

STATE OF MAINE
LEAD BY EXAMPLE REPORT

2021



GOVERNOR'S OFFICE OF
**Policy Innovation
and the Future**



GOVERNOR'S
Energy Office



“Wherever possible, we will make buildings more energy efficient and we will tap into renewable energy, helping us fight climate change and saving taxpayer money in the long-run. Today, we take another step toward fulfilling our state motto, Dirigo, I lead.”

**—Governor Janet Mills,
November 26, 2019, signing Executive Order 13**

Governor Janet Mills has made combatting climate change and advancing clean energy — and the related cost-savings and workforce development opportunities this creates — among her top priorities.

On December 1, 2020, Governor Mills [welcomed](#) the release of *Maine Won't Wait* ([pdf](#)), the four-year Climate Action Plan by the Maine Climate Council. *Maine Won't Wait* puts Maine on a trajectory **to meet its statutory targets to reduce greenhouse gas emissions by 45 percent by 2030 and 80 percent by 2050, as well as achieve carbon neutrality by 2045**. The Plan calls for decisive steps, including bolstering the electric vehicle market in Maine; reducing vehicle miles traveled; increasing the number of heat pumps installed in Maine homes; doubling the pace of home weatherization, and continuing to transition to clean energy to curb harmful greenhouse gas emissions and grow Maine's economy. The Plan also highlights the powerful role of Maine's natural and working lands and waters to sequester carbon emissions and help it meet its nation-leading goal of achieving carbon neutrality by 2045.

Through *Maine Won't Wait*, the Governor also set a goal of more than doubling the number of clean energy jobs in Maine to 30,000 by 2030. The Plan details how climate action steps create economic opportunities for Maine, such as supporting the growth of the clean energy economy and advancing incentives for consumers, businesses and industries to invest in energy efficiency. Further, the Plan calls for supporting the development of innovative construction materials and local agricultural systems that rely on Maine's important natural resource industries — forest products, farms, and fishing and aquaculture — to build and feed the state into the future. The Plan also focuses on preparing our communities and people to better withstand the accelerating impacts of climate change and highlights the need for a comprehensive and equitable approach to climate action as new programs and allocation of resources are considered.

On November 26, 2019, Governor Mills signed Executive Order 13 ([pdf](#)), directing state agencies to *lead by example* in pursuing energy efficiency, renewable energy, and sustainability measures, many of which reduce operational costs while also reducing carbon emissions. **By taking bold climate actions aligned with the Plan, Maine state government can fulfill its mandate to lead by example.**

This report adopts ambitious Lead by Example targets for state government, based on the strategies set forth in *Maine Won't Wait*. It presents a baseline of energy use and greenhouse gas emissions from state operations and lays out a plan for meeting the goals of the Executive Order. These targets are not stagnant - as soon as we achieve them, we will plan how to exceed them. Every two years, the state will report its annual energy use, sources, greenhouse gas emissions, and progress on this Lead By Example plan to the Governor, the Legislature and the public.

Supporting the outcomes of the Climate Action Plan creates opportunities for Maine's state government to improve operations, decrease expenses, support state workers, protect the environment, and reduce costs to taxpayers. Together, we will not only lead the state, but the nation, by our example.

Sincerely,



Hannah Pingree, Director of the Governor's Office of Policy Innovation and the Future



Dan Burgess, Director of the Governor's Energy Office

INTRODUCTION

By taking aggressive action to reduce state emissions and promote energy efficiency, Maine state government can help meet our state's climate requirements while saving taxpayer dollars, building a healthier work environment, investing in Maine's economy, and inspiring others to take action.

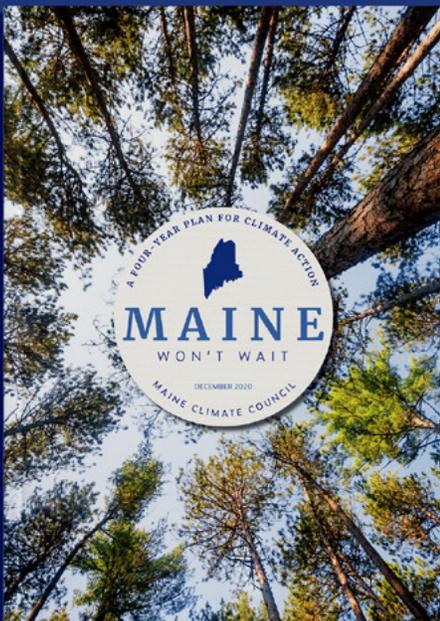
Executive Order 13 (signed November 26, 2019), "An Order for State Agencies to Lead by Example Through Energy Efficiency, Renewable Energy, and Sustainability Measures," directs Maine agencies to *lead by example* by investing in energy efficiency, renewable energy, and emissions reductions; promoting health and sustainability in the workplace; and building resilient infrastructure.

The Executive Order also established a Leading by Example Leadership Committee led by the Governor's Energy Office (GEO) and the Governor's Office of Policy Innovation and the Future (GOPIF) with representatives from the Department of Environmental Protection (DEP), Efficiency Maine Trust (EMT), Department of Administrative and Financial Services

(DAFS), and Department of Transportation (DOT). Together, the committee prepared this report and generated a baseline of energy use and greenhouse gas emissions from state operations from which to establish the *lead by example* targets contained within this report.

Per the Order, state government operations will strive to equal or exceed Maine's emissions reduction targets and to seek cost efficiencies. State facilities will be designed with greater resilience to new climate conditions. In addition, state agencies will reduce waste, promote employee health, increase operational efficiency and seek other cost savings. The Order also requires an update of the Augusta Master Plan for state facilities and aligns procurement processes to meet these objectives.

Maine Won't Wait, the state's four-year climate action plan, establishes the framework for the state's *lead by example* efforts. The Plan includes outcomes for key actions, as indicated in Table 1.



Sector	Metric	2025	2030	2050
Transportation	Number of Light-duty EVs on the Road	41,000	219,000	904,000
	EV Share of New Light-duty Vehicle Sales	28%	85%	100%
	Reduction in Light-duty Vehicle Miles Traveled per Vehicle	10%	20%	20%
	ZEV Share of New Heavy-duty Vehicle Sales	12%	55%	100%
	Reduction in Heavy-duty Vehicle Miles Traveled per Vehicle	2%	4%	4%
Buildings	Number of Households with Retrofit Heat Pumps (installed after 2018) and Legacy Fossil Systems	80,000	130,000	26,000
	Number of Households with Whole-Home Heat-Pump Systems	35,000	116,000	487,000
	Newly Weatherized Households (after 2019)	17,000	35,000	105,000
All	GHG Emissions (Million Metric Tons)	14.50	11.67	3.72
	Emissions Reduction from 1990 Levels	32%	45%	82%

Table 1: Reducing Carbon Emissions - Key Targets for State-Wide Action
Source: *Maine Won't Wait* (December 2020), page 107

Current Baseline

The Governor's Energy Office (GEO) worked closely with the Department of Administrative and Financial Services (DAFS) to collect energy usage data across numerous state facilities and the state fleet. In total, the state manages more than 4,200 properties (including parks, garages, office buildings, corrections facilities, docks, etc). In Augusta alone, the Bureau of General Services (BGS) manages 1.9 million square feet of buildings. The state additionally operates 2,100 fleet vehicles, including 5 EVs and 16 hybrid vehicles (see Figure A).

Figure B provides a high-level overview of energy consumption across the state's buildings and vehicles in calendar year 2020. While the state's Climate Action Plan and DEP emissions reporting and goals set 1990 as the baseline year for state emission reductions, the state government's 1990 baseline for emissions was not currently available for this report. Assuming efficiencies from lighting, heating and building envelope initiatives, and the impact of the state's renewable portfolio standard on government electricity purchases, it is probable that state government has followed the state of Maine's overall trajectory of reducing emissions close to the 17.5 percent seen in total state emissions reductions between 1990 and 2017 (the data used in the most recent DEP emissions reporting).

With the help of the DEP, this energy usage was converted into estimated associated greenhouse gas emissions (see Table 2, Figure C).

As shown in Figure D, roughly half of state government greenhouse gas emissions come from transportation, a quarter from electricity, and a quarter from heat and process fuels. These numbers, while high level, inform the *lead by example* targets for emission reductions. They are also consistent with the emissions profile of the entire state (see Figure E).

