




BELCO

**YOUR
ENERGY
FUTURE
STARTS
HERE**



BELCO





BERMUDA'S ELECTRICITY SYSTEM IS AT A CRITICAL CROSSROAD

BELCO has the critical responsibility for maintaining Bermuda's electricity system and generating a safe and continual supply of electricity to our customers. We take our obligation to serve this community very seriously. **After decades of service, our infrastructure is in urgent need of replacement and upgrades.**

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If the critical replacement and upgrades of infrastructure are not made, and BELCO maintains the status quo, approximately \$26 million in additional cost per year will continue to be spent on a deteriorating system that will deliver sub-standard operational, economic and environmental outcomes. Simply put, if nothing is done, rates will continue to escalate and system reliability will continue to decrease.



Our path is clear: NOW is the time to invest in a better energy future for Bermuda.

To take an interactive video tour explaining why we need to upgrade, visit:

www.youreenergyfuture.bm

YOUR ENERGY FUTURE

Three Interdependent Projects for Maximum Benefit to Bermuda

As a regulated company, BELCO must acquire approval from the Regulatory Authority on changes to its electricity infrastructure. To that end, BELCO has submitted a Capital Plan to the Regulatory Authority that includes the implementation of three major projects.

1

REPLACEMENT GENERATION

The development and construction of new, dual-fuel, high efficiency replacement generators on BELCO's existing Pembroke facility.

2

TRANSMISSION & DISTRIBUTION UPGRADE

Upgrades to overhead and underground cables and infrastructure, and the implementation of advanced metering technology.

3

LIQUEFIED NATURAL GAS (LNG)

Implementation of a liquefied natural gas (LNG) supply chain through importation of LNG using a competitive tendering process for supply, which would be processed through a third party LNG terminal and natural gas pipeline built in Bermuda.



BELCO

If this proposal is approved and implemented, the result will be a **reliable** supply of electricity at a **lower cost** than what can be produced with our existing infrastructure; a **greatly improved environmental footprint** due to a cleaner fuel supply for generation; the creation of approximately **200 jobs**; **economic benefits** in the form of new national infrastructure to encourage tourism and business development; support for the **expansion of renewable energy**; and the provision of **value-added services** for our customers.

WHO IS THE REGULATORY AUTHORITY?

The Electricity Act 2016 [The Act] came into operation on Friday, October 28th, 2016 and with it, a new regulatory regime that will introduce new protocols and procedures for the way BELCO generates, distributes and sells electricity to Bermuda.

The Act establishes a framework by which future investments in the production and sale of electricity will be evaluated and regulated.

The responsibilities of the Regulatory Authority include:

- Licensing the generation of electricity
- Licensing the transmission, distribution and retail sale of electricity
- Managing the new Integrated Resource Plan process, including public consultation
- Regulating retail rates for electricity
- Setting service standards

For more information on The Regulatory Authority, visit: **www.rab.bm**



REPLACEMENT GENERATION

We need to replace 50% of our generation capacity in order to ensure Bermuda maintains a reliable, safe and cost effective electricity supply into the future.

Why?

- A significant portion of the generation fleet is at the end of, or beyond, its useful service life.
- Extending the service life of the older generators does not make financial sense; nor, in some cases, is it physically possible.
- System reliability is deteriorating and there is a potential risk of catastrophic failure.
- Replacing the aged generators is less costly than continuing to operate and maintain them.
- 80 megawatts (MW) of the existing 161 MW of generation capacity is scheduled to be decommissioned by 2020. This is approximately 50% of our current generating capacity.
- After the decommissioning of the 80MW of power in 2020, there will be insufficient capacity on the Island to meet the demand for electricity.
- Without a new generation plant, BELCO cannot maintain a reliable, safe and cost effective electricity supply for Bermuda.

How?

Build a new, dual-fuel, high efficiency generation plant, with an estimated total project completion time of 21 months.

Specific project details include:

- Retiring eight generators (80MW of capacity).
- Building a new power station on BELCO's existing Pembroke facility to house the replacement generators.
- Constructing 60 MW of generating capacity including four dual-fuel engines (56MW) and a heat recovery steam generator (4 MW) to generate additional electricity.
- Using dual-fuel generators that will run primarily on natural gas, a cleaner and more efficient option.
- The replacement generators will also be capable of running on fuel oil as a back-up to natural gas.
- Installing one 4.5MW gas turbine unit that will support the required back-up generation and high demand period.
- Converting remaining generators to natural gas operation so they continue to run reliably and are more environmentally friendly.

