

Northwest Energy Task Force

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ENERGY TASK FORCE

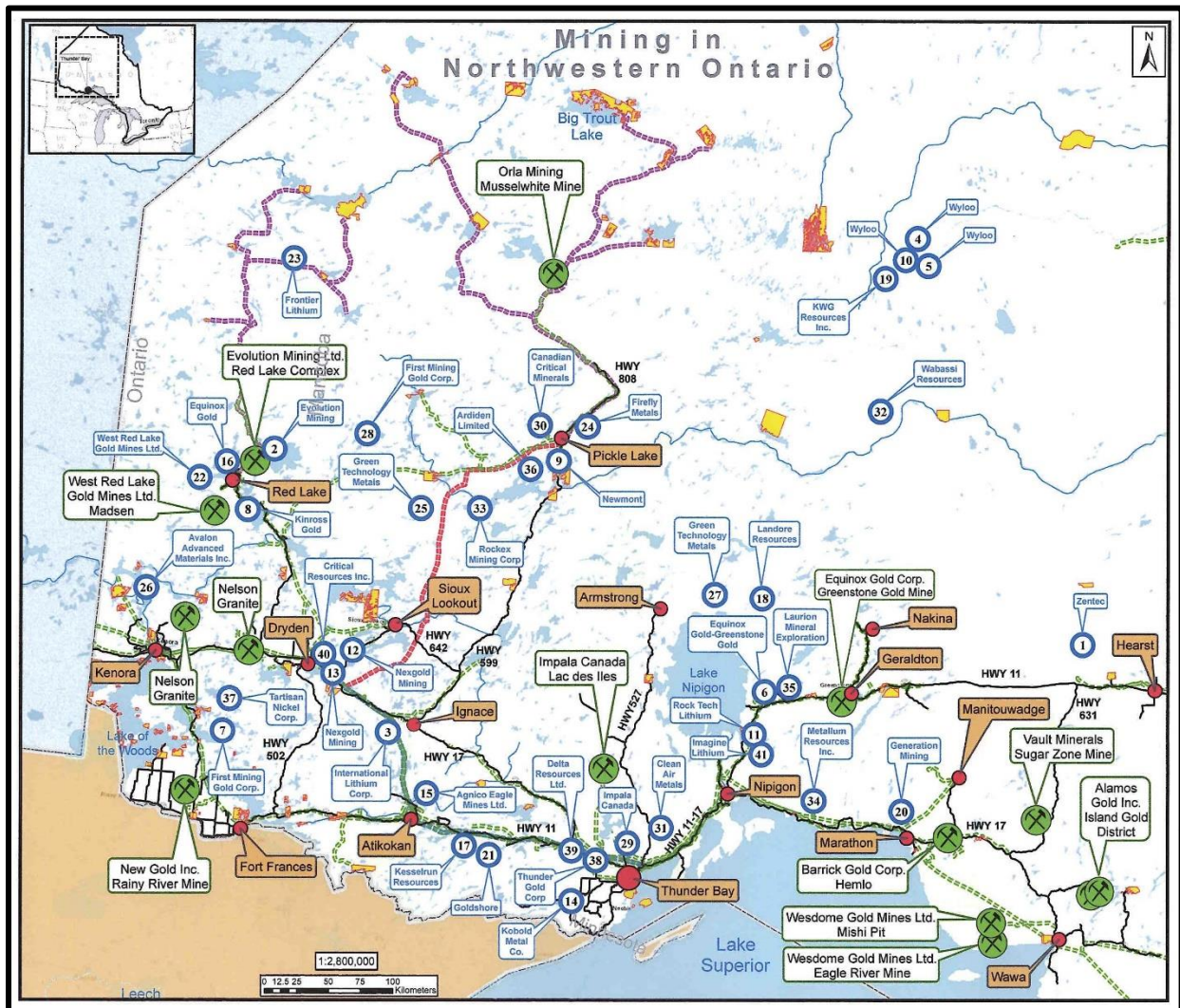
DEMAND AND OPPORTUNITY

Energy Challenges in Northwestern Ontario

January 27, 2025

Introduction

For the past 20 years the Northwest Energy Task Force (NW ETF)¹ has compiled load projections for the ever-expanding mining industry in the Northwest. Those load forecasts have been regularly shared first with the OPA and more recently with the IESO and has assisted those organizations in better understanding and projecting the needs of the region. We do this with a comprehensive understanding of the process of bringing a mine into production.