This data provides a snapshot of state government's current energy use. As part of the *lead by example* initiative, GEO and GOPIF will continue to work closely with DAFS and other state agencies to refine this data. This includes working with DAFS to catalog prior years electricity and fuel consumption, and to determine how far back this data was collected in order to establish a baseline closer to 1990, which will aid in calculating greenhouse gas reduction progress consistent with the overall state goal of 45 percent reduction from 1990 levels by 2030, and 80 percent by 2050. Regardless, based on the data available, there is a clear opportunity to reduce the current greenhouse gas emissions associated with state government energy consumption.

STATE OF MAINE VEHICLE FLEET (2,101 VEHICLES)

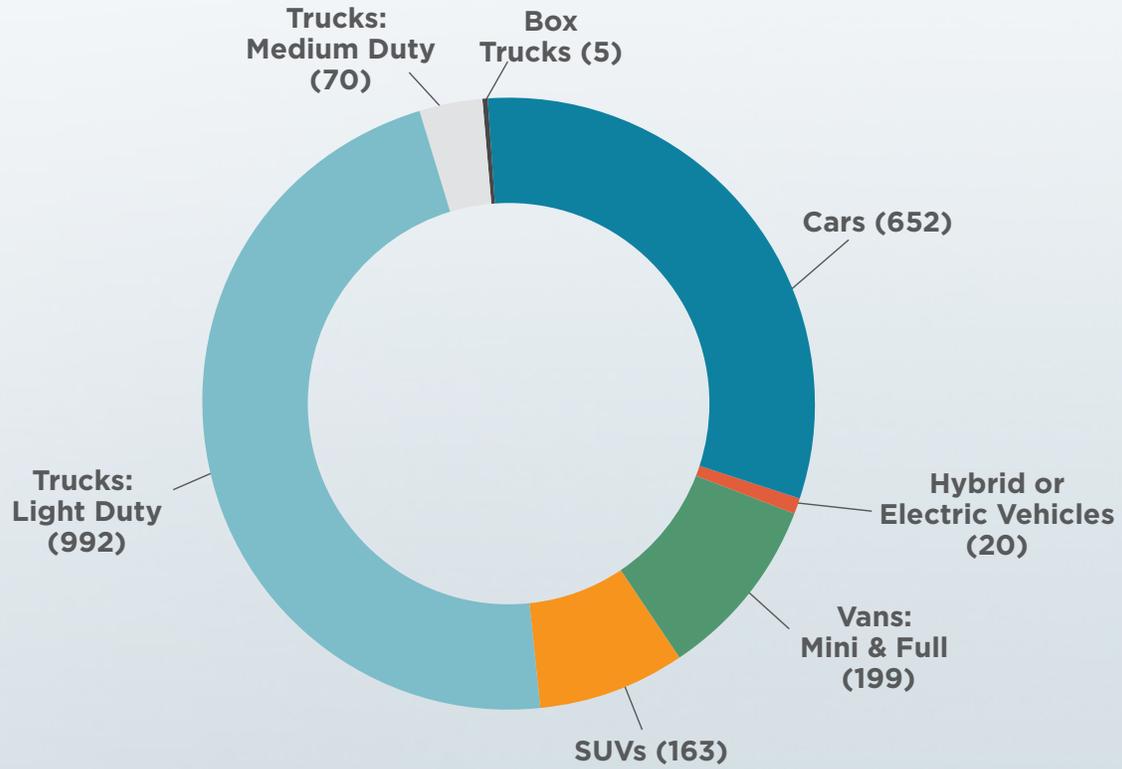


Figure A: 2020 State of Maine Vehicle Fleet, by vehicle class
Source: Internal data



