New Brunswick gas turbine power plant the right project at the right time

Fast-response facility will ensure reliable power on cold winter nights, help province reduce greenhouse gas emissions

By Willam K. Marshall

New Brunswickers know what a polar vortex feels like. When a mass of frigid Arctic air descends into our region it means more than bone-chilling temperatures. Prolonged subzero cold can threaten lives, strain heating systems and make the daily commute a treacherous hazard.

We depend on NB Power's mix of reliable generation to heat our homes, schools, hospitals and businesses through these regular winter cold snaps. The proposed Renewables Integration Grid Security (RIGS) Energy Atlantic project, a fast-reaction gas turbine plant, will be an essential part of the electrical grid, providing dependable power when we need it the most.

Climate change is real and poses a serious threat to our future. Eliminating large polluters must be a priority for our electrical utilities, but New Brunswick faces cold weather challenges that renewable energy sources cannot handle. NB Power's winter peak loads, during extremely cold weather conditions, can count on hydro, nuclear and thermal generation. We can't say the same about wind, solar and battery reserves.

Electricity is an incredible energy source, but it has limitations. It cannot be easily stored. Batteries are being developed, and their cost is coming down, but they have limited performance in cold weather. Electrical supply must always equal demand. We set that demand when we turn on a television or turn up a thermostat. The power system must respond. With electricity travelling at 90% of the speed of light, NB Power must have fast-acting reserve generation to meet the changing load and to backup any sudden unexpected loss of supply.

Right now, according to the North American Electric Reliability Council the Maritimes Area is the only region in North America that is deficient in generation capacity. Without the RIGS project this deficiency will continue past 2030. Both PEI and Nova Scotia Power made headlines recently announcing the danger of rolling blackouts. Our neighbours were able to keep the lights on because NB Power purchased power from neighbouring areas, which we were able to transmit and provide to PEI, Nova Scotia and even Newfoundland.

Demand rises as temperatures fall

A few weeks ago, Ontario utilities had to contend with a polar vortex descending into the southern part of that province. Utilities could only count on 10 per cent of available wind capacity and no solar generation. Nuclear, hydro and natural gas kept the system from failing. Similar scenarios play out across our cold Canadian climate – frigid temperatures create huge demand spikes on the electrical grid when renewables are at their weakest.

We can't compare renewable energy production in New Brunswick to warmer and sunnier locales like California and Texas. Utilities in these regions can count on solar and wind to produce the most energy in sunny and hot conditions, when utilities need energy for air conditioning. It's the opposite in New Brunswick – our peak electrical demand times are cold January and February mornings when we need to keep our homes from freezing.

Centre Village location the best site

The RIGS electrical facility is the best answer to keeping our electrical grid stable, and the Centre Village location in Westmorland County is the best site on NB Power's grid for the new facility. The intersection of existing NB Power electricity transmission lines and the Maritimes and Northeast gas transmission pipeline provides direct access to the regional power grid and wholesale access to natural gas with no expensive transmission line upgrades. The station is also located on the transmission line to PEI, supporting regional reliability by enabling capacity and energy transfers to PEI and Nova Scotia when necessary.

Moncton has always had a problem with low voltage caused by a substantial electrical load but no local generation. The Moncton area in the last five years is one of the fastest-growing regions in the country. Population growth has pushed electrical demand beyond current capacity.

In addition to provision of capacity and energy, the RIGS generators are designed to synchronize with the grid without using any fuel. In this mode they can provide much needed voltage support that improves supply reliability to the Moncton area. The plant will also reduce the need for a 34-kilometre transmission line and expensive capacitor stations, saving about $70 million in additional infrastructure costs.

With the RIGS plant acting as an electrical shock absorber, NB Power can invest in more renewable wind and solar generation. The utility plans to bring more low-cost wind energy onto the electrical grid over the next few years, reducing the need for higher polluting sources like Coleson Cove or Belledune. The RIGS project will lower greenhouse gas emissions in New Brunswick.

Batteries have a future

Battery storage should be part of NB Power's low-carbon energy solutions. NB Power has issued a request for expression of interest for 50 MW of battery capacity. Where the batteries will provide value for the New Brunswick grid is as operating reserve to back up a generation shortfall, and to store peak wind and solar production in warmer months. If the wind is blowing, under low-load conditions, NB Power must curtail wind power or sell the surplus energy for a lower price. A battery bank could store this surplus power for use or sale when needed. New Brunswick isn't alone in struggling to meet future electricity needs. In Nova Scotia eight large coal-burning power plants must switch to other fuels or cease operations before 2030. A proposed 600 MW of fast-reaction gas turbine generation like the RIGS project is planned to help make up the resulting capacity and energy shortfall. With the increasing movement toward AI data centres, demand for these gas turbines is now exceeding supply. Nova Scotia's Independent Electricity System Operator faces an uphill battle to secure the capability that NB Power has already contracted with the RIGS plant. Building this facility now is a necessity that we can't afford to pass up.

Bill Marshall, president of WKM Energy Consultants Inc., was President and CEO of the New Brunswick System Operator from 2004-2008, and Director of Strategic Planning for NB Power from 1996-2004. He worked for 46 years as a professional engineer in the electric utility industry. He has been accepted as an expert in Power System Planning, Operations and Transmission Tariffs by regulatory authorities throughout the region.