¹ Formerly Common Voice Northwest Energy Task Force and now a committee of the Northwestern Ontario Municipal Association (NOMA)

Northwestern Ontario is poised to be the most significant mining centre in Ontario if not Canada. While the region already has 12 producing mines between Wawa, Rainy River and the north, there are a total of 41 mining projects throughout the region.

These mines need to connect to the grid rather than producing their own electricity through the use of fossil fuels.

It is important to note that 13 of the mines will produce critical metals: 6 producing copper-nickel palladium/platinum ore, 4 lithium and one each of chromite, graphite and zinc.

The NW Energy Task Force has projected 1,484 MW of new loads in the Northwest by 2033.

Today's base load for the Northwest is 484 MW. Should all of the mines come on stream and connect to the grid that will take the power requirement in the region to a total of 1.968 MW. The region currently generates 430 MW and can bring an additional 650 MW from the Northeast. In the short term approximately 600 MW of new load can be provided. That means the region must generate an additional 288 MW of power by 2033 if all of these mines can connect to the grid.

There are a number of potential new sources of power from within the region. They include the proposed Little Jackfish Hydro Electric generator, an increase to the output of the Atikokan Generating Station and Thunder Bay Pulp and Paper mill through their power purchase agreements, the construction of a number of distributed biomass generators, and the provision of solar and wind generators combined by forms of energy storage facilities.

The northwest has a long history of converting the forest (not just boreal forests) into value added products. Today, the region harvests 43% of the available harvest area from 19 separate forest Management Units (MU) with some MUs harvesting as much as 94% of merchantable volume. Approximately 30 to 40% of the wood harvested is residual or non-merchantable timber and may be available for conversion to electrical energy.

In order to fully understand the impact should all of the mines want to connect to the provincial electricity supply grid, the NW ETF has examined each of the existing distribution and transmission lines to determine their specific capacity to power the new mines within its immediate area. The

following outlines the results of that analysis along with recommendations for transmission solution and the identification of options for new generation.

One advantage of using forest biomass to produce electricity is the positive contribution it makes to combating climate change. Canada's Boreal Forest absorbs and stores extremely significant amounts of carbon dioxide. New growth continuously draws carbon dioxide out of the atmosphere, however, at some point absorption stops and old forests start emitting carbon dioxide. For wood fibre that can't be used for traditional forest products, electricity can be generated from forest biomass, creating a reliable, renewable, affordable and climate friendly alternative to more carbon-intensive options.

From an environmental perspective, according to the Pembina Institute, by itself the consuming of wood biomass when compared to natural gas produces 80% less emissions.

