

New facility will provide ‘old school stability’ for New Brunswick’s modern electrical grid

By John MacIsaac

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New Brunswick is adding large amounts of renewable energy to the electrical grid, especially wind and solar, to meet clean energy goals and take advantage of low-cost power. But the transition towards renewable energy and a net-zero grid means NB Power’s robust electrical system will be more susceptible to disruptions and outages.

The proposed Renewables Integration Grid Security (RIGS) Energy Atlantic project, an electricity grid support facility and dispatchable power generation solution planned for southeastern New Brunswick, will help deliver the reliable electrical system New Brunswickers expect.

The RIGS facility is a specialized, dual-purpose asset designed for the modern grid. Its primary job is to provide stability to New Brunswick’s electrical system, operating most of the time, estimated at 85 per cent, as a synchronous condenser – a sort of ‘shock absorber.’

Grid inertia keeps the lights on

A healthy, stable electrical grid requires grid inertia. Think of the grid as a spinning top that must stay perfectly balanced at a constant speed.

Historically, this stability came from the massive, spinning weight of large generators at power plants like Belledune, Point Lepreau and Mactaquac. The generators’ sheer physical momentum resists sudden changes and keeps the electricity ‘top’ spinning smoothly.

New Brunswick is adding large amounts of renewable energy and intends to add more to meet its clean energy goals and lower costs. But these non-synchronous or inverter-based resources don’t have heavy, spinning generators synchronized to the grid.

When NB Power replaces a high-inertia coal plant with a zero-inertia wind farm, the utility removes another shock absorber. This makes the grid more fragile. A sudden event, like a power plant tripping offline can cause the grid’s frequency to crash in seconds, leading to a blackout. Blackouts, often in winter, have dire and immediate community impacts.

The RIGS facility will bring ‘old school’ stability back to the system so ‘new school’ renewable energy can be integrated. When operating in synchronous condensing mode, a clutch disengages the gas turbine from the generator, allowing the generator to spin freely – coasting with the grid’s frequency without burning fuel. Most of the time, the facility will operate in synchronous condenser mode, providing critical inertia needed by the grid to smooth out voltage fluctuations and keep the system stable.

When New Brunswick’s electrical grid is stressed or needs extra power, like during a cold snap or a generator outage, the clutch will engage, turbines will fire up, and the facility becomes a fast-response generator. This mode will only be activated as requested by NB Power.

With the addition of the RIGS facility, New Brunswickers will be able to depend on the 'old school' stable electrical grid without greenhouse gas emissions the vast majority of the time.

RIGS turbines can burn hydrogen

The RIGS facility will be able to provide power in under 10 minutes, much faster than a traditional power plant which can take days to bring online. The RIGS facility will deliver up to 500 megawatts (MW) of essential backup support when it begins operation in late 2028. The units can be activated in individual 50-megawatt blocks, making it possible to match the amount of energy being produced to the demand that needs to be met.

This is a proven strategy. PROENERGY's gas turbine facility in St. John's, NL has reliably operated since 2015. PJM, manager of North America's largest power grid in the northeastern United States, uses the same technology to reliably manage over 220,000 MW of new renewable and storage projects. It's about finding the right energy mix to safely and reliably increase renewable power generation and lower emissions.

The primary fuel used by the RIGS facility will be natural gas delivered via the existing Maritimes & Northeast Pipeline crossing the planned site for the project. In the unlikely event of an interruption in gas supply, the facility's generating units can also switch to low-sulphur diesel, stored on-site. This ensures it can provide critical backup power.

PROENERGY also believes strongly in green hydrogen's future. Turbines for the RIGS project can burn a blend of natural gas and hydrogen (up to 35 per cent hydrogen by volume), providing a pathway to further reducing emissions as New Brunswick continues to 'green' its grid. The company has invested \$12.3 million into hydrogen combustion technology, with the goal of achieving 100 per cent hydrogen-fueled operation for its turbines.

Globally, PROENERGY has installed over 80 "PowerFLX" packages with another 50 on order. Together, these have a combined potential output of 6.5GW – enough electricity to power 6.5 million North American homes. The LM6000/PE6000 turbine engine is one of the most reliable ever built, with a start and operational reliability of nearly 97 per cent.

New Brunswick's power demand is rising. Extreme weather, growing population and increasing renewables integration are creating new stresses on the grid. The RIGS facility will provide backup and flexibility to make the most of wind and solar energy. It's a key part of the journey to a cleaner, more secure energy future.

John MacIsaac is President of PROENERGY Global Solutions Canada Ltd. PROENERGY is a global and vertically integrated energy transition platform. Focused exclusively on grid stabilizing technology and fast-start, dispatchable power, the company supports both energy security and renewable growth with complete turbine services, project development, equipment manufacturing, turnkey generation facilities, operations and maintenance.