CLEANENERGYRESULTS

Annual Report to the Massachusetts Department of Energy Resources

Covering January 1, 2022 – December 31, 2023

Surfside Wastewater Treatment Plant 104.4 kW Solar Array (Funded by Gap Energy Grant)

2022 -23

Massachusetts Department of Environmental Protection

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EXECUTIVE SUMMARY

The Clean Energy Results Program (CERP), launched in November 2011, is a first-of-its-kind partnership between the Massachusetts Department of Environmental Protection (MassDEP) and the Massachusetts Department of Energy Resources (DOER). This innovative program builds on MassDEP's regulatory expertise and authority to support DOER in advancing the permitting and development of renewable energy and energy efficiency projects throughout Massachusetts. MassDEP also works closely with the Massachusetts Clean Energy Center (MassCEC) on CERP program activities.

This Annual Report covers MassDEP activities performed from January 1, 2022 – December 31, 2023. It is being provided to DOER pursuant to the Memorandum of Agreement (MOA) executed between MassDEP and DOER, which sets the conditions for the Clean Energy Results Program funding from DOER. Below are highlights from each key program area. More information on each of these can be found under the Detailed Program Progress section of this report.

MassDEP has made significant progress in the Gap Energy Grant Program. The Gap Energy Grant program expedites the cost-effective installation of energy efficiency and renewable energy projects across the Commonwealth.

1. In early 2022, as the Commonwealth's greenhouse gas reduction goals became more urgent and challenging, MassDEP began creating a new expanded Gap III Energy Grant program that built off its previous energy and environmental results in the water sector. The objective was to provide deeper and more impactful energy-saving results into communities across Massachusetts. In addition to municipal water infrastructure, eligible applicants were expanded to include non-profit organizations focused on agriculture and food production as well as affordable housing and small businesses focused on agriculture and food distribution. These sectors were selected for grant funding as areas where energy project needs were not being fully met even with other grant programs and incentives.

   On May 26 2022, MassDEP's Clean Energy Results Program (CERP) issued its Request for Responses (RFR) for the Gap III Energy Grant 2022-2023 Opportunity in COMMBUYS, under Bid Solicitation BD-22-1045-BWR00-BWR01-75906. This grant solicitation made **seven million five hundred thousand dollars ($7,500,000)** in grant funds available from the agency's Climate Protection and Mitigation Expendable Trust. A core foundational goal of the program is to leverage and maximize other sources of funding, such as energy utility and clean energy incentives, grants, and community funding, to move projects that have completed energy assessments forward to implementation and construction. Two grant funding application tracks were offered – for applicants requesting a Gap Energy grant above $100,000; and those requesting a grant below $100,000. Both options were offered for water utility applicants and the expanded group of eligible applicants: nonprofit affordable housing and agricultural food producing organizations, and small businesses engaged in food distribution and processing.

By July 29, 2022, MassDEP received 67 Gap III Energy grant applications requesting $8,856,350 in grant funds. This represented 43 drinking water and wastewater facility applications, and 24 nonprofit and small business application submissions received. Projects covered all regions of the state that represented a good mix of energy efficiency and clean energy generation projects at water utilities, housing organizations, farms and food pantries.

2. Due to the strength of the applications and strong interest, additional funding from the Climate Mitigation trust was allocated, and on January 3, 2023, MassDEP awarded $8.1 Million in Gap Energy Grants to 62 Organizations and Municipal Facilities. The 62 recipients receiving the grants represent three sectors in the state: municipal water facilities; non-profit multi-family affordable housing organizations; and agricultural and food-producing non-profits and small businesses. (see: Press Release). Overall, the 62 grant awards are supporting more than 100 energy-saving projects statewide that are anticipated to generate more than 9,000 megawatt hours (MWh) in annual electricity savings or onsite generation of clean energy. Overall, the grantees expect to have an estimated annual savings of up to $1,642,963 that can be reinvest back into their facilities and organizational missions.

3. In June of 2023, the Pacific Northwest National Laboratory conducted a cost-benefit analysis that found the 67 completed Massachusetts' Gap Energy Grant projects conducted over the past 9 years at water and sewer facilities are expected to yield more than $66.7 million in energy savings over the life of the projects and provide decreased carbon emissions worth more than $8 million – for a total benefit of more than $75 million. In total, the Massachusetts Gap Energy Grant Program's first two rounds of grant awards produced nearly nine times its original $8.5 million public funding amount – resulting in a very good public return-on-investment for the Commonwealth. (See Report).

4. On August 10, 2023, the Town of Nantucket powered up its first 104.4 kilowatt municipal solar project at the Surfside Wastewater Treatment Plant. The solar project was funded primarily by a $200,000 Gap Energy Grant from the Massachusetts Department of Environmental Protection (MassDEP) Clean Energy Results Program, which was awarded to the Town's energy office in 2019. MassDEP celebrated a "switching-on" event with local officials and project proponents. See Press Release.

5. As part of Climate Week 2023 (September 17th –24th 2023), Energy and Environmental Affairs Secretary Rebecca Tepper and MassDEP Commissioner Bonie Heiple highlighted the future site of a 20-unit Affordable Housing complex in Dorchester. The building will feature an all-electric, energy-efficient central heating and cooling system, funded by the Gap Energy grant program (Heading Home, Inc.). Commissioner Heiple also recognized another Gap Energy Grant-funded project in Hull that week. The Hull Water Pollution Control facility paired our Gap Energy grant with a FEMA grant to make upgrades to their influent process and influent mains within its control building. These critical grants will help the plant handle

a surge of water during storms, making it more resilient as climate change exacerbates coastal and inland flooding.

6. On December 8th, 2023, - MassDEP's Clean Energy Results Program and its partners, Massachusetts Department of Energy Resources (DOER) and the Clean Energy Center (CEC) held a Wastewater Energy Recovery | Mass.gov Summit at the MA Division of Fisheries and Wildlife Field Headquarters, 1 Rabbit Hill Road, Westborough. The Summit highlighted how wastewater can be used as a source of untapped energy, and how the three different technologies presented and various U.S and Canadian projects are being implemented in a practical and accessible way. This hybrid event with in-person and virtual attendance drew in 125 attendees. This was the first educational and outreach phase of our efforts to advance wastewater energy recovery. MassDEP's objective is to help jump-start and evaluate several wastewater energy recovery pilot / demonstration projects in Massachusetts in 2024.

Detailed Program Updates

Anaerobic Digestion/Organics Diversion

In 2022, Massachusetts food waste diversion increased from a baseline of 100,000 tons prior to implementing the initial food waste ban to 360,000 tons. This was an increase of 260,000 tons on an annual basis. In 2023 that number increased to 380,000 tons. Overall, food waste makes up about 21% of our trash, about 930 thousand ton per year. The Massachusetts Organics Action Plan lays out MassDEP's programs and strategies to achieve this goal.

Recycling Loan Fund

MassDEP continues to support recycling market development through its grant and loan programs. MassDEP awarded a $500,000 loan to Black Earth Composting for their new food waste composting facility in Manchester. In 2022 and 2023, MassDEP awarded 14 grants for just over $1 million to grow our infrastructure for managing wasted food. MassDEP also awarded four grants totaling $223,250 to grow the food rescue infrastructure in Massachusetts.

RecyclingWorks in Massachusetts

The **RecyclingWorks in Massachusetts (RecyclingWorks)** program provides free assistance to Massachusetts businesses and institutions on recycling and waste reduction programs. RecyclingWorks has made food waste diversion a program priority. In 2022, RecyclingWorks provided direct or tiered technical assistance to 58 entities and mini technical assistance to 60 entities for organic materials. In recent years, RecyclingWorks also has held forums on practical skills for commercial composting and provided direct assistance to more than 750 businesses on food waste deliveries and compost site assistance.

Commercial Organics Waste Ban Compliance and Enforcement

MassDEP also continues to conduct inspections and issue enforcement relative to the commercial organics waste disposal ban, which initially banned the disposal of food materials from any business that disposes of 1 ton or more per week. In 2022 commercial operations were required to meet a lower food waste threshold of ½ ton per week. This change roughly doubled the number of businesses subject to the food waste ban from 2,000 to 4,000. This increase in participation is credited to reducing food waste in landfills and an increase in food recovery. In 2022, approximately 3,100 Massachusetts businesses and institutions contracted for organics hauling. In 2022, MassDEP issued 189 notices of non-compliance (NON) and 1 administrative consent order with a penalty (ACOP). In 2023, MassDEP issued an additional 12 NONs and 1 ACOP for disposal of food material.

Anaerobic Digestion Facilities

Anaerobic digestion facilities in Massachusetts accept and digest food waste, often with agricultural materials, manure from dairy cows, and at wastewater treatment facilities to generate renewable energy. This energy can be used on site, and excess energy can be sent back into the grid. In 2022 and 2023, existing AD facilities have seen a steady increase in food waste directed to these facilities.