STATE OF MAINE FACILITIES ENERGY USAGE, 2020

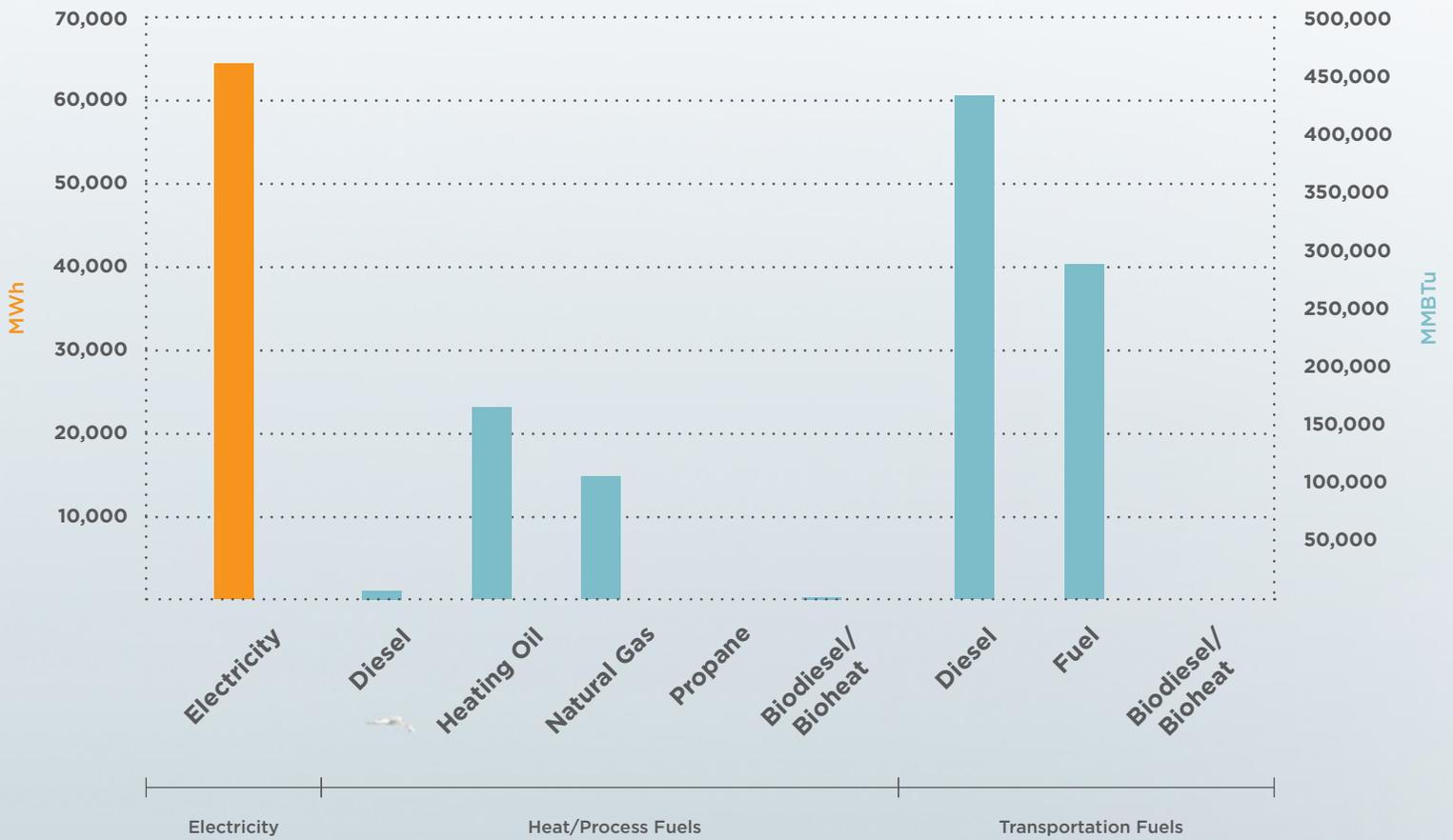


Figure B: Maine State Facilities Energy Usage Data in 2020
Source: Internal data



STATE OF MAINE SHARE OF TOTAL GREENHOUSE GAS EMISSIONS (CO₂e) BY FUEL

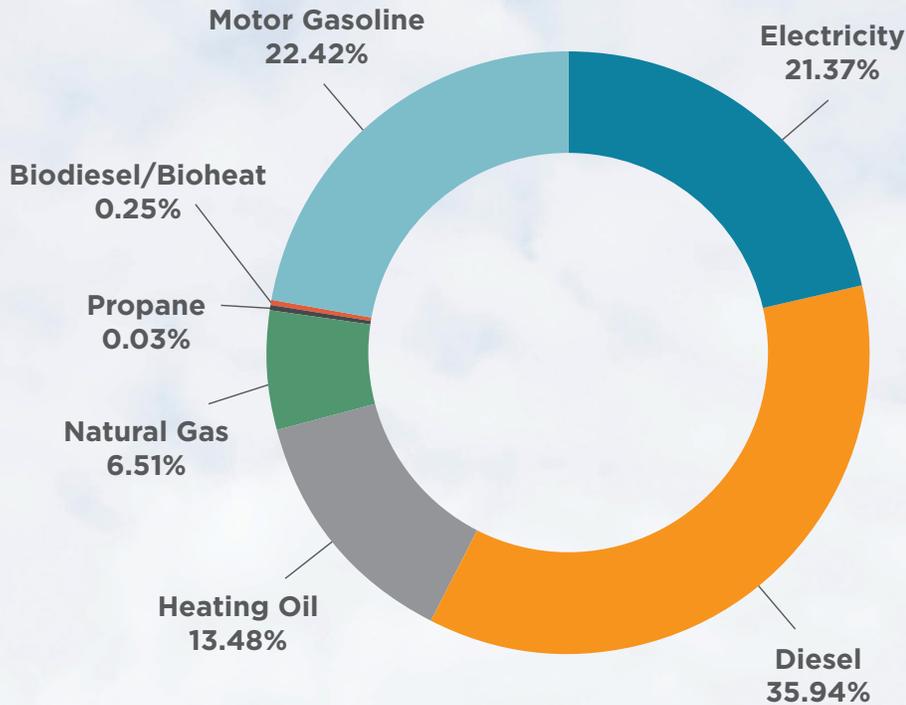


Figure C: State of Maine Share of Total Greenhouse Gas Emissions by Fuel
Source: Internal Data

2020 State of Maine fuel consumption and GHG associated emissions	
Fuel type	Total GHG emissions (metric tons CO ₂ e)
Electricity	21,191.46
Heat/Process Fuels	
Diesel	640.90
Heating Oil	12,229.21
Natural Gas	5,907.69
Propane	30.32
Biodiesel / Bioheat	152.45
Transportation Fuels	
Diesel	31,971.64
Motor Gasoline	20,345.06
Biodiesel / Bioheat	70.87
Total	92,539.59

Table 2: 2020 State of Maine fuel consumption and Greenhouse Gas (GHG) associated emissions
Source: Internal Data



COVID-19 Impact on State Energy and Vehicle Usage

The COVID-19 pandemic had a significant impact on the number of state employees working remotely. While formal data is not yet available, preliminary evidence collected through DAFS Bureau of Human Resources' employee surveys conducted during the pandemic suggest a reduction in carbon emissions, especially in transportation. Of those who responded, preliminary estimates indicate that, between April and November 2020, state employees saved over 17,800 trips per week, drove over 1 million fewer miles per week, and were responsible for 233,000 pounds fewer of carbon emissions every week. While these reductions appear to be significant, most state employees commute in personal vehicles and therefore their reduced emissions would not be attributed to the State of Maine.

Similar results were not seen in state facility electricity consumption, which appears to have remained relatively stable during this time. GEO and GOPIF, working closely with DAFS and others, are continuing to investigate this data.

STATEWIDE SHARE OF TOTAL GREENHOUSE GAS EMISSIONS (CO₂e) BY SOURCE

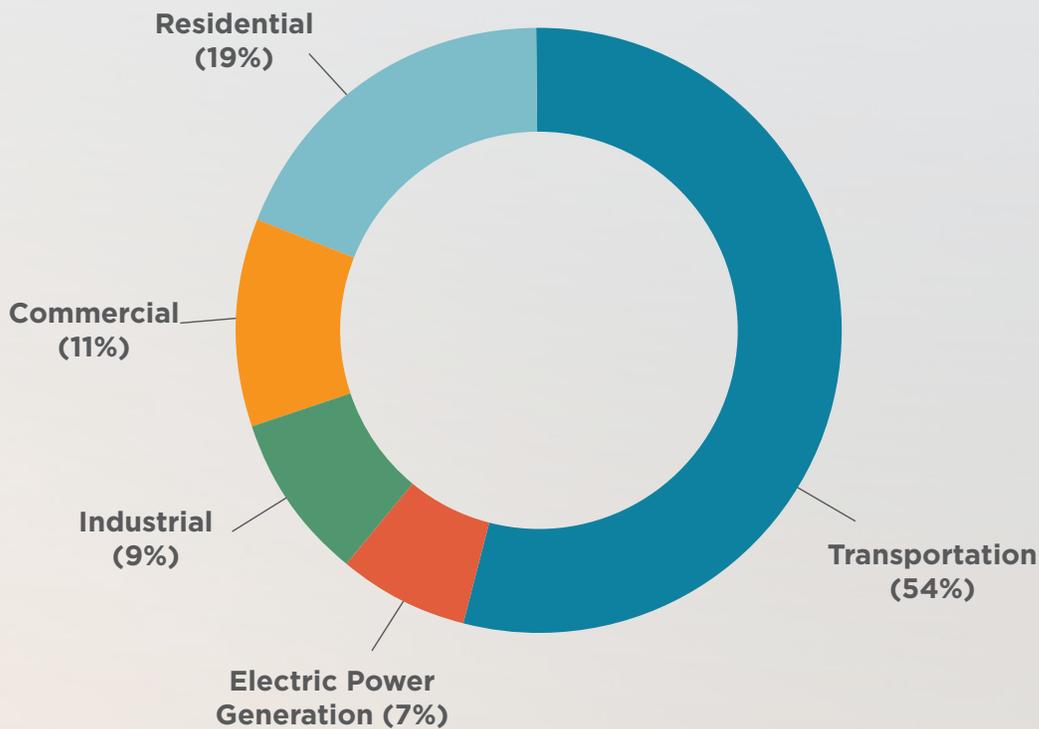


Figure D: Statewide Total Greenhouse Gas Emissions by Source
Source: Internal Data

In 2017, most of Maine's greenhouse gas emissions came from transportation, followed by residential and commercial buildings and operations, then industrial sources, and lastly from electricity generation. Similarly, in 2020, most of state government greenhouse gas emissions come from transportation, a quarter from electricity usage, and a quarter from heat and process fuels.

