*Isle au Haut Electric Power Company*

# Status of the solar project

November 14, 2016

The Isle au Haut Electric Power Co. is a for profit, member owned cooperative. The company owns the cable to Stonington that supplies the island with power.

The cable is almost 34 years old and well beyond its expected life. Up until now it has not caused any problems. Nevertheless, the board of the company decided that it should take steps to ensure the delivery of power at an economical rate in case the cable suddenly failed.

The board explored a number of options including wind, solar, a new cable, diesel, micro turbines, tidal and fuel cells. Until recently none of these options was anywhere close to economical. In the last two or three years, however, the prices for solar and wind power have fallen to levels that make these technologies a reasonable, economical option for the island. For a variety of reason the board chose not to pursue the wind power option.

Over the last 18 months the board has actively pursued the solar option; we contracted with a very experienced solar engineering company and are now close to a final design for the project. With the purchase of town land for installing the solar array, the company will soon be in a position to begin searching for investors in the project.

In the following pages I try to answer what I think are the most common questions people have about the project. If you have others, please contact me Jwilson@maine.edu.

Jim Wilson, President, Isle au Haut Electric Power Co.

# Major questions

- **Do we have a good technical solution?** i.e., one that is compatible with our single phase system, is robust and with a proven record.
- **Describe the system? Two stages, with and without the cable**
- **What is the current schedule for installation of the system?**
- **Will we be a unique system with no outside tech support? Will we be able to maintain the system with on-island personnel?**
- **Who will be the project contractor?**
- **What will be the cost of the system and what impact will it have on electric rates?**
- **What was the estimated cost of alternatives such as a new cable, wind or micro turbines?**
- **How will we finance the system?**
- **What do we have to do to assure financing?**

# Do we have a reliable technical solution?

i.e., one that is compatible with our single phase system, is robust and with a proven record?

- This has been the overarching concern of the board.
- We hired a very experienced engineering firm, Solar Design Associates (SDA), to advise us on the technical aspects of the project.
- Twice we have rejected technical solutions that looked promising but we felt might be too risky.
- We have settled on equipment from EPC. This is recently commercialized military equipment developed for the Navy. It is used in remote locations and often in ship board and loading applications.
- The EPC system is plug and play; it will be monitored remotely by EPC, SDA and ourselves. The inverters are very robust but if they fail they can easily be replaced with overnight delivery. Replacement is a straight-forward matter of reconnecting battery cables.
- We will have to learn the new system; neither we nor SDA thinks this will be difficult.  We have designed the system so that this learning will take place while the cable is still viable.

## Describe the system

- The system will be built in two stages.
    - **Stage one will operate in conjunction with the cable**. We plan to install this stage in the spring of 2017. Stage one will last as long as the cable is viable.
    - **Stage two will operate independently, with no cable** to the mainland.
- Both stages will use large scale lithium-ion batteries, large scale single phase inverters and diesel back-up.
- Stage one will employ 170 kW of solar panels (486 separate panels) and will be able to power the island in the winter in case the cable fails. It will use approximately 250 kWh of lithium-ion batteries and will have diesel back-up. (In this stage we expect the diesel will operate much less often than at present.)
- Stage two will use an additional 954 panels (1440 panels total) for 500 kW and an additional 500 to 550 kWh of lithium-ion batteries and will have diesel back-up. (In this stage we estimate about 100 hours of diesel time over the course of the year, mostly in November to January, exactly how much will depend on our operating experience in stage one. During the transition from stage one to stage two we expect much more diesel use. This should not be for more than a couple of weeks.)

## Who will be the project contractor?

- We expect to contract with ReVision Energy for installation of the system. ReVision will drill the post foundations for the racks holding the solar panels; they'll install the panels and wire them to the inverters and batteries.

- A third company, not yet determined, will connect the batteries, panels and inverters to the island grid.

- SDA has designed the system and will probably purchase the solar panels, inverters and batteries because they can get the best price and will not charge a mark-up.

- IAH Electric Power Co. will prepare the land and handle barge, mailboat and other logistics. Both ReVision and IAH power will use local labor as much as possible.

## What will be the cost of the system and what impact will it have on electric rates?

- In June ReVision provided a preliminary estimate of $575K for the cost of the first stage of the project.
  - This does not include the value of the tax credit and accelerated depreciation. These reduce the effective cost by almost half.
- Since June, prices for solar panels and batteries have fallen dramatically and are expected to fall even more this winter and spring. We will not purchase this equipment until spring 2017 when we expect even lower prices.
- Furthermore, the inverters we will use are much less expensive than what we were considering in June.
- Nevertheless, if the stage one system does cost $575K our break-even costs will fall by about $0.06/kWh, from $0.40 to $0.34
- Stage two costs (using June 2016 prices) will be higher than stage one, approximately the same as our current costs while using only the cable.
- We expect to have firm cost estimates in hand within a couple of weeks.

## What was the estimated cost of alternatives such as a new cable, wind or micro turbines?

- The cost of a **new cable** identical to the one we have currently was estimated at $1,160,000 not including installation. There is no subsidy. Paying off a loan for the cable and continuing to pay for mainland electricity would raise our break-even costs to about double our current costs, at least $0.83/kWh.

- **A larger cable** that would be able to handle 50% growth over the next 20 to 25 years was estimated at $1.7 to $2.0 million and would raise costs to over $1.00.

- **Micro turbines** are estimated to cost about $0.50/kWh, significantly higher than solar.

- Using **diesel only** would cost around $1.10/kWh.

- We did not seriously consider **large wind turbines**. Their efficiency depends largely on a connection to the grid, i.e., a cable; and they pose esthetic and political issues.

# How will we finance the system?

- The Federal government offers a 30% tax credit for investments in renewable energy. We cannot take advantage of the credit because we operate on a nearly break-even basis and pay very little in the way of taxes. So the tax credit isn't worth much to us.

- However, we will form a second company, e.g., the IAH Renewable Energy Co., which will purchase the panels, inverters and batteries and then sell the electricity to IAH Electric Power Co.

- Investors in this second company can take advantage of the tax credit if they have taxable passive income. Passive income is usually rental income from large real estate holdings.

- This second company will sell the electricity to IAH Electric Power Co. at a contracted rate that effectively transfers 90%+ of the value of the subsidy to IAH Electric Power Co.

- Investors will get a very good rate of return with very low risk.

- IAH Electric Power Company will acquire ownership of the equipment in seven years and the second company will be dissolved.

## What do we have to do to assure potential investors that this is a good opportunity?

We need to demonstrate that we have:

1. a good technical solution that is economically viable. We can do that.

2. a stream of revenues that can pay for the investment. We can do that because revenues from the sale of electricity on the island are remarkably stable and predictable.

3. assured access to the land necessary for the solar panels and associated building. We can do this because the town voted at the special meeting on Nov. 15, 2016 to transfer 4.86 acres on Coombs Mt. to IAH Electric Power Company.

**If you have additional questions please contact me at jwilson@maine.edu**