Clean Energy at Drinking Water and Wastewater Utilities

Background: MassDEP provided two previous rounds of streamlined Gap energy grants (2014 & 2018) for constructing energy efficiency and renewable energy upgrades at municipal drinking water and wastewater treatment facilities. The Gap Energy grant program "fills the gap" by leveraging incentives from energy utilities and other funding sources to jump-start energy efficiency and clean energy generation projects forward. During two rounds of Gap Energy funding grants to 67 water facilities, the program leveraged more than $2.6 million in energy utility incentives with Gap Energy program awards of more than $5.7 million, to produce more than $28 million in plant efficiency upgrades and clean energy installations. These projects are saving more than $2.5 million in energy costs / year, produce approximately 24,195 megawatt-hours in electricity savings with on-site generation / year, and annually reduce carbon emissions by 17,977 metric tons.

Gap III Energy Grant Program Expansion, Procurement, and Awards

On May 26 2022, MassDEP's Clean Energy Results Program (CERP) issued its Request for Responses (RFR) for the Gap III Energy Grant 2022-2023 Opportunity in COMMBUYS, under Bid Solicitation BD-22-1045-BWR00-BWR01-75906.

This grant solicitation made **seven million five hundred thousand dollars ($7,500,000)** in grant funds available from the agency's Climate Protection and Mitigation Expendable Trust, with up to five million dollars ($5,000,000) in grant funds available for drinking water and wastewater treatment facilities (public municipal, district, or authority), and up to two million five hundred thousand dollars ($2,500,000) in grant funds available to nonprofit multifamily affordable housing, agricultural and food producing organizations, and small businesses engaged in food distribution and processing.

MassDEP held two Bidder's Informational Conferences (via Zoom), on Thursday, June 2, 2022, and on Tuesday, June 14, 2022. MassDEP accepted and responded to questions verbally at the informational sessions, and accepted written questions electronically through 5 p.m. on Friday, June 17, 2022. MassDEP compiled all questions received from both the information conferences and submitted in writing and provided Official Answers on the CERP Gap Grant website on Friday, June 24, 2022. Grant applications were accepted electronically until 5 p.m. on Friday, July 15, 2022, for drinking water and wastewater facilities, and until 5 p.m. on Friday, July 29, 2022, for nonprofit and small businesses.

A streamlined electronic grant application process was set up through the database software program *IMeet* that was managed by MassDEP's sister agency, the Massachusetts Department of Energy Resources (DOER). The Gap Energy Grant electronic application system was designed by DOER's grant manager, Jane Pfister in consultation with Michael DiBara, MassDEP's project manager.

In total, 67 Gap III Energy grant applications were received requesting $8,856,350 in Gap Energy grant funds. This represented 43 drinking water and wastewater facility applications, and 24 nonprofit and small business application submissions received. Based on the overwhelming interest and strength of the project applications, the original grant budget of $7.5 million was increased to $8.1 million.

On January 3, 2023, MassDEP awarded $8.1 Million in Gap Energy Grants to 62 Organizations and Municipal Facilities. The 62 recipients receiving the grants represent three sectors in the state: municipal water facilities; non-profit multi-family affordable housing organizations; and agricultural and food-producing organizations and small businesses engaged in food distribution. (see: Press Release). Overall, the 62 grant awards are supporting more than 100 energy-saving projects statewide that are anticipated to generate more than 8,000 megawatt hours (MWh) in annual electricity savings or onsite generation of clean energy. Overall, the grantees expect to have an estimated annual savings of $1.7 million that can be reinvested back into their facilities and organizational missions.

Below in Table 1 are the Gap III Energy Grant Awards to municipal drinking water and wastewater utilities; Table 2 contains the awards to nonprofit and small businesses.

Table 1: Grant awards to drinking water and wastewater utilities[1]

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
Adams (WW)	WERO	Upgrading of three mechanical aerators in aeration basin #2, with new variable frequency drives and dissolved oxygen instruments. Replacing two old water pumps with new efficient pumps.	National Grid	172,286
Auburn (WW)	CERO	Installing (4) 75 horsepower variable frequency drives (VFDs) to the Holstrom	National Grid	200,000

[1] The Towns of Charlton and Whatley later declined their grant awards. Their grant awards were reallocated to other grantees.

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
		Court wastewater pump station and installing (4) 100 horsepower variable frequency drives (VFDs) to the Sword Street wastewater pump station.		
Braintree (DW)	SERO	Installing weatherization and building envelope energy efficiency measures (windows, walls, roof) during the construction of the new Tri-Town drinking water treatment plant serving Braintree, Holbrook and Randolph.	Braintree Electric Light Department	182,179
Buckland (WW)	WERO	Installing a 49.9 kW rooftop and ground-mounted solar photovoltaic system and replacing the existing electric resistance heating system with an air-source heat pump. The project is estimated to result in a 36% reduction in total energy consumption.	Eversource	184,625
Burlington (WW)	NERO	Installing a 66.1 kW rooftop photovoltaic system in combination with new weatherization and window stripping measures at the Mill Pond water treatment plant.	Eversource	177,805
Charlton (WW) *(later declined)*	CERO	Replacing the existing natural gas-fired HVAC and dehumidifier in the processing area with an electric water source heat pump system. Fuel switching project will result	National Grid	53,494

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
		in ~ 11.5% reduction in total energy usage.		
Chicopee (WW)	WERO	Replacing a total of 16 outdated and inefficient pumps and several new variable frequency drives at the wastewater treatment plant.	Chicopee Municipal Lighting Plant	200,000
Dartmouth (WW)	SERO	Installing an Energy Management System and two ductless heat pumps in the lab area at the wastewater treatment plant.	Eversource	87,032
Deerfield (WW)	WERO	Replacing the single existing aging and inefficient floating aerator with four energy efficient floating aerators and two floating mixers.	Eversource	179,173
Easthampton (WW)	WERO	Replacing four aging mechanical aerators with new energy efficient aerators equipped with variable frequency drives at the wastewater treatment plant.	Eversource	179,173
Edgartown (WW)	SERO	Replacing three primary sludge and three secondary waste pumps at the wastewater treatment plant.	Eversource	200,000
Essex (WW)	NERO	Replacing the existing 40-year-old boiler high-efficiency condensing boiler; replacing the original, 75kVA electrical transformer. Installing variable frequency drives to	National Grid	109,499

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
		wastewater pumping stations #1 & #4.		
Franklin (WW)	CERO	Replacing existing pumps & installing variable frequency drives at the Grove Street #1 and 2, and Milliken wastewater lift stations.	National Grid	110,113
Gloucester (DW)	NERO	Installing VFDs, motors, and SCADA controls at two locations.	National Grid	80,203
Groton (DW)	CERO	Installing solar panels at new water treatment facility.	Groton Electric Department	103,500
Haverhill (DW, WW)	NERO	Installing VFDs, motors, and lighting at two locations.	National Grid	33,465
Hull (WW)	SERO	Upgrading five existing influent pumps with four new dry pit submersible pumps and associated influent force main piping.	Hull Municipal Light	90,000
Ipswich (WW)	NERO	Replacing the existing blowers with four 50 hp blowers (three duty plus one standby) and replacing the fine bubble diffuser system.	Ipswich Municipal Light Department	191,512
Leominster (WW)	CERO	Replacing three transformers at the WWTP. Installing new heat pumps and performing a facility wide update to the weatherization and sealing of the perimeter of the building.	National Grid	88,783
Lowell (WW)	NERO	Replacing 11 transformers at the Wastewater Treatment Plant (WWTP) with high efficiency transformers.	National Grid	47,687

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
Manchester-by-the-Sea (WW)	NERO	Replacing all four (4) of the exiting dissolved oxygen (DO) probes with new probes, and upgrade of the SCADA systems and controls that regulate DO and blower speed in each of the four (4) aeration basins.	National Grid	60,671
Massachusetts Water Resources Authority (DW)	NERO	Installing air source heat pumps at the Canton wastewater pump station and water source heat pumps at the Brookline water pump station along with Smart thermostats.	Eversource	96,053
Maynard (WW)	CERO	Replacing an old oil-fired standard efficiency hot water boiler with a high efficiency (HE) 3-Pass boiler and new air separator and pumping systems as required.	Eversource	89,075
Melrose (WW)	NERO	Installing variable frequency drives on two pumps at both the Fellsway and Upham pump stations.	National Grid	19,833
Millbury (WW)	CERO	This project is a combination of 3 measures: adding an approximate 100 HP pony pump, adding pump coating, and increasing/adjusting tank floats.	National Grid	200,000
Montague (WW)	WERO	Upgrading the existing coarse bubble diffused aeration system to a fine	Eversource	75,375

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
		bubble diffused aeration system.		
Natick (DW)	NERO	Installing variable frequency drives (VFDs) on air stripper fans, replacement of electric heaters with air-source heat pumps, and replacement of fluorescent lights with LEDs.	Eversource	105,210
Orange (WW)	CERO	Aeration upgrades include replacement of two 50 HP positive displacement blowers with two 35 HP energy efficient hybrid mixers/blowers.	National Grid	188,345
Orleans (DW)	SERO	Upgrading/optimizing the HVAC at the Water Treatment plant with a split air-cooled system, two FCUs, two dehumidifiers, and supplemental heating. Addressing ventilation needs in the chemical and electric rooms.	Eversource	104,876
Pittsfield (WW)	WERO	Installing three reciprocating engines and a new gas conditioning skid in the WWTP CHP system. This clean energy project has an estimated 35% reduction in electric utility bill.	Eversource	200,000
Plymouth (WW)	SERO	Installing Sequential Batch Reactor Instrumentation and a variable frequency drive at the wastewater plant.	Eversource	97,795
Rockport (DW, WW)	NERO	Installing VFDs and update program controls at two pump stations; installing VFDs, installing	National Grid	107,483

