It seems this very critical consideration, by its omission, is not deemed to be of public interest or was not developed sufficiently to be made public. Either way it is a serious misstep and betrays some underlying issues that BEL has to say how it will correct for the future otherwise it could be costly in the long term to the Belizean public.

If my points are not very clear and clarification is needed I stand ready to take a phone call or sit down with anyone to clarify.

Regards,

Robert Tillett, P. Eng.
Electrical and Mechanical Engineer
E-mail: rtillett@gmail.com

ANNEX 2: Determinations and Decisions in Respect of the Electricity Supply Infrastructure for the Northern Islands

The FTRP-2020 Decision

“...i) Adequate Analytics and required Regulatory Filings to determine expected standards of performance and associated investments by BEL...

- a) The preparation of a comprehensive Generation and Transmission Plan is the highest priority. As of December 18, 2019 the Commission directed BEL to submit its least cost generation plan (LCGP) for the purpose of identifying future needs, elucidating the utility’s planning philosophy and propose associated investment;

...

- c) Notwithstanding approval of BZ\$37.95 million in consideration of a 2nd submarine link between the Cayes and the mainland, the PUC will require BEL to explain its proposed planning and design thinking before proceeding with construction activities;”

The ARP-2021 Decision

“...g) Standards of Performance...

iii) **Caye Caulker Interconnection** - The standards of performance in respect of the execution of Caye Caulker Interconnection made by the Commission in its 2018 ATRP Decision remains in force, and shall apply mutatis mutandis for subsequent ATPs.

iv) **2nd Submarine Cable to San Pedro** - The standard of performance in respect of the execution of 2nd submarine cable made by the Commission in its 2020 FTRP Final Decision shall be January 1, 2024. Failure to meet this timeline shall cause the ROR for 2024 to fall from 10% to 9%, and shall apply mutatis mutandis for any subsequent years. Notwithstanding approval of BZ\$37.95 million in consideration of a 2nd submarine link between the cayes and the mainland, the PUC is requiring BEL to explain its proposed planning and design thinking before proceeding with procurement and construction activities;”

The ARP-2022 Decision

“...6.4.2 REDUNDANT SUBMARINE CABLE FROM MAINLAND TO AMBERGRIS CAYE –

BEL is forecasting that by 2024, the current 17 MVA capacity of the submarine cable will be breached. The PUC approved the project given the clear business case. The Commission viewed this project as having the highest priority and made a determination for a penalty regime if the Licensee failed to meet its previous commitment for a redundant submarine cable in 2023. Given proposed plans for 15 MW of BESS at the San Pedro Substation the Commission has decided to remove this project from the FTP 2020|2024 CAPEX and suspend the penalty regime, provided that the Licensee installs the BESS within the timeline determined by the Commission.”