STATE OF MAINE SHARE OF TOTAL GREENHOUSE GAS EMISSIONS (CO₂e) BY SOURCE

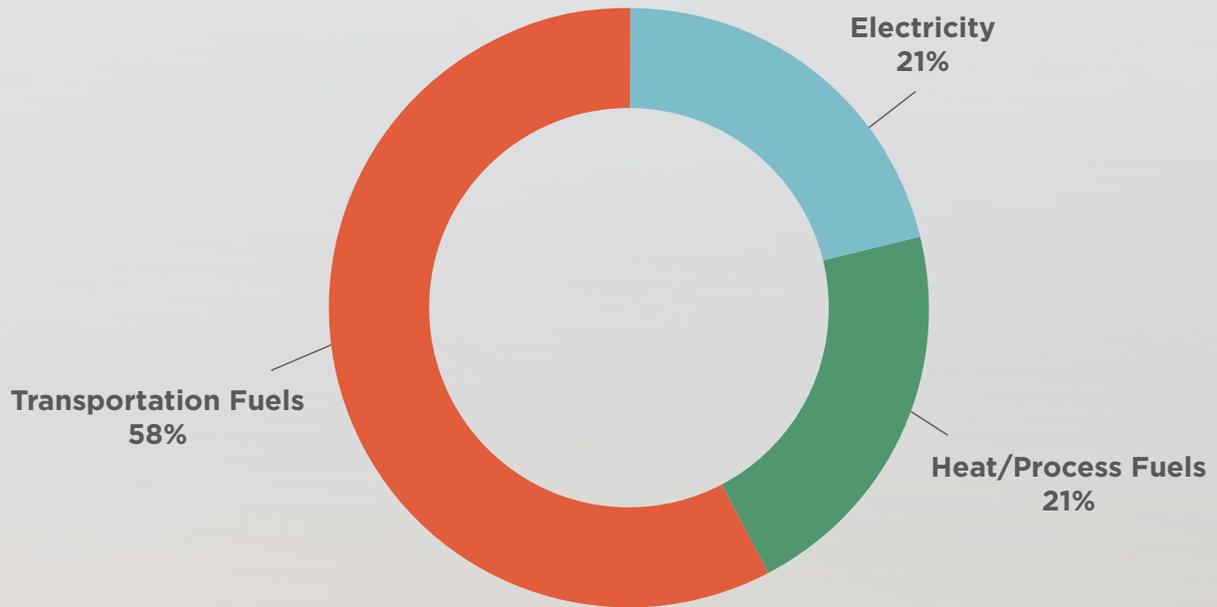
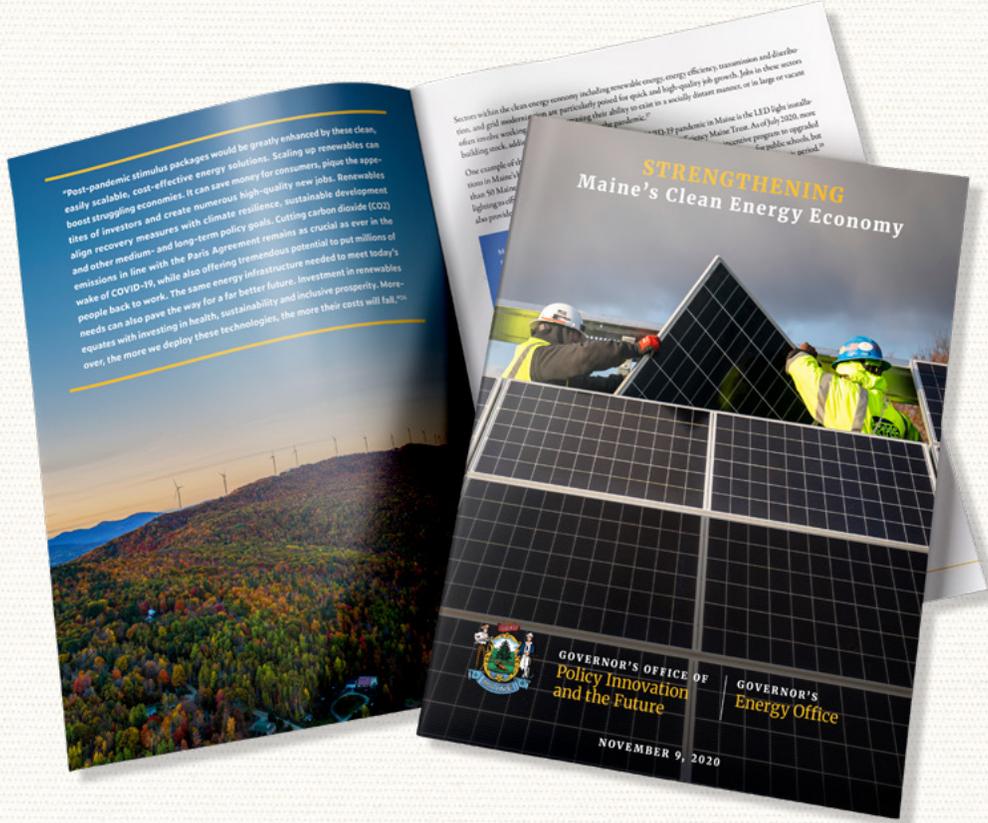


Figure E: State of Maine Share of Total Greenhouse Gas Emissions by Source
Source: Internal Data



Methodology for Greenhouse Gas Emission Calculations:

The state's energy usage data (Figure B) was used to estimate associated greenhouse gas emissions (Figure C). Estimated greenhouse gas emissions from fuels were calculated using emission factors from CFR 40 Part 98 for CO₂, CH₄, and N₂O. Emission factors in metric tons per million British thermal unit (MMBtu) were multiplied by the fuel consumed, which was converted from various volumetric units to MMBtu using standard conversion factors and assumptions from the U.S. Energy Information Agency. Certain transportation fuels used in small quantities were combined with motor gasoline for this analysis. Emissions from the production of electricity consumed were calculated using emission factors from ISO New England's most recent annual report (2018). Emission factors in metric tons per megawatt hour (MWh) were multiplied by the electricity consumed, which was provided in MWh. The emissions estimates, in metric tons of each pollutant, were then converted to metric tons of carbon dioxide equivalents (CO₂e) by multiplying the emissions by the global warming potential (GWP) for each pollutant. The GWPs used were those reported by the latest Intergovernmental Panel on Climate Change (IPCC) Assessment Report (AR5, 2014). Emissions converted to CO₂e were then summed to estimate the total greenhouse gas emissions.



Prior Energy Data & State Initiatives

With support from the Maine Law and Legislative Reference Library, this report sought previous *lead by example* studies and directives the state has undertaken, in an attempt to inform the 1990 state energy usage baseline and to better understand past state efforts around efficiency and emissions reductions. This is not a comprehensive list, but is rather intended to provide insight into the types of initiatives that were previously pursued.

- A January 1998 report by the Bureau of Public Improvements, State of Maine Electrical Energy Conservation Program Report, included electricity usage for state facilities. The report estimates state electricity usage for 1988 to be 53.4 million kWh across 6.9 million square feet of building space (including Maine Maritime Academy and the Vocational Technical Institute system, now the Maine Community College System). There was no accounting of fuel usage included in this report, and actual electricity usage numbers are only available for state accounts served by Central Maine Power (Bangor Hydro and Maine Public Service accounts were estimated).
- The Energy Conservation in Buildings Act of 1999 directed DAFS to “develop an energy savings pilot project designed to achieve reduced energy consumption goals by 2010.”¹
- The Clean Government Initiative of 2001 directed state government and state universities to improve environmental compliance and performance through energy efficiency, purchase of environmentally friendly commodities and services, recycling, enhanced fleet efficiency, and pollution prevention.²
- The Task Force to Advance Energy Efficiency, Conservation and Independence at State Facilities convened in 2009, with a report submitted in 2010 to establish annual energy consumption data reporting and invest in energy improvements at state facilities.³

This lead by example initiative will continue to learn from previous efforts in state government, in alignment with the goals and requirements of the overall state Climate Action Plan.

¹ Energy Conservation in Buildings Act (5 MRSA §1770, 1999)

² Clean Government Initiative (38 MRSA §343-H, 2001)

³ Task Force to Advance Energy Efficiency, Conservation and Independence at State Facilities https://digitalmaine.com/cgi/viewcontent.cgi?article=1003&context=bgs_docs

LEAD BY EXAMPLE TARGETS FOR MAINE STATE GOVERNMENT

Overall, Maine state government will seek to achieve an additional 30 percent reduction in state emissions by 2030, through a variety of initiatives, based on a 2020 baseline.

In support of this goal, the following *lead by example* targets will be implemented.



Clean Energy

The state will lead the effort to prioritize clean energy and to achieve the Governor’s goal of doubling clean energy and efficiency jobs by 2030.

- By 2024, state government will purchase 100 percent clean energy for its electricity usage. This will include maximizing the use of state buildings and lands for clean energy generation, where practicable.

Buildings & Energy Efficiency

The state will prioritize improvements to building envelopes and the efficiency of HVAC and buildings systems in state facilities. State government will encourage efficiency of heating systems, including utilizing high efficiency heat pumps or lower-emission fuels and technologies where possible.

- By 2023, the state Bureau of General Services Augusta Master Plan will incorporate and prioritize opportunities for modern HVAC system upgrades, incorporation of renewables, and building envelope and system improvements that increase efficiency, as funds allow and prioritizing the most cost-effective improvements.
- Construction of any new state buildings will prioritize highly-efficient building design, the use of modern, climate friendly wood-based building materials, and will incorporate renewable



energy, where possible. Utilizing advanced wood products, including mass timber products such as cross laminated timber (CLT) and other innovative wood products — especially those produced in Maine — will support modern, lower-carbon construction techniques and the state’s forest products industry.



Transportation

The state will continue to increase the percentage of new vehicle purchases that are zero emissions vehicles (ZEV) and plug-in hybrid electric vehicles (PHEVs). The state will also promote the use of the GO Maine commuting option, increased ridesharing, and policies that allow for increased telework for state workers. The upcoming “Clean Transportation Roadmap” will analyze the role that the state fleet can play in helping to achieve the state’s clean transportation goals.

- In 2022, the GO Maine program will be re-launched, via Maine DOT, and will market a program and incentives that encourage shared commuting options for state workers.
- By 2022, the state shall have a policy on teleworking that incorporates lessons learned from the rapid transition to temporary telework during the health emergency, and that allows for teleworking options where feasible, given roles and management responsibilities.

- By 2025, a minimum of 50 percent of newly purchased or leased light-duty state fleet vehicles, with appropriate use cases, will be ZEVs or PHEVs. The state will ensure the availability of adequate and coordinated charging infrastructure to meet this target.
- By 2030, 100 percent of all newly purchased or leased light-duty state fleet vehicles, with appropriate use cases, will be ZEVs.
- State government agencies will pilot, where practicable, emerging low and zero emission technologies for medium and heavy-duty vehicles as new technologies emerge, ultimately setting future targets based on available technology options.