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
		temperature switches, and installing a heat pump motor at the WWTP; and replacing a low-lift pump and repairing a discharge head at the DWTP.		
Rutland (DW, WW)	CERO	Installing VFDs at the WTP and five pump stations; removing Parco valves at the WTP; and replacing water pump motors at two pump stations.	National Grid	86,859
Scituate (WW)	SERO	Replacing the aeration blower with high-efficiency compressor blower and replacing the hot water boiler with an efficient condensing hot water boiler at the WWTP.	National Grid	160,735
South Essex Sewage District (WW)	NERO	Replacing five constant speed plant water pumps with five new pumps with variable-speed drives at the wastewater treatment plant.	National Grid	200,000
Stoughton (DW)	SERO	Replacing water pump motors at two pump stations and two lift stations and replacing a natural gas fueled heater with a 93% efficient condensing unit heater. This fuel-switching project will result in 6,211 kWh saved.	National Grid	92,755
Upper Blackstone Clean Water (WW)	CERO	Replacing the chiller with high-efficiency unit in the administration building and replacing 2 belt filter press feed pumps with 2 new	National Grid	181,211

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
		units that reduce the motor horsepower by over 50% at treatment plant.		
Weymouth (DW)	SERO	Installing VFDs on the 2 main 50HP high-efficiency finish water pump motors at the drinking water treatment plant.	National Grid	48,200
Whately (DW) *(later declined)*	WERO	Installing a 20.16 kW rooftop solar photovoltaic system and upgrading lighting components at the Water Department's Pump House. This clean energy project provides energy savings and increases climate resiliency.	Eversource	67,567
Yarmouth (WW)	SERO	Installing two energy efficient transformers and installing vapor-tight LED fixtures	Eversource	13,787

Table 2: Grant awards to nonprofit and small businesses

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
Allston Brighton Community Development Corp (Nonprofit/Affordable Housing), Allston	NERO	Installation of a 97kW rooftop solar photovoltaic system at five affordable housing buildings, containing 53 units, in Allston.	Eversource	200,000

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
Cambridge Community Center (Nonprofit/Food Pantry), Cambridge	NERO	Installation of a 103.2 kW Resilient Power Microgrid system, consisting of 43.2 kW rooftop solar photovoltaic and a 60 kW combination battery power and biodiesel generator system.	Eversource	150,868
Cascap Inc (Nonprofit/Affordable Housing), Newton	NERO	Installation of a 35.3 kW solar photovoltaic and battery storage system at Nonantum Village Place - providing 35 affordable housing units for seniors of limited means in Newton.	Eversource	171,833
Catholic Charities Worcester County (Nonprofit/Food Share Pantry), Southbridge	CERO	Replacing the 40+ year-old oil-fired boiler and tank and installing a new high-efficiency natural gas-fired boiler and hot water system.	National Grid	35,804
Dismas House of Massachusetts (Nonprofit/Agricultural Farm), Oakham	CERO	Replacing the existing pellet and combination oil heating system with an energy-efficient air-source heat pump system.	National Grid	43,146
Elliot Farm LLC (Small business/Agricultural Farm), Lakeville	SERO	Installation of a 68.4 kW solar photovoltaic and battery storage system with an Active Demand Response program with Eversource.	Eversource	200,000
Farmer Dave's LLC (Small business/Agricultural Farm), Dracut	NERO	Installation of a 48kW solar photovoltaic and a geothermal heating and cooling system on its new food processing and commercial kitchen and distribution facility.	National Grid	164,808

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
Heading Home Inc (Nonprofit/Affordable Housing), Dorchester	NERO	Installation of an efficient central Variable Refrigerant Flow heating and cooling system in a new (ENERGY STAR rated), affordable housing multifamily building to house 20 families in Boston.	Eversource	200,000
Hebrew SeniorLife (Nonprofit/Affordable Housing), Brookline	NERO	Installation of a 39.5 kW rooftop solar photovoltaic system and building envelope treatment that will achieve Passive House construction standards.	Eversource	200,000
Home City Development Inc (Nonprofit/Affordable Housing), Springfield	WERO	Installing 4.8 kW rooftop solar array and energy efficiency measures that meet Mass Save All Electric Level 2 Program requirements at a 40-unit affordable townhouse condominium development in Springfield.	Eversource	200,000
Housing Assistance Corp (Nonprofit/Affordable Housing), Bourne	SERO	Installing a 40.3kW rooftop solar photovoltaic system at a 44-unit affordable housing complex designed for families.	Eversource	99,686
Housing Nantucket (Nonprofit/Affordable Housing), Nantucket	SERO	Installation of a rooftop solar photovoltaic system on 22-units of multifamily affordable housing across eight buildings.	National Grid	200,000

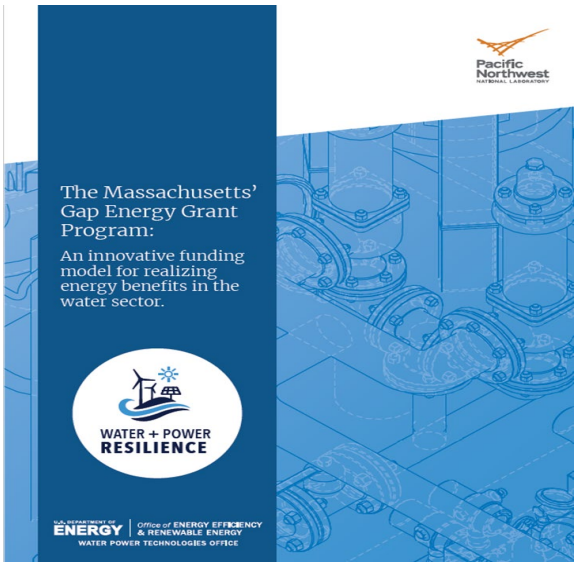
Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
Island Housing Trust (Nonprofit/Affordable Housing), Tisbury	SERO	Installation of a 176 kW rooftop solar photovoltaic system and building envelope improvements across five duplexes - providing affordable housing (rental and ownership) to 60 residents and their families.	Eversource	200,000
Nantucket Boys & Girls Club (Nonprofit/Affordable Housing), Nantucket	SERO	Installation of 34.4 kW of rooftop solar photovoltaic arrays on four buildings to provide affordable staff housing and maintain a highly skilled based workforce.	National Grid	107,726
Natick Community Organic Farm (Nonprofit/Agricultural Farm), Natick	NERO	Installing a 13.2 kW solar photovoltaic system on a new barn.	Eversource	36,511
POAH Inc (Nonprofit/Affordable Housing), Weymouth	SERO	Installing a 43 kW solar photovoltaic system at a 20-unit, income-based, multifamily-housing complex.	National Grid	99,240
Stratford Street United Church (Nonprofit/Food Pantry), West Roxbury	NERO	Installing a 27.8 kW rooftop solar photovoltaic system that will complement new heat pumps. The Food Pantry serves 650-800 families/month in Boston and delivers food to veterans outside the city.	Eversource	82,764
The Farm School (Nonprofit/Agricultural Farm), Athol	WERO	Installation of a 15.8 kW rooftop solar photovoltaic system on two barns on the Farm School.	National Grid	124,110

Entity	Region	Project Description	Electric Utility Provider	Gap Grant Award ($)
Townsend Ecumenical Outreach (Nonprofit/Food Pantry), Townsend	CERO	Installation of a 38.4 kW rooftop solar photovoltaic system that will jump-start the conversion of their oil furnace to highly efficient "mini splits".	Unitil	130,137
Veterans Benefits Clearinghouse Development Corp (Nonprofit/Affordable Housing), Roxbury	NERO	Perform air sealing to the building envelope and insulate pipes in the boiler; install a variable speed drive on the boiler pumps; and install a 48 kW rooftop solar photovoltaic system for hybrid ownership.	Eversource	192,010
We Grow Microgreens LLC (Small Business/Agricultural Farm), Hyde Park	NERO	Installing a thermal efficiency condensing natural gas boiler with modulating technology to support the in-floor heating system and replace the current conventional boiler.	Eversource	49,408
Young Women's Christian Assoc of Newburyport (Nonprofit/Affordable Housing), Methuen	NERO	Installation of a 143.5 kW rooftop solar photovoltaic system that will support the new construction of 48 affordable housing units, with Passive House Institute and Energy Star standards, for the lowest income seniors.	National Grid	200,000

US DOE Water-Technologies Office and Pacific Northwest National Laboratory (PNNL) Evaluation/ Case Study of the Massachusetts' Gap Energy Grant Program

In June of 2023, the US DOE Water-Technologies Office and the Pacific Northwest National Laboratory (PNNL) conducted a cost-benefit analysis of the Massachusetts' Gap Energy Grant Program. This study evaluated the Massachusetts' Gap Energy Grant projects completed at 67 drinking water and wastewater facilities during two rounds of funding (Gap I & Gap II). Overall, the study concluded that the Massachusetts' Gap Energy Grant Program cost-effectively spurred investment in energy efficiency and renewable energy technologies in the water sector

that resulted in over $75 million in total benefits -- a return of nearly 9 times its original public investment (5.7 million in Gap Energy grants and $2.8 million from other public sources) for the Commonwealth.



