

# How a Hingham Sustainability Director Can Turbocharge Progress to Net Zero

## Executive Summary

Funding a Sustainability Director effective 7/1/2022 assures that the Town can optimally support the CAPC and move aggressively on ready- to-be-deployed, climate-related projects. These projects will not only fund the new position, but they will also be significant steps toward our goal. Adopting a passive stance until a Climate Action Plan is delivered in 2024 means needlessly delaying progress toward net zero and risks deferring substantial economic and climate benefits. Implementing the Sustainability Director role will prepare the Town for sustainability-related challenges ahead and will also help in securing new energy-related grant money that will help keep us on track to meet our goal of net zero by 2040.

### Hingham's Commitment:

1. 2021 Town Meeting approved a "stretch" goal – net zero by 2040 - and chartered a Climate Action Planning Committee (CAPC) to develop a plan to get there.

### The Problem:

2. Despite the CAPC's best efforts, difficulties in obtaining consulting resources and the sheer scope of the task mean it is unlikely that Hingham's Climate Action Plan (CAP) would be available before early 2024.
3. Waiting until the final CAP is completed to take further actions squanders precious time that could be used to begin Hingham's difficult journey to net zero by 2040 and means that Hingham may needlessly forfeit significant economic benefits that highly cost-effective climate-related projects could yield.
4. Currently, sustainability related issues and projects are added on top of town officials' day-to-day responsibilities. There is no one in Town administration tasked with leading on sustainability issues and engaging with myriad community stakeholders to inform, educate, and solicit support of and participation in the Town's climate action planning and implementation. While the CAPC has created a community engagement workgroup that will undertake key tasks directly related to the plan, the CAPC is not constituted to solely undertake a broader scope on behalf of Town Administration while simultaneously developing the plan.
5. We have reviewed comparative data published by the DOER Green Communities program that show that Hingham lags far behind comparable towns, especially those that have invested in the Sustainability Director role, in securing energy-related grants. Hingham is forfeiting many hundreds of thousands of dollars in grant money because there is no one with the specific remit, focus, bandwidth and specialized expertise to identify these grant opportunities and pursue them. The same dynamic impedes capturing the benefits of municipal solar.

### The Solution:

1. Hingham needs to create a Sustainability Director position in the FY 2023 budget. Listed in this report are eighteen towns we know have implemented this role. A Hingham SD would be a critical enabler of the Climate Action Plan Committee's effectiveness, serving as single point of contact between the CAPC and myriad Town departments and committees. The SD would facilitate the flow of information on current policies, related short term planning, functional capabilities, constraints, etc. The SD could take the lead in community outreach, educating the public and soliciting input/ participation in the planning process, thus maximizing deployment of CAPC resources to development of the CAP.
2. Creating the Sustainability Director position in the FY 2023 budget, available to be filled effective 7/1/2022, would be a critical first step in the larger challenge of aligning Town administrative functions as necessary for implementing the plan to attain net zero by 2040. It would provide a single, authoritative point of contact and focus for climate-related issues for Town staff as well as the larger community. It would consolidate responsibility for sustainability-related issues in one Town management function and relieve Town administrators of the burden of trying to address sustainability issues on an ad hoc basis.
3. The position could be financed with savings from Green Communities projects and solar on municipal roofs yielding compelling long term returns. Plus, comparative analysis shows that it is reasonable to expect that a Sustainability Director would bring in new grant money equivalent to many times the cost of the position.

## How a Hingham Sustainability Director Can Turbocharge Progress to Net Zero by 2040

**Context:** The Climate Action Planning Committee (CAPC) is comprised of eleven citizen volunteers who meet biweekly. They have recently convened and organized themselves into initial workgroups. Because the desired MAPC consultant resource will not be available until Summer of 2022, it appears that the Committee will need several months to issue an RFP for consulting services, review responses, select a consultant, negotiate terms, and bring on the necessary resource(s). This is a process that will extend well into 2022. Despite the best efforts of the Committee, it is likely that it will not be until the end of 2023, or even well into 2024, before the Committee is able to produce the final plan. Recognizing that the CAPC has no municipal authority, implementation of the plan will require new roles within the Town administration, both in the short term for initial recommendations and longer term when the plan is finalized.