Resilient Infrastructure

The state will prioritize resiliency to sea level rise and other climate impacts and will design new state infrastructure assets to be climate ready. Improving the resilience of state facilities and infrastructure is vital to preserving the long-term value of these public investments. Vulnerability assessments and climate-ready design standards are important first steps, ensuring that the state has a comprehensive understanding of its asset risks and policies in place to minimize additional new risks. Investments in the resilience of state infrastructure will have additional public benefits including improved emergency response and access to public health resources during disruptions, and economic resilience during an ensuing recovery.

- By 2023, the state will assess the vulnerability of state-owned infrastructure to climate change impacts.
- By 2023, the state will develop more specific guidance for agencies to integrate climate risk management into asset construction and maintenance. When building new facilities or upgrading existing ones, climate-ready infrastructure considerations should include the Maine Climate Council's sea level rise projections in project siting or design.



Green Procurement & Waste Reduction

The state will continue to identify opportunities to procure Maine-sourced and climate-friendly goods and services, such as locally produced food and carbon-storing mass timber for state construction projects. The state will also pursue efforts that lead to healthier workplaces and reduce solid waste from government facilities.

- By 2025, state institutions will purchase at least 20 percent of their food and food products from local producers.
- By 2023, the state will set targets that lead to healthier workplaces and that reduce solid waste from state-owned facilities.

In total, these efforts will not just reduce emissions, they will save taxpayer money. Electric vehicles have lower operating and maintenance costs, and building energy efficiency and efficient heating systems will result in lower utility bills. Resiliency investments result in avoided damages due to both recurring and unexpected climate hazards, while helping maintain continuity of operations in the face of increasingly frequent extreme weather events. To the extent possible, savings earned through these *lead by example* activities will be invested in additional savings and efficiency projects to continue to reduce emissions, support Maine products and industries, and increase the efficiency of long-term state government operations.

ACHIEVING THE TARGETS: ACTIONS AND EXAMPLES

In order to achieve the state's *lead by example* targets, the state will pursue the following actions. In many cases, these actions build on early leadership shown by many Maine agencies and departments.

Clean Energy

Mitigating and adapting to the impacts of climate change, and increasing renewable energy generation within the state, are priorities of Governor Mills' administration. Working together with the legislature, Maine has made significant progress on these issues. Reducing the State's dependence on fossil fuels and transitioning to a more diverse portfolio of clean energy resources reduces the State's emissions. These actions also support Maine's economy by creating local job opportunities and reducing expenditures on out-of-state fossil fuels, keeping more Maine money in the state.

In June 2019, Governor Mills signed legislation increasing the state's Renewable Portfolio Standard (RPS) from 40 percent to 80 percent by 2030, and setting a goal of 100 percent renewable electricity by 2050 (LD 1494: An Act To Reform Maine's Renewable Portfolio Standard). A separate obligation for thermal technologies was added to the Maine RPS, requiring four percent of Maine's heating and cooling load be met by renewable resources in 2030. In addition, changes to Maine's RPS law require the Public Utilities Commission (PUC) to procure 14 percent of Maine's electrical load via 20-year contracts.



In addition, Public Law 2009, Chapter 329 added a statutory directive requiring that all electricity consumed in state-owned buildings be supplied by renewable resources. While state government has met the requirements of the RPS, it has yet to achieve 100 percent consumption of renewable resources. Were the state to reach compliance with this statute, associated greenhouse gas emissions for state facilities would be significantly lower. Therefore, the GEO and GOPIF will work closely with DAFS to bring the State of Maine into compliance with this requirement through the strategies outlined below.

Action 1: By 2024, state government will purchase 100 percent clean energy for its electricity usage.

There are multiple pathways for Maine to achieve this target, including through the procurement of renewable energy certificates through a competitive electricity supplier, through bilateral contracts with a selected project(s), and through offsetting electricity needed through onsite clean energy generation. The state will examine and identify next steps to pursue this target further.

This can and must be done in a cost-effective manner. In September 2020, the state procured more than 500 megawatts (MW) of renewable resources at highly competitive prices — averaging 3.5 cents per kilowatt-hour (kWh) — leading the way for renewable energy to lower energy cost burdens for Maine ratepayers. Of the 546 MW of procured capacity in the first round of procurement, the large majority (483 MW) is new solar development, with the remaining coming from wind, biomass, and hydro. These projects are together committed to providing Maine with more than 450 full-time equivalent jobs during construction and more than 30 full-time equivalent jobs in every year of the operations phase; initial capital spending of more than \$145 million; additional spending of \$3 million

annually; and tax payments averaging \$4.7 million annually over the 20-year contract term.⁴ This procurement process, directed by the legislature and managed by the PUC, resulted in low cost, highly competitive long-term energy contracts and significant economic benefits for the state.

Action 2: In addition to procuring clean energy, the state will consider opportunities to use state buildings and lands for clean energy generation, where practicable.

Developing state-owned renewable energy projects is a way to further demonstrate the opportunities for supporting the clean energy transition with visible action. Many state agencies are already actively considering these types of projects on their land; to date, the Maine Army National Guard, working with the Maine Department of Defense, Veterans and Emergency Management, manages a portfolio of over 160 kilowatts (kW) of solar photovoltaic installations, while the Department of Corrections is pursuing interconnection for a 5 MW solar project on one of its properties.

Both strategies, procurement and development of projects, are in alignment with the goals of the *lead by example* initiative and the strategies outlined in Maine’s Climate Action Plan. All of state government should work together with DAFS, GOPIF, and GEO to determine how to implement these strategies.

Buildings & Energy Efficiency

Heating, cooling, and lighting of buildings are responsible for almost one-third of Maine’s greenhouse gas emissions. Maine state government can reduce greenhouse gases as well as costs by modernizing our buildings to use clean energy, increasing energy efficiency of our building stock and how these buildings are managed, and utilizing lower-carbon building materials.

Maine Won’t Wait includes building actions to transition to cleaner heating and cooling systems and efficient appliances, accelerate efficiency improvements to existing buildings, advance the design and construction of new buildings, and advance and promote climate-friendly building products such as mass timber and wood-fiber insulation made in Maine.

Maine Won’t Wait specifically recommends that the state should *lead by example* in publicly funded buildings, “reducing emissions from the buildings sector by requiring best practices in design and construction, including building materials selection; heating, cooling, and lighting systems; and enhanced efficiency and weatherization.”

Action 3: Improve the efficiency of existing state buildings.

State agencies have undertaken many projects to improve the energy efficiency of state-owned buildings and building systems. These projects include 1) upgrading building systems to use less energy and switch to cleaner fuel sources; and 2) improving building performance through weatherization. The state will continue to build on existing examples to undertake projects which lead to more efficient state government operations.



⁴ Maine Public Utilities Commission. Commission Selects Renewable Energy Projects to Help Achieve Maine’s Renewable Portfolio Standard Goals. September 2020. <https://www.maine.gov/tools/whatsnew/index.php?topic=puc-pressreleases&id=3329595&v=article08>



Leading by Example: DOT

Maine Department of Transportation (DOT) has implemented green facility improvements across its various campuses, garages, offices, and other properties that have and will continue to save in energy costs and reduce greenhouse gas emissions. To date, these include:

- LED lights have been installed in over 100 buildings and parking lots, as well as over roads and bridges;
- 26 heat pumps have been installed in facilities across the state; and
- Facilities have implemented weatherization improvements to reduce heat loss, including insulation, weather stripping, and replacement of windows and doors.

DOT is also participating in two pilot programs for biofuel and biodiesel. The Scarborough Region Office is undergoing a pilot project that utilizes B20 biofuel to heat and cool the facility throughout the year. This pilot resulted in a reduction of over 56,000 pounds of carbon dioxide emissions in 2020, compared to traditional No. 2 heating oil. Additionally, DOT Region 1 trucks are participating in a pilot program to utilize B20 biodiesel during select months. This pilot has resulted in a reduction of nearly 20,000 pounds of carbon dioxide emissions in 2020, compared to traditional on-road diesel. DOT will continue to expand these pilots as opportunities arise.