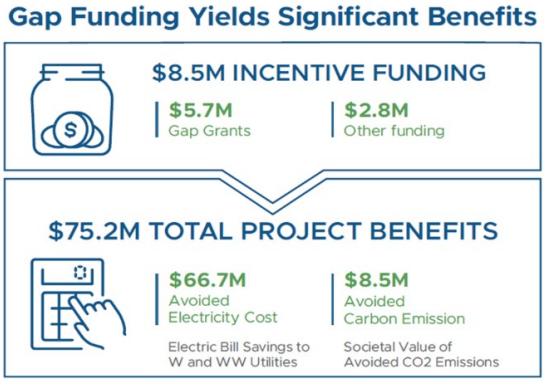


Figure 1. US DOE Water-Technologies Office and Pacific Northwest National Laboratory (PNNL) Evaluation/ Case Study of the Massachusetts' Gap Energy Grant Program, June 2023

Additionally, the study showed that cumulative energy efficiency and clean energy saved and generated over the course of the useful life of the Gap I and Gap II projects will result in 441,000 megawatt-hours and 125,634 metric tons of CO2 emission reductions.

With the demonstrated success of the previous Gap Energy Grant I and II rounds, the Massachusetts' Gap Energy Grant Program entered its third round in 2022 with an expanded goal to reach a new, broader community. The Gap Energy Grant III provided $8.1 million in funding for energy upgrades to two new sectors: nonprofit multifamily affordable housing, nonprofit agricultural food-producing organizations and small businesses engaged in food distribution and processing facilities, in addition to water and wastewater facilities. Below is the timeline of the Gap Energy Grant Offerings and the Grant Awardees by Organizational Type.

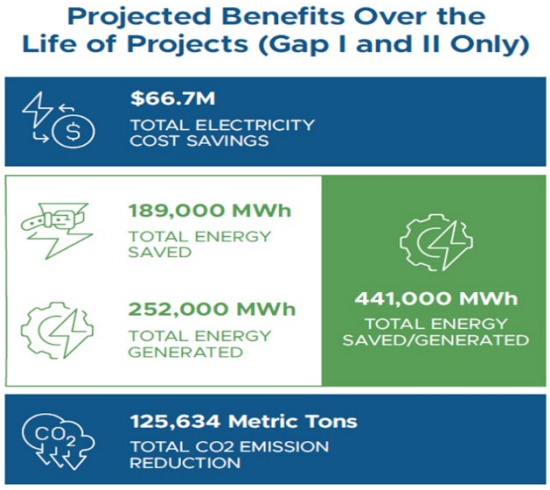
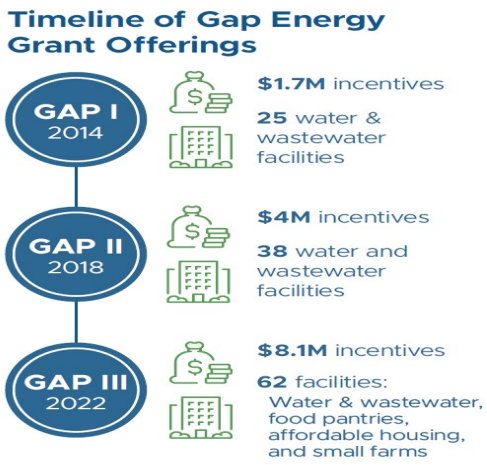


Figure 2. Project Benefits findings from US DOE Water-Technologies Office and Pacific Northwest National Laboratory (PNNL) Evaluation/ Case Study of the Massachusetts' Gap Energy Grant Program, June 2023



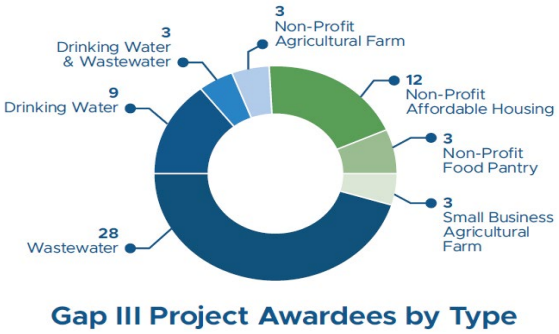


Figure 3. Gap Grant Timeline and Gap III Grant Awardees by Type from US DOE Water-Technologies Office and Pacific Northwest National Laboratory (PNNL) Evaluation/ Case Study of the Massachusetts' Gap Energy Grant Program, June 2023

Webinar on Results of US DOE Water-Technologies Office and Pacific Northwest National Laboratory (PNNL) Evaluation/ Case Study of the Massachusetts' Gap Energy Grant Program

On July 25 2023, MassDEP's CERP, in collaboration with the Pacific Northwest National Laboratory (PNNL) Water & Power Resilience effort held a national Zoom webinar to share the PNNL Gap Funding Analysis and to highlight the Lessons Learned from the Massachusetts' Gap Energy Grant Program. The speakers included: Juliet Homer, PNNL; Sharon Zaret, US DOE State and Community Energy Program; Danah Tench and Michael DiBara, MassDEP - Clean Energy Results Program; Patrick Hill, City of Brockton; Samuel Kenney, Consultant for the City of Fitchburg.

Officials Celebrate the "Switching On" of Nantucket's first municipal solar project at the Surfside Sewer Facility – Funded with a Gap Energy Grant

On August 10, 2023, the town of Nantucket powered up its first 104.4 kilowatt municipal solar project at the Surfside Wastewater Treatment Plant. The solar project was funded primarily by a $200,000 Gap Energy Grant from the Massachusetts Department of Environmental Protection (MassDEP) Clean Energy Results Program, which was awarded to the Town's energy office in 2019. MassDEP celebrated a "switching-on" event with local officials and project proponents. See Press Release. The rooftop solar array, which consists of 232 solar panels, will generate enough clean power to offset 6-8% of the facility's onsite load and save the Town more than $35,000 annually. Additionally, the project will offset 106 metric tons of local greenhouse gas emissions each year.

Figure 4. Surfside Wastewater Treatment Plant 104.4 kW Solar Array (Funded with Gap Energy Grant)

Local and State Officials Celebrate Groundbreaking at YWCA Residences at Ingalls Court in Methuen

On Friday September 15th, MassDEP Commissioner Bonnie Heiple along with other local and state officials participated in the groundbreaking ceremony at the YWCA Residences At Ingalls Court in Methuen. YWCA of Greater Newburyport has created a public private partnership for the development of this affordable housing project that is designed to allow seniors to "age in place." Aging in Place is one of the housing goals of the City of Methuen in its housing production plan. MassDEP's Gap Energy Grant program is providing a $200,000 grant to help fund the installation of a 143.5 kilowatt (kW) rooftop solar array that is slated for completion in early 2025. For this solar project, the cumulative economic and environmental benefits will provide a total estimated 25-year net energy savings of over $900,000 and reduce CO_2 emissions by over 1,050 metric tons over the project life cycle. These cost savings can be re-invested back into the YWCA's programs for the senior population.

Figure 5. YMCA Groundbreaking at Ingalls Court in Methuen (Funded with Gap Energy Grant)

Climate Week 2023: Spotlighting Several Gap Energy Grant Funded Projects

As part of Massachusetts Climate Week 2023 (September 17th –24th 2023), several Gap Energy Grant funded projects were highlighted for energy and environmental leadership.

Heading Home, Inc. - 37 Wales Street in Dorchester

Heading Home is a leading provider of housing and support services for extremely low-income individuals and families currently or formerly experiencing homelessness in Greater Boston.

Energy and Environmental Affairs Secretary Rebecca Tepper and MassDEP Commissioner Bonnie Heiple highlighted Heading Home, Inc. sustainable new construction of a vertical 4.5-story building that is being built to achieve standards equivalent to Leadership in Energy and Environmental Design (or LEED) Multi-family Low-rise rating system. This Affordable Housing project will provide 20 units of permanent supportive housing, comprised of 17 (2-bedroom) and 3 (3-bedroom) apartments. Slated for completion in 2024, the building is designed to be fully electric, free of fossil fuels, and have a low-carbon footprint. It will be built with sustainable materials and provide enhanced indoor air quality to its residents.

Figure 6. Energy and Environmental Affairs Secretary Rebecca Tepper and MassDEP Commissioner Bonnie Heiple at the Heading Home, Inc site in Dorchester (Funded with Gap Energy Grant)

Town of Hull Water Pollution Control Facility, 1111 Nantasket Avenue

Commissioner Heiple recognized another Gap Grant-funded project in Hull for their strong climate leadership and for making strategic resiliency investments. The Hull Water Pollution Control facility benefited from MassDEP's Gap II energy grant to improve the efficiency of the plant's aeration and odor control systems. These previous energy efficiency upgrades have already saved Hull approximately $105,000 in electricity savings (700,000 kilowatt hours). In early 2023, MassDEP awarded the Town of Hull another $90,000 in Gap III Energy Grant funding that was paired with a FEMA grant to make $1.2 million in upgrades to the plant's influent process and influent mains within its control building. These critical grants will increase the plant's efficiency and ability to handle future increases in wastewater flows, making the plant more resilient as climate change exacerbates coastal and inland flooding.