**Timing:** Should Hingham simply wait passively until the final plan is available, thus forfeiting a year or more of progress toward net zero? Are there other steps the Town could be taking in the interim? Including a Sustainability Director position in the FY 2023 budget would be a proactive step toward facilitating the CAPC’s work during 2022 and laying the necessary managerial foundation for implementation. Creating the position in the FY 2023 budget means the Sustainability Director could start late summer/early fall of 2022. Waiting until FY 2024 to authorize the position means losing an entire year or more that could have been used to accelerate the development and implementation of the Climate Action Plan. Waiting also means deferring sustainability measures that could be pursued without the final plan, action that is currently possible only through ad hoc, extra-curricular assignments for existing town management staff whose primary focus is on day-to-day operations.

**Funding:** We have included specifics on how the Town could fund this position for FY 2023 out of cost savings in **Appendix A – Cost Justification**. Solar panels on municipal rooftops alone could yield over \$150,000 in **annual** cost avoidance savings through reduction of Hingham’s electricity bill. Green Communities projects are estimated to generate a return of over \$500,000 in savings on a net cost of approximately \$4 million. Other towns have received partial grant funding for similar positions and Rep. Joan Meschino and Sen. Patrick O’Connor are looking into what might be available for Hingham.

**Hingham Lags Behind:** The following is only a partial list of Massachusetts municipalities that have created roles variously termed Sustainability Director, Sustainability Coordinator or Energy Manager: **Acton, Ashland, Arlington, Bedford, Brookline, Concord, Holliston, Lexington, Milton, Natick, Newton, Quincy, Plymouth, Somerville, Wellesley, Winchester, Weston, and Weymouth.**

**Sustainability-related Grants:** Another key area in which Hingham lags far behind other comparable towns is in securing sustainability-related grant money in programs such as the DOER’s Green Communities Grant Program. For example, DOER online documentation shows that Acton, a town with a comparable population, has obtained almost \$1.6 million in Green Communities grants since program inception; **Hingham has obtained just \$142,232. Hingham’s GC grant receipts pale in comparison to our benchmark communities in the program:**

Town	Green Communities Grant Money Awarded Since 2018	Green Communities Grant Money Awarded Since Program Entry
Acton	\$574,677.00	\$1.44 million
Cohasset	\$328,420.00	\$636,095.00
Concord	\$255,442.00	\$825,148.00
Duxbury	\$411,105.00	\$550,810.00
Hanover	\$322,208.00	\$1.4 million
Marshfield	\$799,215.00	\$981,935.00
Needham	\$148,270.00	\$148,270.00
Norwell	\$339,019.00	\$636,095.00
Rockland	\$262,493.00	\$919,922.00
Scituate	\$428,445.00	\$1.1 million
Winchester	\$384,992	\$1.5 million
Weston	\$199,999	\$582,381
Weymouth	\$670,034	\$1.2 million

Source: <https://www.mass.gov/orgs/green-communities-division>

This is in no way intended as a criticism of any current Town staff who may have some involvement in grant processes. The intent rather is to show the magnitude of grant resources Hingham is currently forfeiting and the potential for improvement if Hingham were to create a position with the requisite remit, focus, bandwidth and specialized expertise.

**Initial Role:** Hingham's Sustainability Director could initially be tasked with the following:

- a. Begin the installation of solar panels on all feasible municipal roofs. As Appendix A shows, this project alone would generate annual savings of more \$150,000 in avoided electricity costs that would more than pay for the position. (The City of Newton is moving aggressively to accomplish a similar goal.) This would be a significant fiscal benefit to the Town as well as serving as an example to the larger community by modeling aggressive climate action. As Appendix A shows, if the Sustainability Director accomplished nothing else, this would still constitute a long-term endowment to the Town worth many millions of dollars.
- b. Be responsible for identifying new sustainability-related grant opportunities and driving to completion the Town's current Green Communities CR3-ERP (Energy Reduction Plan). This plan specifies sixty-six "shovel ready," pre-vetted projects, most of which are currently categorized as "Planned." Three of these projects have been started and are slated to be completed by year end. In total, the sixty-six initiatives are projected to yield over \$500,000 in savings with payback periods ranging from months to several years. cursory review suggests that eight of these projects could directly reduce the Town's use of fossil fuels. For example, two of the projects involve remediating condenser boilers and installing a demand ventilation control system at Hingham High School. These two projects alone will reduce the Town's use of natural gas by 31,682 therms. The current approach to completing the sixty-six projects appears to be special assignments for the various Town staff, who are understandably already consumed with day-to-day operations. Consolidating responsibility under a Sustainability Director would give these projects clearer ownership, focus and accountability. Implementing these projects would further augment energy-related savings that will fiscally benefit the Town and could serve to partially defray the cost of the new position.
- c. Begin to conduct feasibility analysis on other potentially highly impactful "tactical" projects that need not be deferred pending finalization of the CAP.

