

HMLP pathways to a 100 percent carbon-free power supply

The goal

Hingham Town Meeting of 2020 voted to set a goal for the town to reach net-zero carbon emissions town-wide by 2040 -- in the commercial, residential and governmental sectors. HMLP has a central role to play in reaching this goal. HMLP has initiated programs to assist customers in the transition to electricity from fossil-fuel uses, but to achieve net-zero carbon emissions, the electricity which customers switch to must, by some date, be free of carbon emissions.

With this in mind, HMLP adopts this roadmap for converting its power portfolio to 100% carbon-emissions-free generation as rapidly but as responsibly as possible. While the goal is clear, the path to get there is still developing, so HMLP intends to revisit and reset this policy from time to time as conditions require.

HMLP also seeks to achieve these important goals alongside the transition to a carbon-emissions-free power supply:

1. Maintain affordable rates for all customers
2. Provide adequately for maintenance of HMLP's assets
3. Find the most cost-effective path to power-supply conversion
4. Avoid purchasing "renewable" energy which pollutes in other ways, to the degree possible- contracts should be considered with this in mind.

Obstacles to achieving the goal

There are several obstacles to converting HMLP's power supply which must be overcome to achieve the goal.

Lack of supply on the energy market

There is simply not enough renewable or emissions-free energy available in the market to make an immediate transition. In fact, HMLP's current policy is to purchase as much renewable energy as possible, which is more appealing than ever as the price of renewable energy now competes favorably with fossil-fueled energy. But new sources of supply fall short of demand today.

Lack of local renewable distributed energy resources (DER)

Distributed energy resources (DER) are small electrical generation and/or storage units connected to the grid or to a distribution system such as HMLP's. In Hingham, the most common and practical variety of DER is solar arrays belonging to HMLP customers. These units

serve their owners when there is demand for the electricity in the home or business, and their excess energy is sold to HMLP when supply exceeds demand in the host location.

Solar installations in Hingham contribute a very small percentage of the current power supply, and lag behind the number of installations in some other municipal light plant towns. Also, most of the installations are residential. There are less than ten commercial-sized solar arrays in Hingham.

More distributed energy resources could contribute to progress towards our goal.

Inability to match electricity produced in town with demand

As the amount of solar energy generated in Hingham grows, the disparity between electricity available during the day and the demand in peak time, early evening, will grow.

Batteries are a distributed energy resource which can theoretically overcome this problem by storing electricity and dispatching it when it's most needed. The energy stored could be excess solar energy from solar arrays or simply energy stored when the price is low, to be dispatched when the price is high. HMLP already operates a battery for this purpose. But very few batteries are in use in Hingham, and HMLP lacks a system to coordinate these resources to be dispatched when they are needed.

A large increase in solar energy generated in town could potentially lead to solar saturation, a condition in which solar energy available exceeds all demand in town at certain times. For DER to play a significant role in the conversion of our power supply to non-emitting, batteries or other techniques for disposing of excess electricity at peak times will be required.

Difficulty in planning for market purchases in the future

HMLP anticipates that renewable energy will be increasingly available on the market, but when and how much can't be known at this time. Energy New England continues to seek appropriate projects, but at this point we can't plan to replace any given contract with renewable energy because there's no way to know for sure what will be available ten or even five years from now.

As an example of this difficulty, we know that Energy New England has secured us the right to purchase some of the new Massachusetts offshore wind energy that is will be built, but we don't know how much we will be able to purchase, or exactly when it will be available.

Possible pathways to power-supply conversion

Since the passage of the Next Generation Roadmap Act of 2020, municipal light plants have targets they must meet in converting their supply away from fossil fuels. Munis are addressing this requirement in a variety of ways, and many have developed plans. A review of other plans shows that in general, they largely consist in different combinations of two major approaches:

1. Entering into contracts to buy carbon-emissions-free renewable energy when possible, and
2. buying Renewable Energy Credits to offset the fossil-fueled portion of their portfolios.