Figure 7. MassDEP Commissioner Bonnie Heiple with Southeast Regional Office and CERP staff at the Town of Hull Water Pollution Control Facility
(Funded with Gap Energy Grant)

MassDEP Convenes Statewide Wastewater Energy Recovery Summit

On December 8th, 2023, - MassDEP's Clean Energy Results Program and its partners, Massachusetts Department of Energy Resources (DOER) and the Clean Energy Center (CEC) held a Wastewater Energy Recovery | Mass.gov Summit at the Massachusetts Division of Fisheries and Wildlife Field Headquarters, 1 Rabbit Hill Road, Westborough. This hybrid event with in-person and virtual attendance drew in 125 attendees. The Summit highlighted how wastewater can be used as a source of untapped energy, and how the three different technologies presented and various U.S and Canadian projects are being implemented in a practical and accessible way. This was the educational and outreach phase of our efforts to advance wastewater energy recovery. The goal is to help implement and evaluate several wastewater energy recovery pilot projects in Massachusetts in 2025. This innovative energy recovery method will help boost the Commonwealth's clean energy economy and advance Massachusetts emission reduction goals.

Figure 8. Images from the Statewide Wastewater Energy Recovery Summit held at the MA Fish and Wildlife Office, Westborough, December 8, 2023

Regional Office and Boston Program Summaries

Western Region 2022 and 2023 Summary

- **1/7/2022- Vanguard Renewables Anaerobic Digestion (AD) Facility, Deerfield (WERO):** MassDEP issued a Demand for Payment of Stipulated Penalties in the amount of $7,500 to Deerfield AD1 LLC for failing to comply with conditions of Administrative Consent Order that was issued on 9/28/2020. Specifically, Deerfield AD1 failed to comply with its daily average hydrogen sulfide emission limit as required by the Administrative Consent Order.

- **1/21/2022 - Town of Ludlow Landfill and Clean Capital LLC., Ludlow (WERO):** MassDEP issued a permit approving the design for certain stormwater control system repairs at the Ludlow Landfill located on Holyoke Street. The permit was issued to the Town as well as Clean Capital LLC. Clean Capital LLC operates the solar array on the landfill and is responsible for certain maintenance activities for the site.

- **3/25/2022 - Campus-Wide Decarbonization Project, Smith College, Northampton (WERO):** Led by MassDEP Clean Energy Results Program (CERP), with regional wastewater and drinking water program staff the team met with the Cambridge-based nonprofit, Home

Energy Efficiency Team also known as HEET, and Smith College's Sustainability representatives. The purpose of the meeting was to discuss their three-phase geothermal project that will transition their existing 3.5 MW fossil fuel fired Combined Heat and Power (CHP) turbine system to a borehole geothermal district system -- anticipating a 90% CO2 emission reduction across 3 million square feet of buildings upon project completion. The project is designed, and Phase I of the project will begin soon. Smith College representatives are interested in potentially using a nearby Northampton wastewater sewer line as a renewable heating and cooling sink that would significantly reduce the required number of boreholes in Phase III of the project. MassDEP provided examples of sewer heat recovery approaches and offered future assistance in exploring this potential option further with Northampton officials.

- **5/11/2022 - Solar Project at Deerfield Landfill, Deerfield (WERO):** MassDEP conducted an on-site pre-permit meeting for a proposed solar and battery storage facility at the closed Deerfield Landfill. Representatives of the Town and developer presented their plans.

- **7/5/2022 - Rockwood Farm, Rockwood Ag-Grid LLC, Rockwood Ag-Grid Organics LLC, Granville (WERO):** MassDEP has executed an Administrative Consent Order with Rockwood Farm, Rockwood Ag-Grid, and Rockwood Ag-Grid Organics relative to multiple Air Quality and Solid Waste violations at the anaerobic digester and de-packager located at Rockwood Farm in Granville. As part of the settlement the parties will pay a civil administrative penalty of $20,000 and complete their return to compliance in accordance with an approved schedule.

- **7/15/2022- Vanguard Hadley Anaerobic Digester (AD), Hadley (WERO):** MassDEP issued a renewal to the Recycling, Composting, or Conversion (RCC) Permit for the anaerobic digester located at the Barstow Farm in Hadley. The permit is valid for a five-year term.

- **8/25/2022 - Bondis Solar Expansion, Agawam (WERO):** MassDEP held a pre-permitting meeting with Cogentrix relative to the development of a 2MW solar project with 1MW of battery storage on existing closed landfill areas at the site. This proposal will add to the existing solar array. The project as defined is a standard landfill solar project and will require a post-closure use permit. Separately, Cogentrix indicated that their long-term vision for the overall site (not landfill related) is the decommissioning of all combustion activities and the installation of additional battery capacity. Their intent is to protect their interconnect capacity at the site in the long term. They currently have a petition in front of ISO New England for an additional 45MW of battery storage capacity and may eventually seek to expand to 200 MW of battery capacity.

- **3/9/2023 – Pittsfield Wastewater Facility, Pittsfield (WER0):** The wastewater program supported the Pittsfield wastewater facility in its energy efficiency upgrades which included lighting upgrades, heat pumps, variable frequency drives on heating, ventilation, and air conditioning equipment, aeration ammonia controls, new aeration blowers, and a compressed air mixing system. The plant saw an annual reduction of 560,000 kilowatt-hours of energy consumption over the last several years.

- **5/30/2023 - SunPin Solar, Wales (WERO):** The Division of Wetlands and Waterways (DWW) issued an approval - Superseding Order of Conditions under the Massachusetts Wetlands Protection Act to SunPin Solar Energy Services for a proposed a 2.8 megawatt ground mount solar array in Wales.

- **11/1/2023 - Russell Solar, LLC, Russell (WERO):** The Division of Wetlands and Waterways received a request for a Superseding Order of Conditions under the Massachusetts Wetlands Protect Act. The project proposes a 2.75 megawatt ground mounted Solar Array in Russell.

- **4/2023- 10/2023 - Mainspring Energy, Inc., WESTFIELD, (WERO):** WERO staff met during this time with Mainspring Energy, Inc. (Mainspring Energy) in a pre-permitting meeting and guided them through the Air Approval process. Staff also provided technical oversight during the performance testing for both emissions and noise. Data from this installation will aid future installation of similar units of this technology (linear generators). Mainspring Energy is in the process of installing two (2) new 240 kilowatt electrical (kWe) Linear Generator Packages at the property of Lineage Logistics, a cold storage facility, located in Westfield, MA. Linear-generator technology is a new category of power generation technology that consists of two identical 120 kWe linear generator cores packaged inside a single enclosure. Unlike gas turbines and internal combustion engines, which both utilize a flame and burning from combustion (resulting in high temperatures and NOx emissions), linear generator technology uses a low-temperature reaction that results in high thermodynamic efficiency and near-zero NOx emissions.

- **8/2023 - Sublime Systems, Holyoke, (WERO):** Air Quality staff and management met with Sublime and toured their pilot program for low carbon embedded cement in Somerville and discussed future approval requirements. Sublime Systems is proposing to construct a demonstration size facility on Water Street in Holyoke that will utilize a chemical process to produce low embedded carbon cement. This process will reduce greenhouse gas emissions from the production of concrete compared to the existing process. The Department has not yet received a permit application.

Northeast Region 2022-2023 CERP Summary

- **1/3/22, Newbury Landfill, Town of Newbury:** MassDEP's Northeast Regional Office issued a conditional approval to the Town of Newbury and ACE Solar, Inc. which permits the installation and operation of a 0.582 megawatt (MW) solar photovoltaic power generating facility (PV Facility) at the closed Newbury Landfill. The Town owns the landfill; ACE Solar will install and operate the solar facility. Subject to conditions set forth in the approval, the proposed solar facility will be constructed on a 2.37-acre portion of the landfill and will be connected to the electric utility grid.

- **6/10/22, Rocco Landfill, Sutton Brook Disposal Area, Syncarpha Tewksbury, LLC, Tewksbury:** Syncarpha and the Town of Tewksbury completed construction of the previously approved 3.0 MW solar photovoltaic power generating facility and 2.0 MW battery storage system at the Sutton Brook Disposal Area, which includes the closed Rocco Landfill located in Tewksbury. The project has been connected to the utility grid and began operating in June 2022. In August 2022, U.S. EPA recognized the project and MassDEP's permitting efforts with a National Notable Achievement Award ("Outstanding Re-Powering Team Effort").

Figure 9. Tewksbury solar project at Rocco Landfill/Sutton Brook Disposal Area (photo shows the array constructed on the northern lobe area).

- **7/11/22, Danvers Landfill, Town of Danvers:** MassDEP's Northeast Regional Office issued to the Town of Danvers a conditional approval of the Town's proposed soil filling project at the closed Danvers Landfill. The project includes the receipt and placement of approximately 210,000 cubic yards of grading and shaping materials to grade the site in anticipation of the installation of a solar photovoltaic power generating facility (PV Facility) in the project area. The approved design establishes the final grading, stormwater controls,

and a Soil Management Plan. The project began receiving materials in late 2022 and soil placement is expected to be complete in approximately 2 years. Permitting of the PV Facility will be the subject of a separate application and MassDEP review.