**Initial Job Description:** Concord has now had two Sustainability Directors over a period of about three years. Kate Hodges, Concord's Deputy Town Manager, recently shared with us that their respective roles, areas of focus, skill sets, and strengths were a function of the Town's needs at the time based on how Town administration was then constituted and where they were in the development and implementation of the CAP. Needs changed significantly as Concord moved from CAP development to implementation.

With that in mind, what follows below outlines the envisioned role and benefits of a Sustainability Director for Hingham, derived in part from Concord's job description but primarily tailored to Hingham's current and anticipated needs:

- Consolidates responsibility for energy, sustainability, resilience and climate-related issues and projects under one Town administration accountability.
- Responsible for identifying, prioritizing, and applying for sustainability-related grants, working with Town staff and other partners to develop project scopes, budgets, and timelines and completing required reporting for these grants.
- Provides a single point of contact to facilitate collaboration between the CAPC and Town administration and provides the CAPC with centralized access for support on data, current policies, functional capabilities, constraints, etc., from various departments and committees within the current Town administration.

- Dedicates a Town management position to oversee ongoing socialization and timely implementation of interim climate action plan recommendations *as they are formulated* by the CAPC.
- As an officer of Town administration, provides a single, outward-facing point of contact for authoritative information about the CAP and the Town’s sustainability measures, with strong outreach to a diverse community of stakeholders, especially businesses, non-governmental organizations, and households within Hingham.
- Helps solicit participation and input into the CAP, clarify emergent issues and advocate effectively for cooperation and voluntary action.
- Communicates regular updates and key information to Town staff, committees and the general public via diverse channels including Harbor Media, Town Website, newsletters, press releases, special reports and social media pages.
- Provides a single focal point for integrating, coordinating, and managing the myriad issues often categorized under the rubric of “sustainability.” Please note:
  - There are many sustainability-related Town committees and functions, as well as citizen groups, that touch on sustainability issues in Hingham (please see list in Appendix B).
  - Hingham does not have a clearly defined position under which sustainability is vested as a formally designated remit; related work typically takes the form of “add-ons” to roles such as the Town Administrator, whose plate is already overflowing, e.g., Green Communities projects. This is not a robust strategy for meeting the need.
- Serves as primary liaison to state agencies on sustainability issues, especially as the Commonwealth’s Roadmap is implemented in phases. E.g., will monitor the issuance of new regulations/recommendations, including the “stretch” building codes we know are coming, and will facilitate Hingham’s responses.
- Forms strategic partnerships across all Town Departments to advance Hingham’s sustainability goals.
- Researches, recommends, and implements additional climate action strategies to help Hingham achieve energy reduction, sustainability and resilience goals.
- As the CAP is formulated, the Director of Sustainability will be responsible for developing and administering programs, policies, and initiatives to advance Hingham’s climate mitigation and resilience goals.
- Coordinates closely with Town Committees, Boards and departments as well as local groups, businesses, residents, and state agencies.
- The Sustainability Director will eventually be tasked with measuring and reporting out progress toward climate goals.
- Serves as committee member on committees and task forces, such as building committees.
- Works closely with Town fleet managers to deploy electric vehicles in town fleet.
- Acts as project manager, or co-manager, for energy or sustainability-related capital projects.

1. **Position Costs:** Concord's salary range for the Sustainability Director position is from \$74,142 to \$111,838; they typically hire well within the first half of their salary ranges. This suggests a job market in which Hingham could expect to pay \$80,000 to \$90,000 in salary. Estimating the cost of benefits at approximately 33% of salary would suggest a total annual cost of the position that would range from \$106,400 to \$119,700. Since related associations and periodicals are critical resources for updated information and professional networks, it would also be prudent to plan \$2,000 to \$3,000 for memberships and subscriptions.