Leading by Example: BGS

In 2020–2021, the Bureau of General Services (BGS) took initial steps to reduce building footprints, contribute to healthier work conditions for state employees, reduce energy consumption, and replace inefficient mechanical equipment. Efforts include:

- “Right sizing” agency spaces to their needs. Some agencies are considering reducing the number of staff members assigned full-time to state facilities. This has led to development of “touch-down” or “hoteling” spaces in some buildings. While future telework and remote work policies are still being developed, some agency decisions supporting a smaller central office footprint have been made in upcoming projects;
- Addressing building envelope deficiencies, focused on Augusta state-owned buildings;
- Upgrading the East Campus Central Steam Plant boiler, which provides the heating capacity for the entire East Campus in Augusta. The installation of three new “right-sized” Hurst steam plant boilers will result in significant energy savings, as well as increased reliability and ease of maintenance; and
- Upgrading the 56,000-square-foot Ray Building (starting at the end of 2021), to include the installation of a new heating and cooling system, installation of more efficient windows, and the addition of extra layers of insulation to the building envelope. Other goals being discussed include LED lighting fixtures, daylight harvesting, and motion sensors.

Phase 2 of BGS’s building program will include several key strategies in the state’s Climate Action Plan, including increasing building efficiency to reduce emissions and operating costs. The state’s next 20-year Facilities Master Plan will be guided by the state’s climate and efficiency goals.

Action 4: Reduce emissions from the buildings sector by requiring best practices in design and construction, including building materials selection; heating, cooling, and lighting systems; and enhanced efficiency and weatherization, as well as renewable generation where applicable.

Several agencies are considering building renovations or new construction in coming years and to the maximum extent possible, should prioritize items inducing but not limited to energy efficiency, renewable energy, modern construction and design, forest products such as CLT, and future electric vehicle charging and other transportation needs.

New market opportunities can support the ability of Maine’s natural resource economies to adapt to climate change impacts, and to grow clean-energy jobs and businesses in Maine. Innovative new products including cross-laminated timber (CLT), a building material for multi-story buildings that stores carbon for the life of the building; the use of wood cellulose in building insulation products as a replacement to petroleum-dependent fiberglass insulation; biodegradable and recyclable food packaging paper that replaces single-use plastic; and transportation and heating biofuels derived from woody biomass can help Maine meet our climate goals while supporting economic development in critical economic sectors. The state will continue to build on existing examples to undertake projects which lead to reduced emissions from state owned buildings.





Leading by Example: DOC

In 2020, the Maine Department of Corrections (DOC) joined the U.S. Department of Energy's Better Buildings Sustainable Corrections Infrastructure Partnership (SCIP) Accelerator. The SCIP Accelerator is intended to demonstrate solutions leveraging energy and water efficiency, renewable energy, and storage technologies to reduce operating and maintenance costs in public correctional facilities while maintaining facility security and resilience and developing the workforce and economies of surrounding communities.

In Maine, the SCIP Accelerator will support DOC in tracking energy consumption and conservation at each of its facilities and in developing a long-term plan for energy efficiency and renewable energy generation. The program will also provide DOC with technical assistance on solar energy siting, water conservation, and a program that can provide solar energy work force training to inmates.

Leading by Example: DVEM

Since 2015 the Maine Army National Guard (MEARNG), working with the Maine Department of Defense, Veterans and Emergency Management (DVEM), has reduced annual energy use on average by over 12 percent and CO₂ emissions by over 15 percent, all while total square footage increased over 10 percent. These reductions were achieved by utilizing an aggressive engineering design process that optimized new heating, ventilation and air conditioning technology, fuel switching and renewable solar energy for new construction and modernization projects.

All projects start with an integrated building envelope analysis that is used to calculate the required HVAC baseload and electric demand, ensuring that the HVAC systems are not oversized which typically results in short cycling, increased energy cost, and premature failure of the equipment. Solar photovoltaics, heat pump heating and cooling, and micro combined heat and power (CHP) units are technologies being deployed at MEARNG facilities.

MEARNG has received LEED designations for three newly constructed facilities in Brunswick (LEED Platinum), Bangor (LEED Silver), and Augusta (LEED Silver, pending). MEARNG received the 2017 Secretary of the Army Energy and Water Management Award for Innovation and New Technology for the 75 kW micro combined heat and power (CHP) unit in the 123,000 square foot Army Aviation Support Facility in Bangor. The engineered design approach included the integration of the CHP unit into the existing heating plant and electrical distribution system. Since 2016, this has resulted in more than \$50,000 in annual energy savings, representing more than 20 percent of the facility's utility bill. This project also received the 2016 Combined Heat and Power Energy Star Award from the U.S. Environmental Protection Agency for significant pollution reduction and energy efficiency qualities.

In coming years, MEARNG expects to begin a microgrid electricity demand reduction project that includes another CHP unit, battery energy storage systems, and a supplemental integrated solar photovoltaic array.

TRANSPORTATION

Transportation is responsible for 54 percent of Maine's annual greenhouse gas emissions. To meet Maine's emissions reductions goals by 2030 and 2050, Maine must pivot to the future by pursuing aggressive transition strategies and innovative solutions within this sector.



Maine Won't Wait includes transportation actions to accelerate Maine's transition to electric vehicles, increase fuel efficiency and use of alternative fuels, and reduce vehicle miles traveled. Deploying broadband, encouraging development that locates schools, workplaces and shopping opportunities near where people live, as well as increasing public transportation funding and public commuting options, will reduce vehicle miles traveled. Greenhouse gas emissions modeling shows that a swift transition to electric vehicles, increasing fuel efficiency, and reducing vehicle miles traveled are all essential components of achieving the greenhouse gas emissions reductions goals, and that the goals cannot be achieved with one component alone. The state will pursue the following actions in alignment with the *Maine Won't Wait* transportation targets.

Action 5: The state will encourage ridesharing for state workers, through the relaunch of GO Maine and other programs.

Maine DOT is scheduled to re-acquire the GO Maine rideshare program in July 2021. GO Maine provides ride matching services for commuters and rewards for those participating. The program enables state employees to reduce transportation-related greenhouse gas emissions by decreasing the number of miles that they drive

alone. Additional benefits include provision of an “emergency ride home”, a Multimodal Trip Planner program with more transit modes, and preferential parking. DOT is working to expand and improve the program and will reveal GO Maine 2.0 in January 2022. Several state agencies already have employees participating in GO Maine; DOT is looking to increase participation through increased advertisement and promotion, additional incentives, and on-the-ground outreach. Agencies will also consider having infrastructure available for employees to use for personal or shared bicycle storage to facilitate short trips during the day, such as lunch or coffee breaks or local commuting.



Leading by Example: Efficient Teleworking

The Maine Department of Agriculture, Conservation, and Forestry (DACF) has seen employee commuting decline substantially due to COVID-19. When Bureau of Forestry staff do have to go into the field, they batch meetings and requests for assistance by geographic region so that employees can reduce vehicle miles traveled. The agency is also responding to more requests for assistance through online programs where appropriate and developing how-to webinars which reduce vehicle miles further.

Prior to the onset of COVID-19, the Department of Education (DOE) had started implementing options for telework. This included purchasing videoconferencing devices and encouraging staff to use them for meetings and trainings, cutting down on the need for travel. DOE is also exploring options for future buildings, satellite offices and workspaces that will accommodate a workforce operating remotely more of the time. DOE plans to set quantifiable emissions reductions goals, a portion of which will reflect a more remote workforce and associated reduction of the department's total office space requirements.



Action 6: The state will develop a policy on teleworking that allows for teleworking options where feasible.

During the COVID-19 pandemic, more state employees are teleworking than ever before. Many agencies are interested in continuing remote work policies for telework, meetings, and travel after the pandemic has passed. By 2022, the state will have a policy on teleworking that incorporates lessons learned from these recent experiences with teleworking and which allows for teleworking options where feasible.

Action 7: The state will continue to electrify transportation, by transitioning its fleet to ZEVs and PHEVs where appropriate and by piloting emerging technologies where practicable.

Governor Mills has prioritized the advancement of clean transportation. Multiple state agencies are pursuing cleaner vehicles and are utilizing Efficiency Maine Trust (EMT) rebates when purchasing electric vehicles and the associated charging infrastructure.

In coming years, electric and hybrid vehicles will continue to be adopted by state agencies. The state light-duty vehicle fleet will meet or exceed the goals of 50 percent of newly purchased or leased ZEV or PHEV by 2025, and 100 percent ZEV by 2030. The forthcoming Clean Transportation Roadmap will include consideration of fleet transitions in support of these goals. Additionally, electric vehicle charging stations will be installed at agency offices to encourage the use of electric vehicles by employees and visitors. Agencies will also consider having bicycles available for employees to use for short trips during the day, such as lunch or coffee breaks.