Figure 10. This is a photo of the Danvers Landfill project (photo shows progress on soil filling in Phase 1 area to support future solar development).

- **11/09/22, Food Waste Diversion, Black Earth Compost, LLC, North Shore Regional Compost Facility, Manchester-By-the-Sea (NERO)**: Northeast Regional Office Solid Waste Section issued a conditional approval to Black Earth Compost, LLC for modifications to the previously approved regional compost facility proposed at 201 Pine Street in Manchester-by-the-Sea. The site is owned by the Town of Manchester-By-the-Sea and is currently occupied by the Town's capped and closed Manchester Landfill and the Manchester Transfer Station. In 2021, MassDEP issued a Post-Closure Use Permit for the proposed facility. Black Earth was selected by the Town to construct and operate the facility. The 2022 decision approves certain modifications to the facility, including revisions to the building size, aeration system, and biofilter. The installation of a conveyor system to the compost storage area was also approved. Black Earth expects to process up to 90 tons per week of source-separated food waste bulked with yard waste. The facility can also transfer food waste to another permitted compost facility or anaerobic digester. This new facility

supports the 2030 Solid Waste Master Plan, which sets a goal to increase annual food waste diversion to 780,000 tons by 2030.

- **5/19/23- Wheelabrator Saugus, Inc., electric vehicle charging stations, Saugus (NERO):** Wheelabrator Saugus, Inc. installed electric vehicle charging stations at the Wheelabrator Saugus Waste-to-Energy (WTE) Facility, pursuant to a MassDEP approval issued in May 2023. Two charging stations will support a pilot project demonstrating the use of electric refuse collection vehicles operated by WIN Waste Innovations in the greater Boston area. The collection vehicles will be emptied prior to being parked and charged overnight. The MassDEP decision does not alter the operation of the WTE Facility and does not modify the WTE Facility's existing waste handling capacity.

Figure 11. Electric vehicle charging stations at the Wheelabrator Saugus Waste-to-Energy (WTE) Facility

- **5/19/23 - Town of Andover, Ledge Road Landfill, Andover (NERO):** In May 2023, MassDEP issued a Final Decision to the Town of Andover approving the revised Corrective Action Design for the landfill project. During Fall 2023, construction began on the capping and closure of the Ledge Road Landfill in Andover. The project was originally approved in 2019 and the Town subsequently elected to modify the design by removing a proposed post-closure use (DPW material storage yard). There is currently no proposed post-closure use for the site; however, removal of the DPW yard expands the on-site area available for the possible future development of a solar photovoltaic power generating facility. Completion of the capping project is anticipated in Fall 2025. A solar project would be the subject of a separate review and approval.

- **12/15/23 - Kearsarge Energy/Town of Concord, Concord Landfill (NERO):** MassDEP-NERO met with representatives of Kearsarge Energy in December 2023 to discuss a proposed renovation and expansion of the existing solar photovoltaic power generating facility at the Town's capped and closed Concord Landfill. Kearsarge is proposing to replace the existing solar array on the landfill plateau and install more panels in additional areas of the site. The existing development is approximately 1.7 MW DC and became operational in 2014. The renovation and expansion project would increase the site to more than 4 MW. Pending receipt of necessary permits, Kearsarge is expecting to begin construction in 2024.

Southeast Region 2022-2023 CERP Summary

- **1/5/22 - Falmouth Landfill Solar, Falmouth (SERO):** On January 5, 2022, BAW's Solid Waste Management Section issued a Notice of Noncompliance (NON) to Falmouth Landfill Solar, LLC as the Permittee of the post-closure use of the Falmouth Landfill for a solar project, located at 458 Thomas B. Landers Road, Falmouth, for failing to limit all vehicles with a ground pressure greater than 7 pound per square inch (psi) from entering the landfill final cover system, which is a violation of permit condition #12 of the MassDEP's Post Closure Use Permit approved on January 29, 2016. On August 18, 2021, Falmouth Landfill Solar, LLC consultant submitted a report which evaluated the landfill's final cover system and determined that no corrective actions were required.

- **1/27/22 – 6.85 MW Solar Array on Landfill, Sharon (SERO):** On January 27, 2022, BAW's Solid Waste Management Section issued a Post Closure Use (PCU) approval to Mountain Street Solar Project 2019, LLC (Mountain Street Solar) for a 6.85-megawatt (MW) photovoltaic (PV) array installation with two (2) containerized 5-megawatt hour (MWh) battery energy storage system (BESS) at the Sharon Landfill located at 156 Mountain Street in Sharon. The Town of Sharon has entered a long-term ground lease with Mountain Street Solar who will develop, build, own, and operate the PV array and BESS on the Landfill. MassDEP's review of the proposed design is to ensure that the final cover system and the existing elevation and grade of the Landfill will not be altered, which includes, and not limited to, a review of the stormwater analysis, geotechnical evaluation and structural design analysis such as bearing capacity, sliding calculations and overturning analysis to ensure that the solar panels will withstand the downward and uplift wind load. The proposed area for the equipment pads for the ancillary equipment of inverters and transformers, including the BESS, will be located beyond the landfill closure footprint.

- **2/3/22 - 2.77 MW Solar Array on Landfill, Norwood (SERO):** BAW's Solid Waste Management Section issued a Post Closure Use (PCU) approval to Tangent Energy Solutions and the Town of Norwood for a 2.77-megawatt (MW) photovoltaic (PV) array installation at Norwood Landfill located at 370 Winter Street in Norwood. The Town of Norwood's Municipal Light Department has entered a Power Purchase Agreement with

Tangent Energy who will develop, build, own, and operate the PV array on the Landfill. MassDEP's review of the proposed design is to ensure that the final cover system and the existing elevation and grade of the Landfill will not be altered, which includes, and not limited to, a review of the stormwater analysis, geotechnical evaluation and structural design analysis such as bearing capacity, sliding calculations and overturning analysis to ensure that the solar panels will withstand the downward and uplift wind load. Under the permit conditions, the Applicants (Tangent Energy and the Town of Norwood), will be required to submit final designs for the proposed equipment pads prior to commencement of construction.

- **3/1/22 - Removal of Wind Turbine from Town Landfill, Kingston (SERO):** BAW Solid Waste Program approved a Post-Closure Use permit application, submitted by the Town of Kingston and Kearsage Energy LP, for the dismantling and removal of the existing wind turbine located on the Kingston Landfill. The wind turbine was installed on the Landfill in 2011 and has been inactive since 2016 and was the subject of complaints by residents, bankruptcy and private litigation. The removal of the 1.8 MW wind turbine is the first step to facilitate the permitting and installation of a 2.7 MW solar array by the Town of Kingston and Kearsage Energy LP. The Town of Kingston entered into an agreement to remove the wind turbine with the solar developer to make way for a larger solar array on the Kingston Landfill. MassDEP had approved a permit application for a 1.9 MW solar array on the Kingston landfill in 2020 which has not been constructed. On February 9, 2022, the Town of Kingston and Kearsage submitted a separate permit application for a proposed 2.7 MW solar array which is under review by MassDEP.

- **7/20/22 - 2.7 MW Solar Array on Landfill, Kingston (SERO):** BAW's Solid Waste Management Section issued a Post Closure Use (PCU) approval to Town of Kingston and Kearsage Energy, L.P./Kearsage Kingston, LLC for a 2.7± megawatt (MW) photovoltaic (PV) solar array installation with one (1) battery energy storage system (BESS) at the Kingston Sanitary Landfill located on Cranberry Road in Kingston. The solar array will be constructed on an approximate 9.25-acre portion of the capped landfill, which includes the area previously occupied by a wind turbine. Through a separate solid waste permit application, MassDEP issued an approval on March 1, 2022, for the dismantling and removal of the wind turbine, which has been inactive since 2016. Landfill cap repair associated with the demolition work for the wind turbine will be completed prior to the start of the construction of the solar array. MassDEP's review of the proposed design is to ensure that the final cover system and the existing elevation and grade of the Landfill will not be altered, which includes a review of the stormwater analysis, geotechnical evaluation and structural design analysis such as bearing capacity, sliding calculations and overturning analysis to ensure that the solar panels will withstand the downward and uplift wind load. The proposed area for the equipment pads for the ancillary equipment of inverters and transformers, including the BESS, will be located beyond the landfill closure footprint. *This*

permit supersedes a Post Closure Use Approval issued to Advanced Solar Products, Inc. on October 8, 2020, for a 1.9316 MW PV solar array.

- **10/17/22 - 2.39 MW Solar Array on Landfill, Attleboro (SERO):** BAW's Solid Waste Management Section issued a Post Closure Use approval to No Fossil Fuel, LLC for a 2.39-megawatt photovoltaic solar array at the Attleboro Landfill Inc. Landfill located on Peckham Street in Attleboro.

- **12/7/22 - Potential Future Solar Array on Landfill, Browning Ferris Industries (BFI) Fall River Landfill (SERO):** BAW's Solid Waste Management Section issued a Post Closure Use (PCU) approval to Browning-Ferris Industries, Inc. of MA and the City of Fall River for the reuse of imported soils to grade and shape the Landfill to facilitate the potential future development of a solar photovoltaic (PV) array.