Supply Improvements

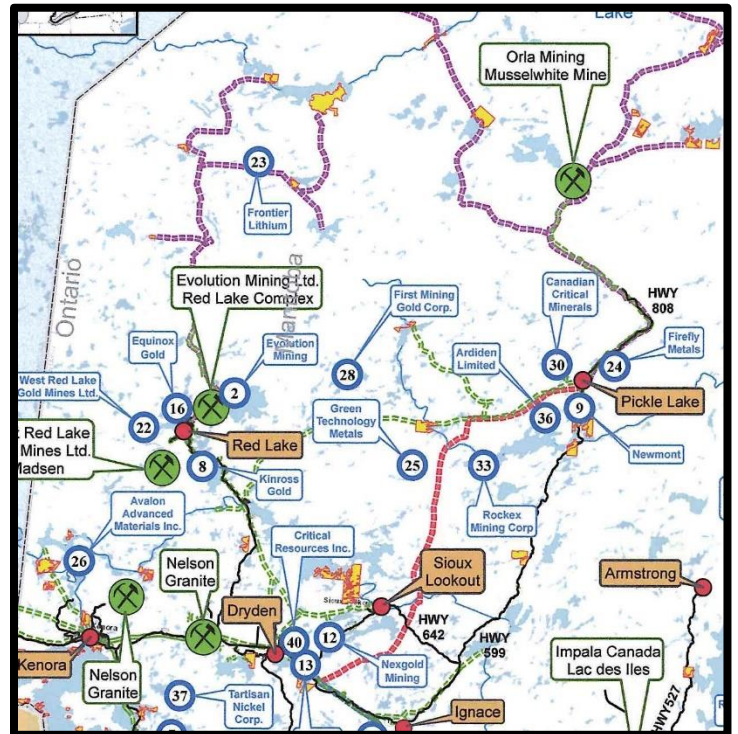
The East West Bulk Transmission line along with the soon to be constructed Waasigan Bulk Transmission lines are key to ensuring that some of the mining areas have the electrical power that is required. As designated bulk transmission projects construction costs of both lines are shared across the entire rate payer base. That base also benefits from the revenue generated by the lines well past when the original capital cost has been covered as well as improving the overall economy of Ontario. This approach can and should be used to bring power into other areas where a multitude of mines are planned.

Key areas are Dryden, Ear Falls/Red Lake, Pickle Lake, Greenstone and the Ring of Fire.

Dryden to Red Lake and North

The Waasigan Bulk Transmission line is designed to bring power to the community of Dryden and points north. Unfortunately, the existing transmission line from Dryden to Ear Falls then on to Red Lake is at or near capacity as is the output of the two hydro generation facilities during high water. The existing mines rely on electricity flowing north from the grid to supplement the hydro supply. The radial line is also susceptible to unplanned outages due to forest fires and ice and windstorms.

A compilation of the required loads identified by the 11 mine proponents that will derive their power through Waasigan indicates new loads totalling 550 MW by 2033. This load includes mines within the vicinity of Dryden (63MW), Ear Falls/Red Lake (221 MW) and Pickle Lake (267 MW).



According to the EA prepared for the Waasigan Transmission line the capacity of the new circuit connecting Atikokan to Dryden will be 175 MW.² Unfortunately, as the existing transmission line from Dryden to Ear Falls and Red Lake is at or near capacity, clearly indicating that it is not capable of additional load amounts made available by Waasigan to go north of Dryden.

Additional generation could be achieved through the construction of a 40 MW biomass generator adjacent to the Ear Falls Sawmill. This location would see significant efficiencies in harvesting, transportation and processing and there is significant undercutting in the adjacent Forest Management Areas. The Trout Lake FMA harvests 68.5% of its allowable cut and the Red Lake FMA harvests 36.1% with 30 to 40% of those cuts available as fuel for a biomass generator.

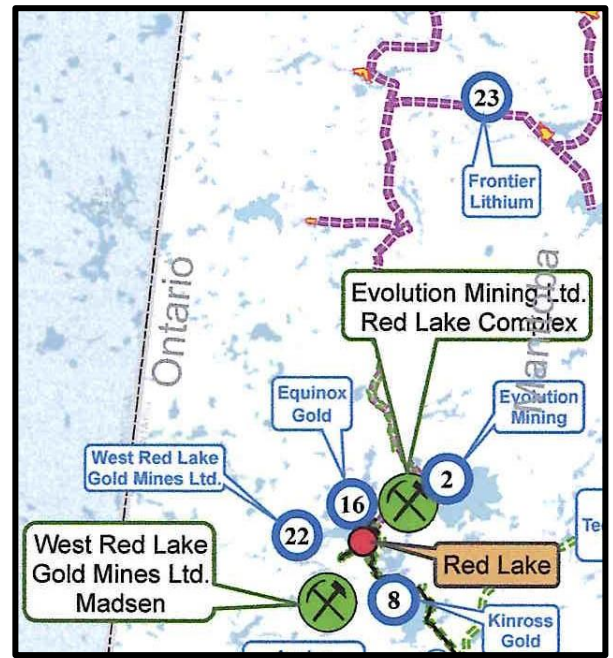
² The existing single circuit from Atikokan is able to carry 175 MW to Dryden and points north.