Benefits

- Increased system reliability
- More cost effective approach to generating electricity
- Operations that are cleaner for the environment
- Significant decrease in the vibration and noise level currently experienced by nearby residents
- Fuel supply redundancy



WE GENERATE

We maintain

17 GENERATORS

that create Bermuda's electricity

BELCO



2

TRANSMISSION & DISTRIBUTION UPGRADE

Overhead and underground cables and infrastructure are an essential part of the system that delivers electricity to your homes and businesses. They are key in supporting future development in Bermuda.

Why?

- BELCO's Transmission & Distribution assets are well beyond their useful life, which results in a higher number of faults due to system vulnerability and higher maintenance costs. Nearly 25% of current underground transmission cables are 60+ years old; this will increase to 40% within 10 years.
- Distribution upgrades will improve reliability, reduce costs and expand grid capacity.
- The upgrades will enable the provision of new, value-added services for our customers.
- This project supports the expansion of renewable energy in Bermuda.
- Upgrades are needed in order to meet the demands of new developments in the east and west ends of the Island including: the Morgan's Point and Town of St. George hotel developments and marinas, the new airport and the Solar Photovoltaic Finger project adjacent to the Airport runway.

How?

Replace underground transmission cables, upgrade distribution assets and facilities and implement advanced metering technology.

Specific project details include:

- Substation switchboard replacements
- Grid transformer upgrades
- Transmission cable replacements
- Critical distribution infrastructure reinforcement [i.e. schools and cell towers]
- Grid modernization projects such as Advanced Metering Infrastructure (AMI)

Benefits

- Increased system reliability
- More cost effective supply of electricity
- Operations that are safer and cleaner for the environment
- Customers will have greater insight into their electricity consumption.
- Enhanced data utilization will enable us to improve outage restoration performance and reduce operational costs.

WE INVEST

We spent

\$3,000,000

on improving our cabling last year

BELCO





3

LIQUEFIED NATURAL GAS (LNG)

LNG is a clear, non-toxic liquid, which is the result of cooling natural gas. Cooling the gas to make liquid helps store and transport it to remote locations and islands such as Bermuda, who do not have ready access to gas fields.

Why?

- Natural gas is the cleanest burning fossil fuel and due to the vast gas fields being developed around the World it will be cheaper than fuel oil in the decades to come.
- Fuel oil prices are more volatile than natural gas prices and this is a burden on our customers.
- The overall environmental benefits of LNG are significant.
- The replacement generation and introduction of LNG will help to save approximately \$26 million a year in maintenance, lubricants and fuel to run the existing aged generators.

How?

Within three years, introduce natural gas to Bermuda through a competitive LNG procurement process, with appropriate governance oversight.

Specific project details include:

- Undertaking a competitive bidding process to select a vendor to build, operate and maintain an LNG import terminal and gas transmission pipeline to BELCO's central plant.
- Undertaking a competitive bidding process to select a vendor for the delivery of LNG supply via ship to a terminal port.

Benefits

- LNG will stabilise the cost of electricity for customers because long-term, low cost, fixed commodity contracts can be negotiated. This will reduce the volatility of the fuel costs to generate electricity.
- The overall environmental benefits are significant [i.e. emission reductions of 99% for sulfur dioxide, 85% for nitrogen dioxide, 99% for particulates and 32% for CO₂]. Additionally, using LNG would improve efficiency and reduce the environmental impact by allowing the use of a waste heat recovery steam generator to create additional electricity.
- There is greater potential for additional distributed generation [i.e. combined heat and power distributed generation plants located on customer sites that have high electrical and heat demand].
- Having a steady supply of LNG brings other commercial options for Bermuda.

WE DISPOSE



We spent

\$235,723

disposing of waste oil last year

BELCO



REPLACEMENT
GENERATION



TRANSMISSION
& DISTRIBUTION
UPGRADE



LIQUEFIED
NATURAL
GAS [LNG]

WHY IMPLEMENT ALL THREE PROJECTS SIMULTANEOUSLY?

Simultaneous implementation of the three projects will result in the delivery of maximum benefits including:

- Consistency with long-term public interest and the Electricity Policy
- The lowest cost of electricity for Bermuda with the least environmental impact
- Increased reliability of Bermuda's electricity supply
- Significant environmental improvements
- The creation of approximately 200 jobs and additional sub-contracted work
- Over \$300 million invested into Bermuda's infrastructure

BELCO is one of the only organizations in Bermuda with an obligation to serve our community. We take this responsibility VERY seriously. You deserve a more reliable, safe, cost effective and environmentally friendly electricity supply than our current aged infrastructure can provide. The solutions contained within this document will provide just that. They represent the most prudent and cost-effective approach in addressing the risks of our aging infrastructure, while enhancing the Island's environmental profile and minimizing electricity costs.

This has been a decade-long journey for BELCO, with a high level of national discussion over the years. The project is shovel-ready. We are ready to go!

NOW is the time to invest in a better energy future for Bermuda.



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