Figure 12. 2023 Aerial of the solar array at the Kingston Landfill

- **4/11/23 - 2.7 MW Solar Array on Landfill, Kingston (SERO):** Construction of the PV array began on November 30, 2022, and proceeded through the winter and early spring of 2023. The array was brought online on April 11, 2023, when Eversource issued an Authority to Interconnect (ATI). The interconnection utilized existing customer owned utility poles and Eversource utility owned poles, with three new utility poles installed outside of the capped landfill limits. Site restoration for the landfill was completed on June 21, 2023.

Figure 13. Cable tray installation at the Kingston Landfill. aboveground conduits are a typical design as MassDEP. It does not allow penetrations of a landfill final cover system.

- **8/1/23 - Mainspring Energy, Inc., Sharon (SERO):** MassDEP approved the installation of a dual core Linear Generator to produce electric power at the Lineage Logistics cold storage facility located at 1 Commercial Street in Sharon. "The unique design and advanced controls used in Mainspring linear generators enable both the direct conversion of linear motion into electricity and use of a low-temperature reaction that produces near-zero NOx emissions. Much like a fuel cell, Mainspring's linear generator only operates while producing electricity. This contrasts with an engine, which can only operate by producing mechanical energy."

- **9/25/23 - Gas Recovery Systems, LLC, Fall River (SERO):** On September 25, 2023, MassDEP received a Non-Major Comprehensive Plan Application (NMCPA) for the replacement of currently inactive landfill gas (LFG) combustion engines and turbine for the generation of electricity. The gas from the closed Fall River Landfill is currently being combusted in an enclosed flare by the owner of the landfill with no energy recovery.

- **9/11/23 - 4.47 MW Solar Array on Landfill, Taunton (SERO):** BAW's Solid Waste Section received an application for a Post-Closure Use permit application to construct a 4.47 MW DC (2.99 MW AC) solar PV array on the Taunton Sanitary Landfill located at 330 E. Britannia Street. The City of Taunton selected NextGrid to design, permit, construct, own, operate, and maintain a ground-mounted solar photovoltaic (PV) array on the closed landfill. The

Landfill stopped accepting solid waste in 2022 and the landfill's final cover system was constructed in November 2022.

Central Region 2022-23 CERP Summary

- **4/29/22 - Watson Marlow, Devens (CERO):** Air permitting program staff participated in a pre-application meeting with Watson Marlow and their consultants. The UK based company produces silicone based peristaltic pumps and nylon/polypropylene clamps. The facility will be a non-major source of air pollutants, primarily emitting isopropyl from cleaning operations and will apply for a Limited Plan Application Approval (LPA). The facility will be equipped with solar power and be LEEDS certified, with the intent to achieve net zero (a balance between the amount of greenhouse gases produced and the amount removed from the atmosphere), by 2030.

- **8/16/22 - Solar Farm (RTN 2-0000060), Holliston (CERO)**: BWSC staff attended a site meeting with the Licensed Site Professional (LSP), property developer and contractor. The approximately 52-acre property is the location of historic disposal of bulk liquids and solid waste. Following significant remediation efforts which included excavating impacted soils, capping certain areas with up to 60,000 yards of fill, unearthing and disposing scores of trailers full of debris and tires, and connecting properties in the area to a public water system, the disposal site has been redeveloped into a solar farm. Ground-mounted solar panels (17,568 panels) have been constructed on approximately 32 acres of the 52.32-acre property. The panels are expected to generate 5 megawatts (A/C) and 10 MW (D/C) of solar photovoltaic energy at this brownfield site, with anticipated battery storage of 1,040 batteries. After town permits and utility connections are completed, the solar farm was expected to be on-line by the end of October 2022. According to the LSP, a combination of Permanent Solutions and Temporary Solutions have been achieved at this disposal site, which is one of MassDEP's original sites (RTN 2-0000060).

- **3/16/22 Marshall Street Landfill Solar Array Project Post-Closure Use Permit, Holliston (CERO)**: CERO received and reviewed a Major Post-Closure Use permit application for an approximately 2.5-megawatt (direct current) ground mounted solar photovoltaic ("PV") array on the capped Marshall Street Landfill, which is owned by the Town of Holliston, on Tuesday, March 16th. The proposed solar array project, including solar panels and the rack/rail systems, will encompass approximately 9.4 acres of the 15-acre capped Landfill. The solar panel array will encompass most of the remaining top and a portion of the Landfill sideslopes and will consist of approximately 314, 400-watt PV modules (or "panels") interconnected with aboveground electrical wiring in cable trays which will not impact the Landfill cap. The panels will be supported on precast concrete ballast foundation blocks, which will be placed on a layer of crushed stone that is installed on the existing surface of the capped Landfill and will not penetrate the Landfill cover system.

- **Indian Road Landfill Solar Array Project Post-Closure Use Permit, Dudley (CERO)**: BAW Solid Waste reviewed and worked with Proponent regarding a Major Post-Closure Use permit approval to the Town of Dudley and Dudley Landfill Solar, Inc. for the installation and operation of an approximately 1.25-megawatt (alternating current) ground mounted solar photovoltaic ("PV") array on the capped Indian Road Landfill.

- **Riverlin Street Landfill Solar Array Project Post-Closure Use Permit Pre-Application Meeting, Millbury (CERO):** BAW Solid Waste reviewed and worked with Proponent regarding a Major Post-Closure Use permit approval to the Town of Millbury and Millbury Landfill Solar, LLC for the installation and operation of a 1-megawatt (alternating current) ground mounted solar photovoltaic ("PV") array on the capped Riverlin Street Landfill.

- **5/25/23 - Rollstone Renewable Energy Sludge Anaerobic Digester Project, Fitchburg (CERO):** CERO's Regional Director and the BWR Assistant Commissioner along with regional and Boston staff from BWR, BAW, and the Office of General Counsel met with the City of Fitchburg and Rollstone Renewable Energy to continue discussing permitting of a proposed anaerobic digestor for wastewater sludge to be constructed and operated by Rollstone at a former wastewater treatment planned owned by the city.

Boston 2022 - 2023 CERP Summary

2022

- **March 2022, CERP supports UMass Amherst's Massachusetts Technical Assistance Partnership for Pollution Prevention in Food and Beverage Processing –** For several years, MassDEP's CERP has partnered with other state agencies and organizations and the University of Massachusetts' Center for Energy Efficiency and Renewable Energy to support the food manufacturing and Beverage sector. MassDEP provided a letter of support to the University of the Massachusetts for continuing this effort through an EPA New England grant application.

- **April 2022, Clean Energy Development at Massachusetts Drinking Water and Wastewater Facilities Map Updated.** MassDEP's Winter / Spring Session intern, Ruyter Bellevue, worked with Michael DiBara and Phillip Murphy to update the 2017 statewide GIS map with new clean energy project information.

- **May 26 2022, MassDEP's Clean Energy Results Program (CERP) issued its Request for Responses (RFR) for the Gap III Energy Grant 2022-2023 Opportunity in COMMBUYS, under Bid Solicitation** BD-22-1045-BWR00-BWR01-75906. This grant solicitation made **s**even million five hundred thousand dollars ($7,500,000) in grant funds available from the agency's Climate Protection and Mitigation Expendable Trust. The Gap Energy Grant program is designed to expedite the cost-effective installation of energy efficiency and renewable energy projects across the Commonwealth. Additional funds were later allocated to provide a total amount of $8.1 million in funding.

- **July 29, 2022**, MassDEP received **67 Gap III Energy grant applications requesting $8,856,350 in grant funds.** This represented 43 drinking water and wastewater facility applications, and 24 nonprofit and small business application submissions received. Projects covered all regions of the state that represented a good mix of energy efficiency and clean energy generation at water utilities, housing organizations, farms and food pantries.

- **August 17, 2022, Presentation to the National Brownfields Conference in Oklahoma** – Danah Tench, CERP Director, presented on "*Massachusetts Solar Development Success on Contaminated Lands."* MassDEP informed the audience of about 40 participants about the creation of the Clean Energy Results program and its collaborative relationship with the state Department of Energy Resources and Clean Energy Center. The presentation focused on how this relationship led to the successful siting of solar arrays on landfills and contaminated lands. This effort enabled Massachusetts to lead the country in solar on landfills and contaminated lands.

- **October 26, 2022, Presentation to New England Water Works Association's 2022 Water Resources and Sustainability Symposium** – Danah Tench, CERP Director, presented *Massachusetts' Gap Energy Grant Program: A Cost-Effective Pathway to More Sustainable Water Operations.* This annual event draws in drinking water operators, managers and environmental consultants from Massachusetts and other New England states.

- **December 2022, UMass Amherst's Massachusetts Technical Assistance Partnership for Pollution Prevention in Food and Beverage Processing. A c**oordination meeting with the University of Massachusetts was held to discuss EPA's grant and to provide UMass's program with a letter of support for their proposal.