**Resources that Could Fund the Position:**

2. **Solar:** We believe that installing solar arrays on municipal rooftops alone would more than defray the annual costs of this position. While there have been exploratory overtures made between the HMLP Board and the Town to install solar on municipal rooftops, one of the common responses we have heard is that there is great receptivity to the concept, but no single Town management employee has the bandwidth, expertise and remit to push this initiative forward in a timely manner. A Sustainability Director could be tasked with this undertaking, which would comprise a significant step forward for the town toward attaining next zero municipal emissions. We have completed an analysis using Google Project Sunroof and actual data from a residential solar installation in Hingham which illustrates the scale of potential financial benefit to the Town in avoided electricity costs. We conservatively estimate that municipal solar could generate \$150,000 or more in annual net savings. More detail on this illustrative example is provided below.
3. **Green Communities Projects:** To its great credit, the Town has completed Green Communities grant program documentation and identified sixty-six energy-related projects with positive returns and payback periods ranging from two and a half to thirty years. Taken together, these projects are estimated to return more than \$500,00 in savings on a net cost after incentives of approximately \$4 million. It is reasonable to expect that some of the resultant savings could be deployed to defray the costs of the new Sustainability Director position. The first incumbent could be tasked with prioritizing the projects, using criteria such as magnitude of savings, reduction in use of gas and oil, time to payback and other variables. The SD could then manage the resultant prioritized portfolio in a way that optimizes timely reduction in greenhouse gasses and financial returns to the Town.
4. **Grants:** We have heard that some towns were able to initially finance this role partially via grant money. Representative Joan Meschino has indicated that this may be a possibility. Additionally, an aide in Senator Patrick O'Connor's office has said that he would be receptive to a request to file a special earmark in the Commonwealth's budget. We are researching these possibilities further but at this point neither should be seen as a source of funding sufficiently reliable to justify not including the position costs in the Town budget. Any grant money that might materialize would likely constitute a one-time contribution toward reducing the Town's actual FY2023 expenditure for the position. Absence of grant funding is not a reason to defer action.

**Solar on Municipal Rooftops – Data and Methodology**

1. Hingham Net Zero has modeled out an example that illustrates the likely scale, costs, annual electricity production and net savings in the form of cost avoidance (reduced electric bill) that would be available to the Town if it installed solar panels on municipal roofs where that is feasible. The seven buildings used in the example were as follows:
  - Town Hall
  - Plymouth River School
  - East School
  - Middle School
  - Hingham High School
  - Hingham Fire Station #2 (339 Main St.)
  - Hingham Fire Station #3 (847 Main St.)

- a. The North Street Fire Station and Foster School were omitted from the analysis because they are due to be replaced in the next few years.
  - b. Google's Project Sunroof application was used to confirm baseline solar feasibility and obtain the roof square footage available for solar for each of the buildings listed above.
2. Hingham Net Zero utilized the manufacturer's specified capacity data and actual annual production data on a solar array installed on the roof of a residence in the Town. This array uses twenty-two LG 335N1C solar panels with a combined generating capacity of 7.37 kW. (These panels are rated at 335 watts; currently available panels are rated at as much as 500 watts.)
  3. The detailed model is too complex to present in this document. We would be happy to review the spreadsheet with designated Town, Advisory Committee and/or HMLP staff. However, we can describe the basic data and methodology we used in completing the analysis, as follows:

#### **Cost Data**

- a. Obtain the square feet available on the roof of each building from Project Sunroof.
- b. Calculate the production capacity of the array in watts based on the square feet available for each roof.
- c. Calculate the total cost of the array by multiplying the capacity in watts times \$3.00 per watt (average market cost per watt recently estimated by Michael Reive of EAC and Steve Girardi of HMLP for another analysis).
- d. Calculate approximate annual amortization expense of the array based on an assumed twenty-year period by dividing total cost of the array by 20 (see NOTES below). This is the annual cost data against which annual cost avoidance will be compared to derive net return to the Town based on electric bill savings (step j. below).

#### **Production Data**

- e. Utilizing actual production data for a representative twelve-month period drawn from a residential solar installation that has been in production since fall 2017, calculate the total actual annual production in kWh's for the square footage included in the residential array.
- f. Using the actual residential data, calculate the expected annual production in kWh's per square foot for the seven municipal roofs.
- g. Calculate projected total annual production in kWh's for each roof, multiplying the metric obtained in step f. above by the total square feet established for each roof.