Recommendations

In order to ensure that these proposed mines are able to connect to the grid instead of relying on either natural gas or diesel it is essential that **the proposed Waasigan single circuit between Atikokan and Dryden be twinned thereby doubling its capacity to 350 MW and that the bulk transmission line be extended to Red Lake.**

With the Ear Falls/Red Lake cluster requiring 221 MW that would leave 129 MW that could be utilized by the growth in the immediate Dryden area (63 MW) with the remaining 66 MW directed to the Pickle Lake demand.

The existing transmission line serving Ear Falls and Red Lake should also be upgraded as recommended by the OPA in 2015 and confirmed in IESO sub-regional planning documents during subsequent plans.³



³ North of Dryden, Integrated Regional Resource Plan January 27, 2015

North of Red Lake

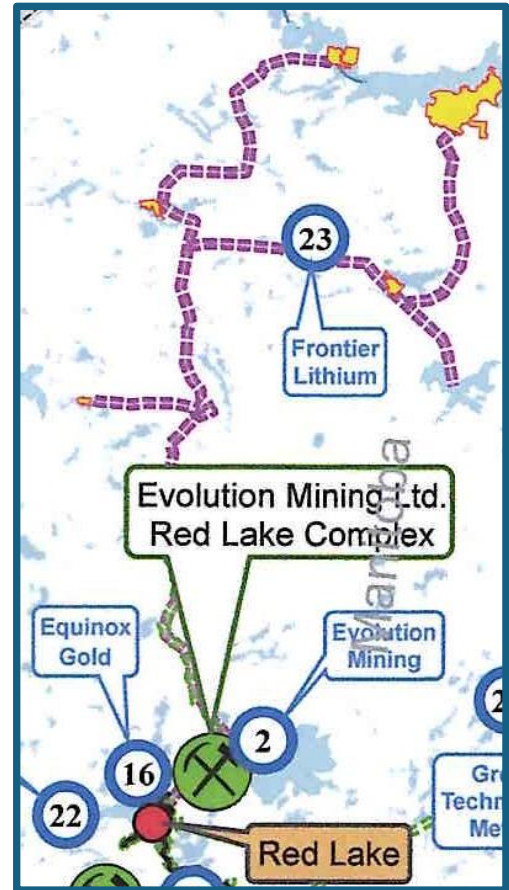
Wataynikaneyap Power has constructed a single circuit 40 MW line from Red Lake to Pikangikum First Nation and north to 5 additional First Nation communities.

The Frontier Lithium mine is situated adjacent to this transmission line and will require 20 MW of power in the initial stage and an additional 40 MW by 2028. The existing transmission line does not have the capacity to power the mine.

Recommendations

One alternative is the addition of a second circuit on the Wataynikaneyap Power line. This will provide as much as 150 MW of power to the area, not only powering the Frontier Lithium mine by enabling the area First Nations to expand.

The other alternative is the establishment of two, 40 MW biomass generators adjacent to the mine site. The White Feather Forest Management Area (FMA) has 30 to 40% of its current 44.8% of its annual allowable cut available for biomass fuel. This would have the added benefit of providing ongoing employment for members of the Pikangikum, Poplar Hill, Deer Lake, North Spirit Lake and McDowell Lake First Nations in the harvesting of the fibre and the biomass generation process. It may be that both options are feasible.