2023

- **January 3, 2023, MassDEP Announces Gap III Energy Grant Awards** – MassDEP awarded $8.1 Million in Gap Energy Grants to 62 Organizations and Municipal Facilities. The 62 recipients receiving the grants represent three sectors in the state: municipal water facilities; non-profit multi-family affordable housing organizations; and agricultural and

food-producing non-profits and small businesses. (see: press release). Overall, the 62 grant awards are supporting more than 100 energy-saving projects statewide that are anticipated to generate more than 9,000 megawatt hours (MWh) in annual electricity savings or onsite generation of clean energy and save grantees over 1.6 million annually.

- **January 2023, Martha's Vineyard "Magic Electric Bus" Water Resiliency Project –** MassDEP coordinated a scoping meeting with Martha Vineyard representatives from the water and wastewater utilities, Martha's Vineyard Commission, Vineyard Transportation Authority (VTA), and the Pacific Northwest National Laboratory (PNNL) to discuss the option of using VTA electric buses to provide some level of emergency power for the town's drinking water well pumps. The VTA buses would later be recharged from the large solar canopies at the bus yard. This operational practice could potentially prolong their fuel supply for the pumps by relieving the need to operate emergency diesel generators. On March 6, 2023, MassDEP's CERP submitted a Letter of Support for Martha Vineyard's Island Water Resiliency Proposal for the U.S. Department of Energy's (DOE) Energy Transitions Initiative Partnership Project (ETIPP). In July 2023, the Martha's Vineyard Commission was awarded a grant for Oak Bluffs, Edgartown, and Tisbury to evaluate clean and resilient backup power source options for water pumping and supply during emergencies and outages.

- **January 2023, Gap Energy Grant Coordination Meeting With National Grid –** CERP staff met with National Grid's energy efficiency program representatives and managers to connect and leverage Mass Save's technical and financial assistance with MassDEP's Gap Energy Grant projects.

- **February 2023, Mass Save® Business Partner Event** – CERP staff attended the virtual event. Sessions included: Deep Energy Retrofit, Demand Response, Electrification & Weatherization, Industrial Process, Lighting & Controls, Commercial New Construction, Small Business.

- **March 2023, MassDEP provides letter of support to Manchester-by-the-Sea (MBTS) for U.S. DOE grant proposal –** Manchester-by-the-Sea (MBTS) and its project partners (SoMax Bioenergy, National Renewable Energy Laboratory, Water Alliance, and Water Research Foundation; collectively, MBTS Partners) applied for a $2 million grant application to the U.S. Department of Energy Efficiency and Renewable Energy Funding Opportunity– Decarbonization of WRRF Unit Processes. This grant proposal would provide funding for a pilot project to examine hydrothermal carbonization (HTC). The proposed pilot would treat a side stream of biosolids from the MBTS wastewater plant and evaluate its treatment effectiveness.

- **April 2023, MassDEP Commissioner touts Gap Energy Grant with Cambridge Community Center –** MassDEP Commissioner Bonnie Heiple and staff celebrated MassDEP's $150,868 Gap III Energy Grant with representatives from the Cambridge Community Center. The Cambridge Community Center offers programs and services designed to meet the evolving needs of the most under-resourced, under-represented residents of Cambridge and surrounding areas. MassDEP's grant will provide funding for the installation of a 103.2 kilowatt (kW) Resilient Power Microgrid system, consisting of a 43.2 kilowatt (kW) rooftop solar photovoltaic and a 60 kilowatt (kW) combination battery power and biodiesel generator system. This clean energy project is estimated to produce over $55,000 in annual cost savings to the Center and approximately $1 million in savings over the project's lifespan.

- **June 2023,** the US DOE Water-Technologies Office and the Pacific Northwest National Laboratory (PNNL) conducted a cost-benefit analysis of the Massachusetts' Gap Energy Grant Program.

- **June 2023, HEET LeGup Team Meeting in Cambridge –** MassDEP staff Joseph Cerutti, Michael DiBara and Alex Gamble participated in HEET's Learning from the Ground up (LeGup) Quarterly Research Team Meeting at MIT's Innovation Center in Cambridge. HEET received a $5 million grant from the Massachusetts Clean Energy Center to help advance Networked Geothermal projects across Massachusetts. The major deliverables include, research and develop an open-source digital twin, or model, of the GeoGrid technology being deployed at the Massachusetts DPU-approved Eversource Framingham Pilot and National Grid's Lowell Pilot Networked Geothermal Project sites; develop a statewide grant program to fund feasibility studies for Massachusetts communities that are interested in implementing geothermal networks.

- **June 2023, National Grid Municipal Energy Summit -** MassDEP CERP Project Manager participated in this event to expand CERP outreach to municipal officials, Mass Save® representatives, consultants, and energy vendors.

- **June 2023, Olmstead Village: Network Geothermal Discussion –** MassDEP CERP Director and Project Manager met with a project advocate and HEET to discuss the Olmsted Village Redevelopment Project in Mattapan. The former Boston State Hospital is being redeveloped to provide 265 new affordable housing apartments and homes. Network geothermal and energy recovery from wastewater were discussed as possible technology and decarbonization options to consider in the redevelopment and design planning process.

- **July 2023**, MassDEP's CERP, in collaboration with the Pacific Northwest National Laboratory (PNNL) Water & Power Resilience effort held a national Zoom webinar to share the PNNL

Gap Funding Analysis and to highlight the lessons learned from the Massachusetts' Gap Energy Grant Program.

- **July 2023**, **State Multi-Agency Battery Energy Storage Coordination** – MassCEP convened a multi-agency discussion (MassDEP CERP, MA DOER MassCEC, DPU) to coordinate educational outreach, training resources, and programmatic efforts to advance battery energy storage across Massachusetts.

- **July 2023, Geothermal Discussion** - MassDEP CERP Director and Project Manager met with Dandelion Energy to discuss residential geothermal installations in Massachusetts.

- **August 2023, Charlton Wastewater Treatment Plant –** CERP project manager met with town officials, National Grid, and B2Q energy consultant to discuss the Gap III Energy Grant project. This project will utilize the plant's wastewater effluent flow as a source (and sink) for a Water Source Heat Pump (WSHP) system to provide heating and ancillary dehumidification to the process area. The WSHP system, approximately 15 tons, is comprised of a closed hydronic loop that is segregated from the clean effluent via a heat exchanger. This highly efficient fuel switching project is anticipated to reduce propane usage by 1,734 therms and electric consumption by 31,807 kWh, while also producing $7,614 in annual cost savings for the facility.

- **August 2023, the Town of Nantucket powered up its first 104.4 kilowatt municipal solar project at the Surfside Wastewater Treatment Plant.** The solar project was funded primarily by a $200,000 Gap Energy Grant from the Massachusetts Department of Environmental Protection (MassDEP) Clean Energy Results Program, which was awarded to the Town's energy office in 2019. MassDEP celebrated a "switching-on" event with local officials and project proponents. See Press Release.

- **August 2023, Meeting to discuss MIT Campus Decarbonization Proposal using Cambridge's water treatment pipe network.** MassDEP's Drinking Water and CERP staff met with MIT and project advocates to discuss a proposal to possibly use Cambridge drinking water to provide heating and cooling via heat exchange for the campus. MassDEP programs provided feedback on the regulatory implications of possibly using the City of Cambridge's drinking water system and discussed the option of looking at using wastewater energy recovery from the on-campus sewer network rather than Cambridge's water system.

- **September 2023, Local and State Officials Celebrate Groundbreaking at YWCA Residences at Ingalls Court in Methuen.** On Friday September 15th, MassDEP Commissioner Bonnie Heiple along with other local and state officials participated in the groundbreaking ceremony at the YWCA Residences At Ingalls Court in Methuen. MassDEP's Gap Energy

Grant program is providing a $200,000 grant to help fund the installation of a 143.5 kilowatt (kW) rooftop solar array that is slated for completion in early 2025. For this solar project, the cumulative economic and environmental benefits will provide a total estimated 25-year net energy savings of over $900,000 and reducing CO2 emissions by over 1,050 metric tons over the project life cycle. These cost savings can be re-invested back into the YWCA's programs for the senior population.

- **October 2023, Dismas House of Massachusetts Gap III Energy Grant Project Completion Site Visit –** CERP project manager conducted a final project site inspection at Dismas House, a non-profit prisoner re-entry organization and agricultural farm at 687 Lincoln Road in Oakham. This fuel switching project replaced the existing pellet and combination oil heating system with an energy-efficient air-source heat pump system.

- **October 2023 – November 2023, MassDEP CERP Wastewater Energy Recovery Summit Planning and Coordination Meetings** were held with MassCEC, DOER, technology providers, energy utilities (Mass Save®) and speakers.

- **December 2023, MassDEP Convenes Statewide Wastewater Energy Recovery Summit -** MassDEP's Clean Energy Results Program and its partners, Massachusetts Department of Energy Resources (DOER) and the Clean Energy Center (CEC) held a Wastewater Energy Recovery | Mass.gov Summit at the Massachusetts Division of Fisheries and Wildlife Field Headquarters, 1 Rabbit Hill Road, Westborough. This hybrid event with in-person and virtual attendance drew in 124 attendees.

- **December 21, 2023, Gap III Grant project completion site visits to Melrose Wastewater Facility** – CERP staff conducted an inspection of the new variable speed drives installed on two pumps at the Fellsway and Upham wastewater pumping stations. These new equipment upgrades were supported by a Gap Energy Grant.

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