

## **Marmora Pumped Storage Questions and Answers**

Recently a number of questions have been raised about the proposed Marmora Pumped Storage project. Here are the questions and their answers.

### **1. Is this a low-cost project?**

Yes, on two counts: First, pumped storage plants in general have lower capital costs than wind, solar, nuclear or conventional waterpower facilities. They also have lower life cycle costs than any other generating technology including gas fired turbine generation. Second, Marmora is unique in having most of the needed components in place, including the water-filled mine and the rock pile available for the upper reservoir.

Because a project's capital cost is a significant driver in pricing power from new sources, Marmora will be a low-cost option for the Ontario Power Authority (OPA).

### **2. Is the project properly designed?**

Yes it will be. The design will address all the necessary technical, environmental, hydrological, electrical, civil and other requirements. The plan will be to reshape the existing waste rock pile so it contains the upper reservoir within its current boundary. The upper reservoir will be inside a berm with gradually sloped sides, not a walled or earthen structure. The upper reservoir has a large surface area, so the needed volume of water can be achieved with a maximum depth of about 20 metres. The upper reservoir will be built to modern dam standards, as described in the answer to question 3.

The powerhouse will be built deep underground about 200 meters below the surface. It will be lower than the water surface in the open pit—but it will not be underwater because it will be housed in a separate underground structure.

The Marmora project technology is well proven. Worldwide, pumped storage accounts for about 127,000 megawatts (MW) of energy supply.

### **3. Will the project be safe?**

Absolutely. The upper reservoir will be constructed using rock from the waste rock pile, then lined with gravel and an impervious liner, such as asphalt. Monitoring drains will check around the clock for any seepage from the upper reservoir. If seepage is detected, the upper reservoir can be rapidly emptied into the lower reservoir (the existing open pit) from which it cannot go anywhere. The upper reservoir will be safe and designed to withstand any foreseeable circumstance, in the same way that any modern dam is safe.

### **4. What is the net impact on energy consumption and emissions?**

Pumped storage can play a critical role in Ontario's electrical system especially as more wind, waterpower and solar generation are built. The pumped storage facility at Marmora can be used to store energy that may be wasted in periods when it is not needed and sell the energy at times when it is needed most (this is called time shifting). This lowers the overall cost to the electricity consumer because the system would otherwise waste

resources in the off-peak hours and use more expensive resources in the on-peak hours. Also new pumped storage provides other electrical features that help integrate, and make better use, of unpredictable generation from wind, solar and waterpower.

For example, Ontario currently has energy sources such as nuclear, wind and waterpower that generate power beyond the grid's needs at certain times, especially at night. In those periods, the independent system operator would signal Marmora to fill the upper reservoir—knowing that it is storing power it will need during coming high-demand periods. In fact, Ontario's Independent Electricity System Operator has called pumped storage, "a system operator's dream."

In summary, having a pumped storage facility would reduce the amount of wasted resources, help optimize use of other renewable energy sources and reduce the need for more expensive resources on peak. The net result is a more cost effective and efficient electrical system.

Regarding emissions, Marmora will generally consume power overnight, and this typically will come from waterpower, wind power or nuclear power, sources that do not involve the creation of greenhouse gases. Gas-fired turbine generating stations and oil-fired boiler plants typically do not operate at night. They are usually reserved for day time peaking use. The power Marmora consumes will come from the Ontario grid and may originate anywhere in the province; it does not have to come from local power stations.

### **5. Will Marmora increase energy costs to Ontario consumers?**

Marmora has to demonstrate to the OPA that it provides a low cost source of new generation to the province and that it can be competitive with other forms of new generation.

Ultimately, because of the attributes of pumped storage (such as time shifting low cost energy to high value periods, supporting better integration and use of renewables, and offering a clean, zero carbon source of peaking power...) as discussed in point 4 above, the overall cost to the electricity consumer should be less.

### **6. Why does Northland need to "sell" Marmora?**

Part of the standard development process is demonstrating a project's value to the Ontario Power Authority (OPA). The OPA accepts projects that can stand on their technical and economic merits and that can demonstrate community support. Northland is confident the project is technically and economically sound. Now we are inviting the residents of Marmora and Lake to demonstrate that the project also enjoys community support.

Northland Power has a 20-year record of successful power generation projects, safe operations and close community relations. We look forward to generating both power and benefits for Marmora and Lake for many years to come.

For those who have any questions, please email us at [marmorapumpedstorage@northlandpower.ca](mailto:marmorapumpedstorage@northlandpower.ca). We will be happy to respond. Thank you.