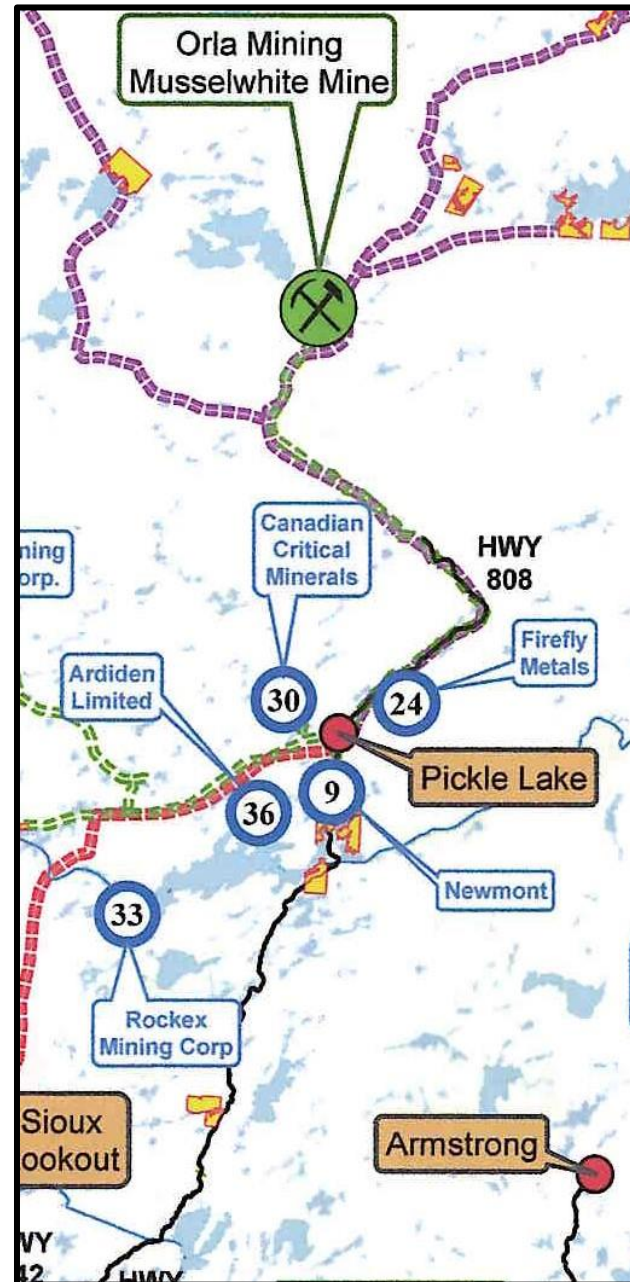
Pickle Lake

Pickle Lake will see growth in the range of 267 MW between now and 2032. This area is now served by Wataynikaneyap Power, and its 230 kv circuit connecting to the grid, has a rating of approximately 180 MW. 39 MW is already committed to Musselwhite Mine, and 10 MW for local consumption. The new 115 kv circuit from Pickle Lake to the remote communities is rated at about 40 MW. That leaves only 90 MW of capacity for the 4 new mines – a projected shortfall of 177MW.

Recommendation

We would recommend that a second 180 MW circuit be added to the Dinorwic to Pickle Lake Wataynikaneyap Power Transmission Line and that discussions with Wataynikaneyap Power commence immediately. The two circuits from Dinorwic to Pickle Lake should be designated a bulk transmission line.

In addition, Pickle Lake is situated in the vicinity of the Caribou FMA and the opportunity is there for the construction of a 40MW biomass generating facility. The current allowable cut is around 30%.