There are several kinds of RECs, including Class 1 RECs, which are expensive, and Class 2 RECs, which are more affordable, as well as many other varieties. For an explanation of Renewable Energy Credits (RECs), see *Appendix A, Renewable Energy Credits*.

Not many municipal light plants have set ambitious goals for increasing the DER in their towns as part of meeting their carbon-emissions goals, but some have.

HMLP has used both of the approaches listed above. HMLP's policy is to purchase as much renewable energy as possible, but as stated above, there is not enough supply. Also, for several years, HMLP's approach has been to sell any Class 1 RECs that come associated with the renewable energy in the portfolio, divesting that energy of its claim to renewability. Then HMLP has bought more affordable Class 2 RECs to cover the entire portfolio, allowing HMLP to claim 100% carbon-free energy in its portfolio.

The difference in price between the Class 1 RECs sold and Class 2 RECs purchased has generated funds each year which HMLP has deposited in a special fund intended for green projects. So far, the funds have been expended to support the development of the Town of Hingham's climate action plan, and on a plan underway to install additional solar panels on the HMLP headquarters roof and parking lot.

HMLP's pathways forward

Going forward, HMLP will:

1. **Continue to contract for carbon-emissions-free renewable energy to the degree possible.** Prices continue to be advantageous, when contracts are available. Energy New England continues to seek appropriate contracts, and we are confident that supply will increase over time.
2. **Develop a plan to build distributed energy and storage resources in Hingham,** ideally solar arrays with associated batteries. Since HMLP can't project details about emissions-free energy on the market, the only immediate route available to increase carbon-free energy in our portfolio is to build it in town. Development of such a plan is underway.

Plans will prioritize:

- a. First, working with the Town to build on town and school properties.
- b. Next, facilitate solar and battery installations at large commercial properties
- c. Third, support individual homeowners who wish to participate'

HMLP will study the financing models available (HMLP owned vs. third party ownership) to find the most advantageous. If HMLP ownership is chosen, it will offer

substantial benefits for the future by making possible town-wide control of those resources for the purpose of stabilizing the grid and maximizing benefit to all ratepayers.

3. **Generate a pool of funds to support solar and storage development in town.** If HMLP has a pool of funds for this purpose, it's very likely that HMLP ownership is the most advantageous model. To this end, HMLP will contribute to this fund three ways:

1. By selling class 1 RECs associated with its energy contracts. HMLP will discontinue the practice of purchasing Class 2 RECs to provide the ability to claim 100% carbon-free energy over the whole portfolio.

This change represents a policy which is different from the more standard approach of other municipal light plants in Massachusetts, many of which rely heavily on plans to buy more RECs each year until their power supply is covered. This change in HMLP's policy has several reasons:

- a. The board is unconvinced that retiring Class 1 RECs is effective at promoting development of new renewable resources, which is the ostensible purpose of RECs. It's argued that a Class 1 REC represents fossil fuel energy that's been replaced by renewable energy in the market. But the only mechanism that might accomplish that which is caused by the retiring of a REC is that the price of RECs would rise – almost imperceptibly, considering the small number of RECs that HMLP holds. The board is unconvinced that this meaningfully contributes to creation of new renewable resources.
 - b. The board is unconvinced that purchasing Class 2 RECs is of value to either the renewable energy market or to the ratepayers, who pay a sum to be able to claim that HMLP's energy is 100% carbon-free. Simply making that claim is of limited or no impact in the real world.
 - c. Selling the Class 1 RECs and putting the proceeds in a fund to support the development of distributed energy resources in Hingham will build new, real-world renewable energy resources, which would not have existed otherwise. This is a meaningful contribution to HMLP's power supply conversion strategy.
2. Bond financing, scheduled for 3-5 years from now. While HMLP's transmission and new substation project is being developed, it must take top priority for any bonding initiative. But while that project is underway, HMLP can develop a plan for building solar arrays and storage with sufficient detail to make the plan a candidate for bond financing, after the transmission project is bonded. This plan should be able to show actual ratepayer savings over the long term, if the amount of solar capacity to be built is large enough. Showing savings over time will be a powerful argument for bonding to finance the plan.
 3. Implementing a voluntary, opt-out program for customers to choose to contribute to the green projects fund for the purpose of building in-town

distributed energy resources. In order to make this a reality, HMLP would commit to retiring any class 1 RECs associated with local generation built using this fund. HMLP will structure and define this program so its goals and permitted uses are clear to the customer.