Leading by Example: Greening the State Fleet

DOT, DEP, and the Maine State Police have added hybrid and electric vehicles to their fleets. Other agencies are planning to add fuel-efficient vehicles to their fleets and electric vehicle charging stations at their facilities in the coming years. The Department of Marine Resources (DMR) upgraded the engine of one of its patrol vessels to a more efficient Tier 3 marine diesel engine under a grant from U.S. Department of Environmental Protection. Tier 3 marine engines are expected to reduce particulate matter emissions by half and nitrogen oxide pollution by 40 percent.

DAFS, in partnership with Efficiency Maine Trust (EMT), installed a total of four new dual-port electric vehicle charging stations at the East and West Campuses in Augusta. Additional charging stations will be installed at the Bangor Dorothea Dix Campus as well as at the Canco Road location in South Portland. A Master Agreement has been established to allow for additional state agencies to install EV charging stations.

At the Department of Agriculture, Conservation, and Forestry's (DACF) Bureau of Resource Information and Land Use Planning, field staff prioritize the highest fuel efficiency vehicles for the longest trips. The Department has also upgraded at least one vehicle to a more fuel-efficient model.



Resilience

Maine must improve the climate readiness and resilience of infrastructure so that it serves Maine better under day-to-day conditions and functions reliably during emergencies.

From flooding to temperature extremes, climate change is already having a negative impact on our roadways and bridges, working waterfronts, water treatment facilities, and utilities. Doing nothing, or putting off much-needed efforts to adapt key infrastructure, will not save money but rather is likely to cost the state and its communities far more in significant property and economic damage losses; straining health care systems during times of crisis due to access issues; and diminishing or compromising disaster responses.

Maine Won't Wait includes resilience actions to assess climate vulnerability and to provide climate-ready design guidance, and to establish the state infrastructure adaptation fund, which will allow the state to leverage four to ten times more federal funding with a relatively modest investment of state funds.

Action 8: Assess the vulnerability of Maine's infrastructure to climate change impacts.

Maine DOT is developing a climate change vulnerability assessment methodology for transportation infrastructure, agency facilities, and other assets. The goal of the assessment is to inventory vulnerable assets and rank key infrastructure based on how vulnerable they are to climate stressors. The assessment utilizes Federal Highway Administration's Vulnerability Assessment Scoring Tool (VAST). DOT's assessment is starting with coastal road segments at risk of inundation due to sea level rise, taking into consideration exposure to the hazard, susceptibility based on the asset's condition and maintenance, and the ability to adapt the asset to changing hazards over time. As the tool is refined, additional climate hazards (such as precipitation and inland flooding) and assets (such as inland roadways, DOT buildings, and waterfront infra-

structure) will be incorporated into the assessment.

It is anticipated that DOT's methodology and tool will be useful to other state agencies to assess climate vulnerability for a wider set of state assets, facilities, and resources. This process will be iterative such that feedback is sought at regular intervals from potential users across government and used to refine the assessment tool. This approach should make the tool both more useful and more user-friendly to various agencies.

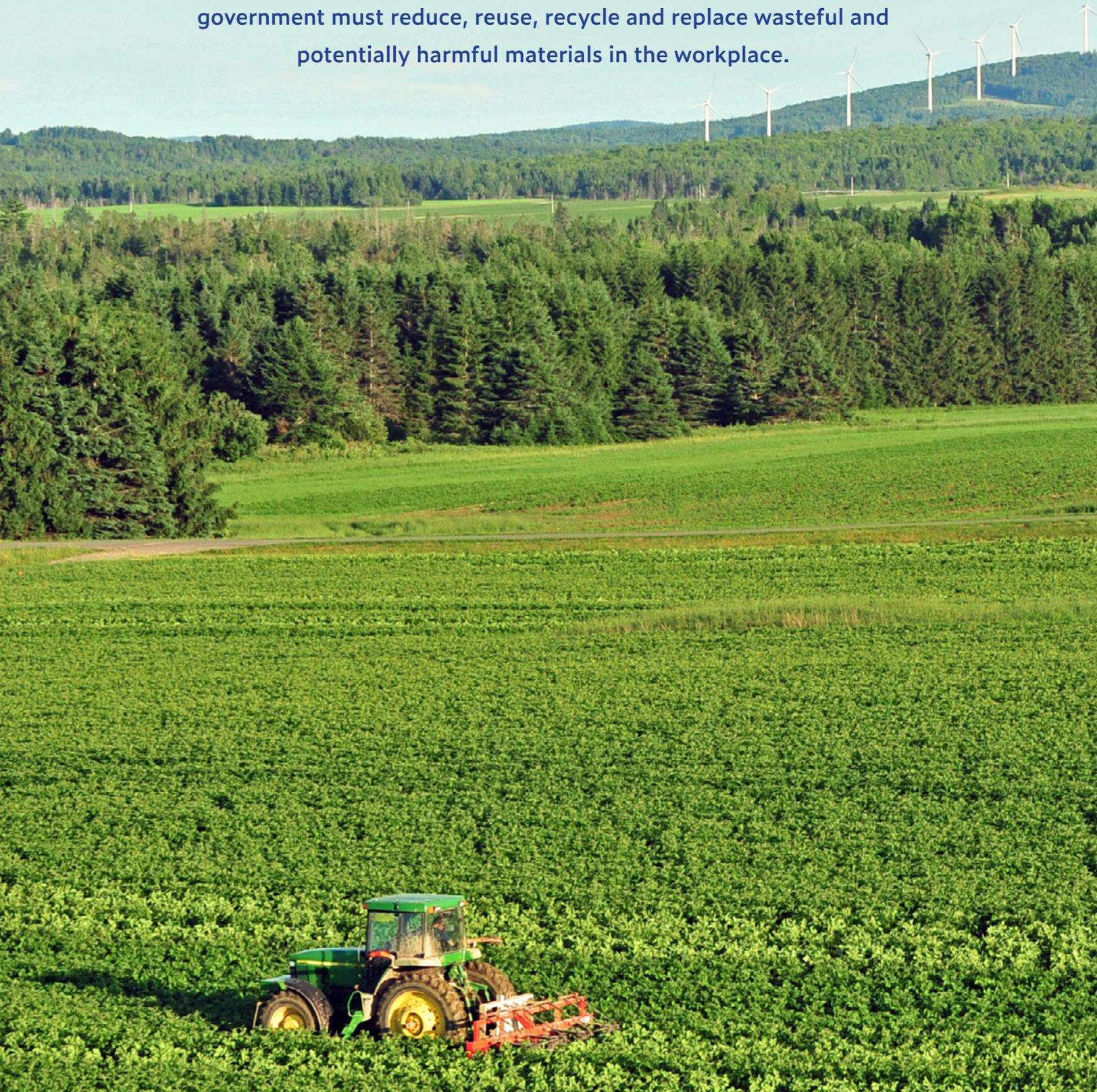
Action 9: Develop more specific guidance for agencies to integrate climate risk management into asset construction and maintenance.

DOT has updated design standards for culverts and bridges to take climate impacts into account. The Bridge Design Guidance was revised to require assessment of 4 feet of sea level rise per 100 years for new bridge designs. The change was based on the National Oceanic and Atmospheric Administration's (NOAA) historical data for the Maine coast and a range of predictions for future sea level rise, and is consistent with the current recommendations of the Maine Climate Council. Additionally, DOT culverts are now designed for 100-year flow rates; prior design guidance was for the 25-year storm event.

Building on DOT's work, the state will expand guidance for other agencies. This will include siting and design standards for minimizing climate risks in new facility construction as well as guidance for managing climate risk in existing facilities and assets. Guidance should include consideration of Maine Climate Council's sea level rise projections and other available climate hazard data.

GREEN PROCUREMENT & WASTE REDUCTION

Maine must continue to support local food producers and strengthen Maine's food systems, contributing both to a reduction in greenhouse gases and supporting Maine communities. At the same time, state government must reduce, reuse, recycle and replace wasteful and potentially harmful materials in the workplace.



Action 10: By 2025, state institutions will purchase 20 percent of their food and food products from local producers.

A strong local food system will support Maine farmers, fishing and aquaculture harvesters, and other food producers while also supporting more resilient Maine communities. Maine’s most recent experiences during the COVID-19 pandemic showed the challenges of global supply chains for a variety of basic needs, including food. Maine should provide financial support to strengthen Maine’s food systems so that more food can be produced and processed in-state and distributed efficiently and affordably. This also includes promoting research, development, and planning efforts that support the growth and stability of Maine food systems. Reducing food waste that contributes to Maine’s greenhouse gas emissions is an important aspect of a strong local food system.