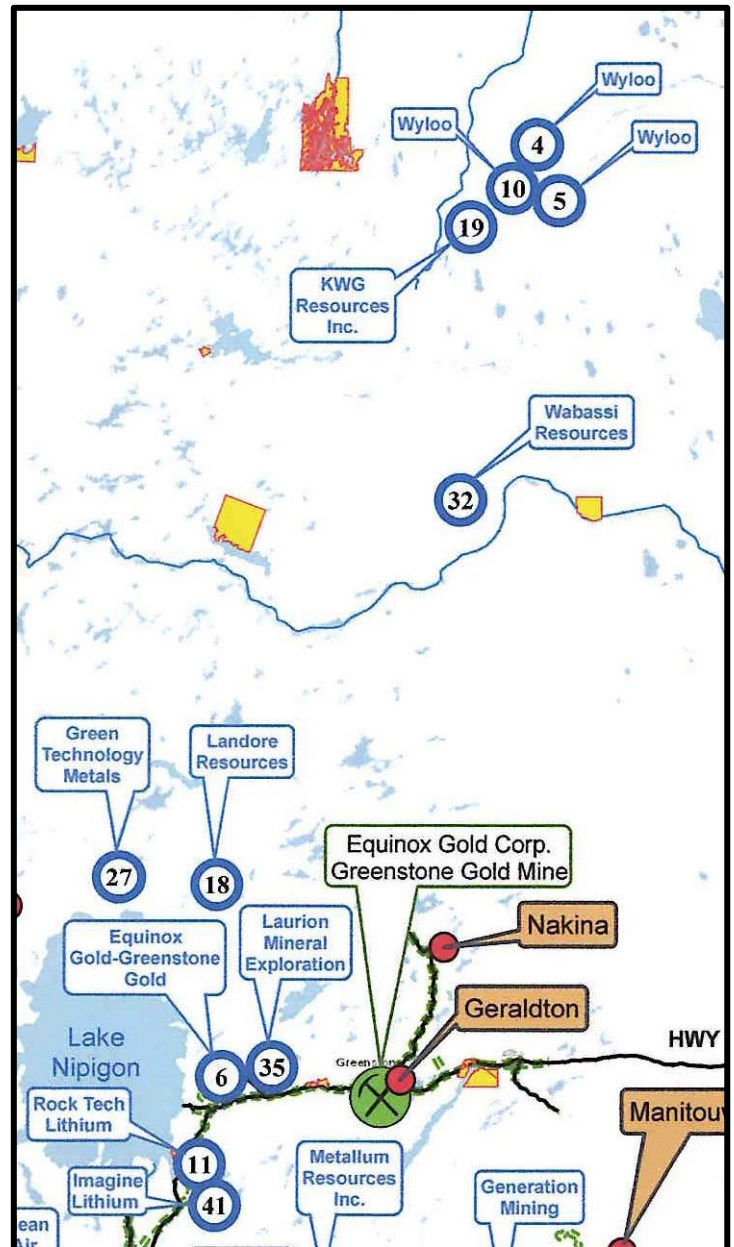
Ring of Fire and Nipigon North

A planning process is underway by the IESO to determine the best way to bring the electrical grid to the mineral rich Ring of Fire. It is essential that whatever source of the electricity is chosen that the bulk transmission line be routed through the communities of Geraldton and Nakina on to the Ring of Fire. This approach will not only provide the municipal communities with the power (and stability) they need to grow but the area First Nations as well. It is projected that there will be new loads in the amount of 220.5 MW in the Greenstone area by 2033.

Two of the four potential mines currently identified in the Ring of Fire will require 70 MW of power. It is anticipated that once the four mines are up and running, exploration throughout the Ring of Fire will identify additional mine projects requiring power.

Wyloo, principal mineral deposit owner in the Ring of Fire is completing a new Feasibility Study (2025 completion) for mine/mill and related infrastructure. Power options are being considered for their Ring of Fire deposits, including biomass.

Geraldton hosts a new (2024) Hydro One approved substation, with excess capacity, financed by Equinox Gold.



Recommendation

As with the Waasigan Transmission line, the Ring of Fire transmission line should be built in two stages: the first would be the connection between the provincial grid and the communities of Geraldton and Nakina. The second would extend the line to the Ring of Fire. This sequence would fulfill the need of the Greenstone communities to supply their growth while waiting for all of the environmental and Indigenous approvals for the Ring of Fire to be completed.