#### **Monetizing the Annual Production in kWh's of Each Roof's Array**

- h. Calculate the expected monetary value of each kWh produced based on a blend of HMLP rates (see NOTES below).
- i. Calculate the total projected monetary value to be realized each year by multiplying the total annual production in kWh's times the appropriate blended HMLP rate. (This represents "gross revenue" before subtracting the annual amortized cost of the array.)
- j. Subtract the annual amortization amount from the total annual monetary value to obtain "net revenue" – the net return to the Town in the form of cost avoidance for electricity.
- k. Sum the "net revenue" for each of the six buildings. **The total projected return to the Town in the form of cost avoidance of electricity charges is \$158,925 – more than enough to cover the cost of the Sustainability Director position.**

**Please note:** solar panels are typically guaranteed for 25 years; however, most panels last much longer, up to 30 or 40 years with relatively minor degradation of output (as little as .25% per year for high end panels). Reasonable estimates of the residual efficiency of good quality, economically priced panels range from 88% at the end of year 20 to 78% at the end of year 40. Note that once the panels are paid off at the end of year 20, each kWh produced becomes pure profit to the town. In this example, the economic value of solar output following financing pay-off, discounted for typical drop-off in efficiency, would be as follows:

Economic Value of Total Solar Output, <b>1<sup>st</sup> Year Post-Pay-off:</b>	<b>\$ 841,903</b>
<b>Cumulative</b> Economic Value for Years 21 -25: (Up to guaranteed life of panels)	<b>\$4,102,654</b>
<b>Cumulative</b> Economic Value for Years 21 -30: (Five years beyond guaranteed life of panels)	<b>\$ 7,966,782</b>
<b>Cumulative</b> Economic Value for Years 21 -35: (Ten years beyond guaranteed life of panels)	<b>\$ 11,592,384</b>
<b>Cumulative</b> Economic Value for Years 21 -40: (Fifteen years beyond guaranteed life of panels)	<b>\$ 14,979,450</b>

This is a conservative estimate. The residential panels used in the example are rated at 335 watts output; currently available panels are rated as high as 480 to 500 watts. Solar is an extraordinarily worthwhile investment with compelling, practically guaranteed long term returns that constitute a virtual endowment to the taxpayers of the Town. A Sustainability Director would enable the Town to capture this magnitude of return while materially lowering municipal emissions.

#### NOTES ON SOLAR MODEL

- a. **Amortization:** because it is not clear how the arrays are to be financed, in order to streamline the model and to simplify calculations, no attempt was made to select and apply an applicable interest rate. Annual amortization is estimated simply by dividing total cost by 20 years. Current interest rates are so low that we estimate that the impact of interest would not materially alter the basic value to the Town. Given the nature of the model, including financing charges would add complexity and risk conveying a false precision which is unrealistic for this kind of example.
- b. **HMLP blended rate:**
- Each kWh immediately consumed as it is produced has a monetary value to the Town which consists of the HMLP retail rate it would have to pay to otherwise purchase that kWh: 17.75 cents per kWh.
  - Each kWh not consumed immediately is "sold" back to HMLP at its average wholesale cost - 9.07 cents per kWh.
  - It is assumed that, during normal operating hours, depending on the building, 100% of the solar production will be consumed. E.g., the fire stations operate 24X7 and it is assumed they will consume each kWh they produce. Thus, the HMLP retail rate of 17.75 cents was used for these buildings.
  - Town Hall and the schools, however, have different patterns of use. When they are closed, each kWh produced would most likely not be consumed and the HMLP average wholesale cost rate would apply to those kWh's. Special blended rates reflecting assumptions regarding annualized patterns of use were developed for the analysis, as follows:

<b>Town Hall:</b>	<b>68.5% Open</b>	<b>15.02 cents per kWh</b>
<b>Fire Stations:</b>	<b>100% Open</b>	<b>17.75 cents per kWh</b>
<b>High School:</b>	<b>82.7% Open</b>	<b>16.25 cents per kWh</b>
<b>Other Schools:</b>	<b>57.5% Open</b>	<b>14.06 cents per kWh</b>

**APPENDIX B**  
**TOWN ENTITIES & CIVIC ORGANIZATIONS THAT INVOLVE SUSTAINABILITY INITIATIVES/ ISSUES**

Climate Action Planning Committee  
The Master Plan Committee  
The Planning Board  
Cleaner Greener Hingham  
DOER Green Communities/other grants  
Development and Industrial Committee  
Energy Action Committee  
Harbor Development Committee  
Hingham Municipal Lighting Plant  
Public Safety Facility Building Committee  
The School Building Committee  
Public Works Department, especially Weir River Water System  
Building Department, Permits and Inspections  
Transfer Station  
Public Safety Department  
Hingham Downtown Association  
Hingham Civic Association  
Hingham Net Zero

and many more...