Jake Ward
University of Maine
Research, Economic Development and Government Relations
5717 Corbett Hall
Orono, Maine 04469

May 18, 2016

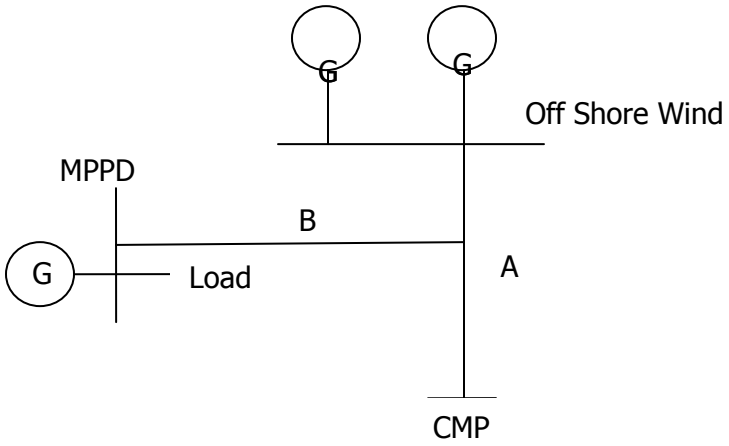
RE: Monhegan Island Task Force Question

Dear Jake,
SGC Engineering is pleased to respond to the question posed by the task force. Below is a summary, with details following.

Summary

- Monhegan is connected by cables to the turbines and to shore/CMP grid
- Monhegan's Primary Power is from the Turbines (when wind blows)
- Monhegan's Back-up is shore power from CMP (when turbines don't spin)
- Monhegan Emergency Backup - MPPD generators are needed if there is an outage in the cable to shore. The turbines cannot supply Monhegan if there is any cable outage.

Question: I understand that wind power is intermittent. What would the cost of storage on Monhegan be? Is there a battery option we could implement?



The Off Shore Wind project will connect to the on shore power system, owned and operated by Central Maine Power (CMP), via the subsea cable identified as "A". This will allow power to flow in both directions:

1) when no wind generation is available - power flows to the platform to support load

requirements there,
2) when wind generation exceeds local (platform) load, power flows to the CMP system for distribution.

If Monhegan Public Power District (MPPD) is connected to the off shore project (cable "B"), it will have similar access to CMP shore power that the platform has – power is available whenever cable "A" and the CMP system are energized, with no dependency on wind or wind generators. MPPD should consider the two possibilities for outages:

1) – shore power outage
2) – Subsea Cable issues

Shore power outages are few and generally of limited duration. With that said, SGC suspects that they are probably more frequent than what the island currently experiences. Cable issues should be infrequent, but when one does occur, it could be days or longer to get addressed. We understand that the Task Force is aware that there is a 20 year life projected for the cable. After 20 years, funding to repair or replace the cable may not be available.

Can the turbines supply power, if not connected to CMP?
SGC does not believe it is feasible for the wind turbines to regulate adequately to power just the island and platform loads (or one or the other). Even if this were possible, it could not work if the issue was a cable outage.

Batteries
Batteries are expensive, have ongoing maintenance needs, require a charging system, have a limited life and need to be replaced, etc. If the island were to add a battery system to their present configuration, it may make sense. That would allow running the local generators in their most efficient mode (instead of following the load), turning them off at times when the batteries are charged adequately to meet the needs, and improving efficiency to the entire system. Diesel is now cheap, and batteries are still expensive, so it may not make economic sense right now. The future is likely to change both of these factors.

Batteries as a backup to loss of shore power – Shore power is likely to be out hours a year (possibly 1-10 hrs/year, but this is just a suggested range), and it may occur at multiple times. Batteries are pretty expensive for this short duration of use. If the outage is beyond the capability of the batteries, then MPPD will still go out or need to fire up the diesels. If the intent is a backup to subsea cable issues, batteries are not practical as the duration of outage could be extensive and diesel would still be required to back up the batteries.

SGC Recommendation – If the island elects to connect to shore power, then they retain the existing generation in operating condition with a weeks' worth of fuel on site. Batteries may be of value as part of the present island system, but are of little value as part of a shore power connection.

Thank you for this continued opportunity to work with you and the University of Maine on this exciting project. If you have any questions or need additional information, please feel free to contact me on my direct line 207-749-9186.

Very truly yours,
SGC ENGINEERING, LLC

A Lloyd's Register Company

Richard D. Hall, P.E.
Senior Project Manager