In addition, consideration should be given to establish three 40 MW biomass generators within the Municipality of Greenstone. One could be located at the former Longlac Sawmill site with the second one at the Nakina Sawmill site and the 3rd adjacent to Beardmore. This power can be used in the short term to assist the community of Greenstone, and the 5 area First Nations grow residentially and commercially. It will also provide power to the anticipated new mines.

West of Thunder Bay

The Shebandewan area of the Northwest has been experiencing a level of service below acceptable standards. At the same time, there are two mining projects working towards construction and operation. The combined new load is 60 to 70 MW.

There are a number of options for an upgrade to the existing distribution system.

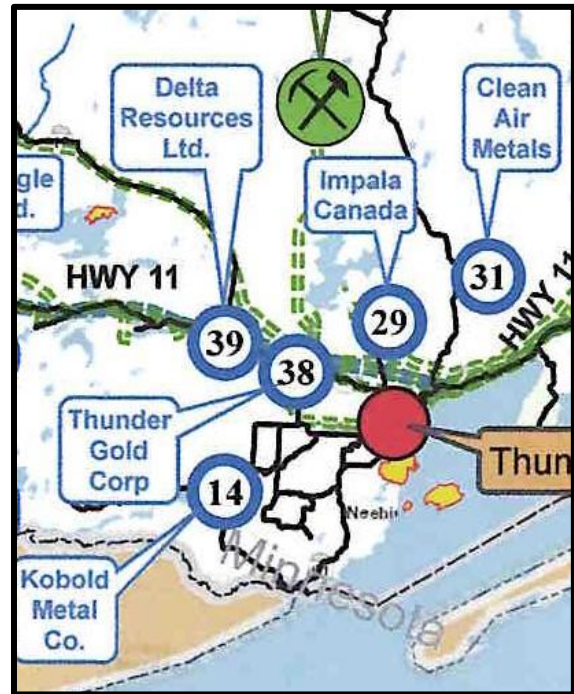


Recommendation

That a detailed examination of the area be conducted by the IESO with recommendations for solutions prepared.

Immediate Thunder Bay Area

With the immediate Thunder Bay area anticipating growth up to as much as 365 MW significant attention must be paid to identifying and implementing a solution or solutions to ensure that the required power is available. Within the immediate Thunder Bay area, there are five mining projects and four potential processing facilities under consideration. This new demand is being examined by the IESO, Hydro One, Synergy North and the Thunder Bay Economic Development Commission (Thunder Bay Committee).



Recommendation

That the recommendation of the Thunder Bay committee be implemented in a timely manner.

SUPPLY

The existing Power Purchase Agreements with the Atikokan Generating Station and Thunder Bay Pulp and Paper and the capacity of both generators provides an opportunity to increase their role in providing power to the grid. Both have a capacity to increase their production.

There is a significant opportunity to create electricity through the conversion of the forests in order to create heat and electricity through distributed biomass generators.

An example is [Whitesand First Nation](#)'s development of a heat and 6.5 MW power facility, fuelled by locally sourced wood to produce energy for three communities and replacing an existing diesel generator.

Other areas where a biomass generation facility could be constructed include Nipigon, Terrace Bay, Thunder Bay, Atikokan, Kenora, Sioux Lookout and Ignace.

In addition to the potential biomass generators listed earlier in this document it is recognized that the region will need more power than currently generated by the existing hydraulic facilities or transferred from Northeastern Ontario.

The Little Jackfish hydro electric generation project can add approximately 80 MW of new, carbon neutral electricity to the grid.



Recommendations

1. That the Government of Ontario declare the Little Jack Fish Hydro Electric Generator as a priority project
2. That the Government of Ontario identify and implement expansion of the output of the Atikokan Generating Station and the Thunder Bay Pulp and Paper Mill and incorporate into their Power Purchase Agreements which should be extended for a minimum of 10 years.