Enough storage must be included in any building plan to eliminate any possibility of destabilizing the distribution system with too much solar capacity. This will have additional reliability benefits to the ratepayers, and can open the door to future microgrid projects which will further enhance reliability.

Future changes to this plan

HMLP is aware that the landscape of renewable energy is changing rapidly, and that this policy must be revisited frequently in order to chart the best course forward. Just a few of the many possible changes that might affect this plan are:

A surge in available renewable resources.

While this would be a good thing, getting closer to 100% carbon-free energy will require HMLP to participate in schemes that will address the variability and volatility of these resources. The closer HMLP comes to its goal, the more important it will be to plan for those challenges.

The arrival of the 2030 deadline for municipal light plants under the Next Generation Roadmap bill, or need to meet Town of Hingham climate action plan requirements.

The Next Generation Roadmap legislation requires that munis meet a goal of 50% non-emitting energy in their portfolio by 2030, 75% by 2040, and net zero by 2050. Also, the Town's climate action plan may set goals which must be met. HMLP could at any point begin retiring class 1 RECs to meet those goals, although it would decrease the funds available for more solar and battery installations.

A partnership with Hull to develop offshore wind

If this possibility develops, it either represents a very large distributed energy resource, or a reasonably-sized contract for renewable energy. In either case, it may change the picture for HMLP's renewable future.

ISO-NE may create opportunities for HMLP to participate in the wholesale market with distributed energy resources.

As part of its response to FERC's order 2222, which requires grid operators to make plans to allow renewable resources to participate in the wholesale market, ISO-NE has proposed allowing Distributed Energy Resource Aggregators (DERA) to assemble portfolios of resources which can sell their energy on the wholesale market. If HMLP's plan to support a large growth in solar energy and batteries is successful, HMLP would

be well-positioned to enter that market as a DERA by aggregating assets that it owns, and possibly even inviting residents and businesses to join with assets they own. This might provide another revenue stream to offset the costs of the DER program.

SUMMARY

HMLP's plan to

- a.) continue purchasing emissions-free energy contracts;
- b.) aggressively develop local distributed energy and storage resources; and
- c.) seek to finance that development for HMLP ownership

represents the best approach for this time, when so few details about the future of renewable energy are clear.

Future adjustments to this plan are inevitable, but this plan is a necessary beginning.

Appendix: Renewable Energy Credits (RECs)

Renewable Energy Credits (RECs) are tokens of renewability which are associated with renewable generation. They are created when the energy is generated, but they can be sold separately from the energy on a regional marketplace. The entity which buys renewable energy can only claim it is renewable if it retains the RECs associated with the energy. If it sells the RECs, the right to claim the renewability goes to the owner of the RECs, which can use it to cover non-renewable parts of an energy portfolio.

The demand for RECs is created by the legal requirement that investor-owned utilities include a certain percentage of renewable energy in their power supply. If they are unable to meet the requirement with actual renewable energy, they can purchase RECs to cover their responsibility. RECs are meant to be an additional source of income to renewable energy developers to encourage the creation of new renewable generation facilities.

There are several kinds of RECs, among them Class 1 and Class 2 RECs. Class 1 RECs represent energy generated in recently-built facilities, and only Class 1 RECs meet the requirements for investor-owned utilities when they seek to achieve their emissions goals. As a result, Class 1 RECs are very expensive. Class 2 RECs are for facilities built before 1997. Because they don't help investor-owned utilities meet their goals, they are in less demand, and cheaper as a result.