The following are recommendations put forward by the Ontario Forest Industry Association and are supported by the NW Energy Task Force and the Northwestern Ontario Municipal Association:

3. Recommend that the IESO enter into bilateral negotiations with current forest biomass PPA holders, as they approach the end of the term, to enter into > 10-year contracts at capacity volumes.
4. Recommend that the IESO establish a program with clear targets to bring forest biomass electrical generation in line with competing jurisdictions including reserving a block of MWs dedicated to forest biomass projects.
5. Recommend that the IESO work with existing forest biomass PPA holders and develop a new process to secure more investment and capacity at existing forest biomass PPA facilities.
6. Recommend that the IESO Establish bioheat & district energy procurement mandates for public building infrastructure.

7. Recommend that the IESO make “avoided capacity” contracts available for new forest biomass CHP developers for the avoided electricity system capacity value of their assets.

Solar, Wind and Storage

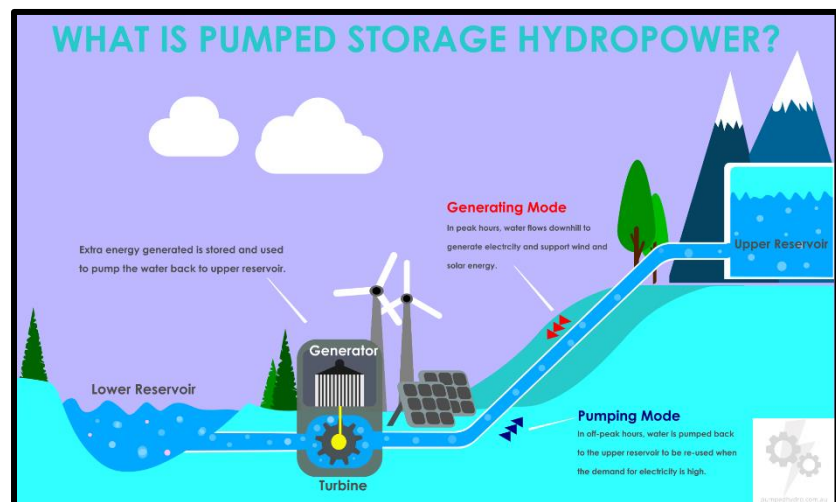
There are significant opportunities across the northwest for the installation of large and small solar and wind installations. However, as the main (and future) demand is industrial in nature and requires a continuous supply of power for its operations major solar and wind projects need to be accompanied by large scale energy storage facilities.

There are three current concepts appropriate for the Northwest:

- Pumped storage
- Compressed air energy storage
- Electric Battery storage

There is one proposal put forward for the Lake Superior North Shore for pumped storage. There is a second one proposed

for a former open pit mine in Atikokan however it has not been able to proceed due to the rehabilitation of the area.



Recommendation

It is recommended that the IESO seek proposals for storage facilities in the Northwest as part of the next call for proposals as well as solar and wind generation.

Ontario-Manitoba Interconnection

The Ontario-Manitoba interconnection consists of two 230 kV circuits plus one 115 kV circuit. The power transfers across the 230 kV interconnection points can be controlled with the use of phase angle regulators. Transfers across this intertie are defined as Ontario-Manitoba Transfer East (OMTE) and Ontario-Manitoba Transfer West (OMTW). Ontario and Manitoba are synchronously connected at 230 kV, while the 115 kV interconnection is

operated normally open (i.e., no power flows) except under rare or emergency conditions. The intertie is located west of Kenora.

Mining loads in NW Ontario will require considerable firm capacity, and increasing the intertie capacity with Manitoba (through either reconductoring the existing transmission lines or constructing a new transmission line) might be a means to provide economic supply for mining operations. This is a long-term supply solution, which is difficult to achieve for biomass given the inherent fibre supply and costly generation.

Recommendation

The Government, through the IESO should examine the opportunity to permanently expand the intertie capacity and contract with Manitoba Hydro.