The Department of Agriculture, Conservation, and Forestry (DACF) has recently hired a new Institutional Market Development Coordinator charged with expanding access to institutional and other markets for more local Maine food producers. DACF also launched a new partnership with the Department of Health and Human Services (DHHS) to increase access to local food for people using supplemental food benefits.

This year, DACF will establish a baseline of local food purchased by state institutions. In coming years, DACF will commence a rulemaking to further advance this target.

Action 11: By 2023, the state will set targets that lead to healthier workplaces and that reduce solid waste from government facilities.

Maine Department of Corrections (DOC) has taken steps to *lead by example* in waste reduction, including composting on average 35,000 pounds of food waste annually from the Maine State Prison, and from Mountain View and the Bolduc Correctional facilities, which is rotated into the soil for a gardening enhancement. In addition, DOC recycles 15 tons of recyclables annually.

The state will build on these examples to recommend programs to continue to reduce waste and improve health statewide, and the state will also recommended targets to guide green purchasing in areas such as cleaning products, energy efficient equipment, and other materials recommended by DEP. BGS has already spent a substantial portion of available facility funds abating long-standing hazardous building material conditions, conducting air quality testing, and abating any mold or other hazards discovered through testing.

Leading by Example: DACF

Several DACF programs have made significant improvements to their processes to become nearly paperless. This includes electronic filing of 1,500 applications a year for Maine Forest Service’s Forest Operation Notifications. During the past six months of implementing DocuSign to digitally process documents, DACF processed 458 documents electronically, saving 2,315 pounds of wood, 6,815 gallons of water, 5,433 pound of carbon, and 376 pounds of waste. The Maine Senior Farm-share program also recently migrated to a digital platform, which increases program efficiency. Serving 17,000 Maine seniors, the digital program substantially reduced paper usage and postage and delivery costs.

In both 2019 and 2020, the Augusta Deering building diverted 43 pounds of non-rechargeable batteries annually from the landfill. In 2019, the Deering Building diverted 109 pounds of food waste from the landfill.

In 2020 DACF offset the emissions of the annual Maine Agricultural Trades Show through procurement of Maine Green Power energy credits resulting in the reduction of 30,600 pounds of carbon dioxide.



CONCLUSION: ACCELERATING ACTION ACROSS STATE GOVERNMENT

A recent survey of Maine state agency leaders on *lead by example* opportunities surfaced enthusiasm for these opportunities but also several important challenges to implementing *lead by example* initiatives. Together across state agencies – and with external partners, including the US Climate Alliance, the National Association of State Purchasing Officials, and expert technical assistance from Efficiency Maine Trust (EMT) – the state will seek creative solutions to overcome these challenges which include:

- **Energy consumption and emissions tracking:** State agencies need a consistent way of tracking energy use and reporting greenhouse gas emissions and reductions. Currently, some agencies have hired consultants to assist in tracking energy use, other agencies are using federal tools, and others do not track their consumption at all. In order to improve energy efficiency and reduce emissions, agencies must be able to measure their energy use. A consistent methodology applied across all agencies would provide the state with a comprehensive picture of energy use and contribute to progress toward *lead by example* emissions goals over time.
- **Technical assistance:** Agencies need technical assistance to implement more complex *lead by example* initiatives like building energy audits and retrofits; tools to model cost savings from electric vehicles, renewable energy, or efficient building systems; renewable energy feasibility and siting; and project design, permitting, and procurement management.
- **Specific directives and additional funding:** Agencies need guidance and funding to support procuring electric vehicles and securing charging infrastructure, improving energy efficient building systems and operations, and other environmental services.

Creative use of available state infrastructure dollars may enable agencies to participate in federal funding programs that support these efforts but require a cost share. Federal infrastructure support may offer opportunities to invest in state infrastructure and efficiency needs and create jobs that support economic recovery, and upcoming transportation legislation may offer similar opportunities for fleet transitions and charging infrastructure.

In addition, through funding mechanisms that use long-term energy usage reductions and power purchase agreements to make clean energy and efficiency projects possible, efficiency cost savings may be invested to enable additional projects. Additionally, the state may consider that opportunities like future sales or leases of state properties designate the savings toward ongoing *lead by example* projects.



State Partnership with Efficiency Maine Trust

Per a December 29, 2020 Memorandum of Understanding (MOU) between the Efficiency Maine Trust (EMT) and the Office of the Attorney General for the State of Maine, EMT received \$3,660,000 in Volkswagen settlement funds to promote the increased installation and use of clean, cost-effective energy measures at properties leased or owned by the State of Maine and through state vehicle fleet programs. EMT will work with state government and the Leading By Example Leadership Committee to design programs and initiatives to support facilities managers to identify cost-effective clean energy and transportation projects at State properties, and to prioritize projects for implementation. EMT will also develop financial incentives to be employed toward the costs of approved projects, including sub-grants, buy-downs, and cost-sharing, and which may include access to financing tools such as leasing, performance contracting, and “self-finance” arrangements. Finally, EMT will provide a range of technical assistance services to deliver the expertise and guidance necessary to facilitate project development. This program will help state agencies develop clean energy, transportation, and efficiency projects that will support the state’s lead by example targets and save tax-payer funds.

Next Steps

Over the course of the coming years, the state will focus on implementation of these *lead by example* programs and initiatives across state agencies to meet the state’s targets. Each agency has designated an internal sustainability lead to help coordinate these efforts. The Leadership Committee and these leads will meet monthly to provide a venue for agencies to learn from each other, to provide support and technical assistance to agencies to implement *lead by example* activities and opportunities, and to work together to measure our progress on these targets. Every two years, the state will report our annual energy use, sources, greenhouse gas emissions, and progress on the *lead by example* targets.

By leading by example, Maine state government can help meet our state’s ambitious climate goals while saving taxpayer dollars, building a healthier work environment, investing in Maine’s economy, creating jobs, and inspiring others to take climate action. And while this report is focused on state infrastructure and operations, this work will undoubtedly be helpful and provide collaboration opportunities with other entities such as Maine Housing, school districts, municipalities, and other large institutions like hospitals and the state’s higher education systems.

APPENDICES: EXECUTIVE ORDER 13

The complete text of the Executive Order is as follows:

An Order for State Agencies to Lead by Example Through Energy Efficiency, Renewable Energy and Sustainability Measures

WHEREAS, climate change is already having negative impacts on Maine and, if not addressed, will have devastating effects on the state;

WHEREAS, increased use of cleaner, low-carbon energy generated in Maine — including solar, wind, geothermal, wood and biomass, and biofuels — will reduce Maine’s reliance on imported fossil fuels;

WHEREAS, Maine has pledged to be carbon neutral by 2045; has committed to reduce greenhouse gas emissions 45percent below 1990 levels by 2030 and by at least 80percent by 2050; and Maine’s renewable portfolio standard requires 80percent renewable energy by 2030 and a goal of 100percent by 2050;

WHEREAS, Maine has supported the electrification of certain technologies for the benefit of consumers, utility systems and the environment; and has acted to transform Maine’s heat pump market to advance economic security and climate objectives;

WHEREAS, the Maine Climate Council is beginning to develop plans to meet the emissions targets in Maine’s buildings, infrastructure, transportation and energy sectors, and to increase the resiliency of Maine’s communities, industries and people; and

WHEREAS, state government should lead by example and invest in renewable energy, increase energy efficiency and resiliency, encourage waste reduction, and strive to reduce operational costs;

NOW THEREFORE, I, Janet T. Mills, Governor of the State of Maine, pursuant to Me. Const. Art V, Pt 1, Secs 1 and 12, do hereby order as follows:

I. POLICY GOAL

Maine state government will lead by example in investing in energy efficiency, renewable energy, and emissions reductions; promoting health and sustainability in the workplace;

and building resilient infrastructure. State government operations will strive to equal or exceed Maine’s emissions reduction targets and seek cost efficiencies. State facilities will be designed with greater resilience to new climate conditions. These efforts aim to reduce waste, promote employee health and increase operational efficiency.

II. SUSTAINABILITY LEADERSHIP COMMITTEE

The Governor’s Energy Office (GEO) and the Governor’s Office of Policy Innovation and the Future (GOPIF) shall convene a Leadership Committee with representatives from the Department of Environmental Protection (DEP), Efficiency Maine Trust (EMT), Department of Administrative and Financial Services (DAFS), and Department of Transportation (DOT). This Committee shall develop a baseline of energy use and greenhouse gas emissions from state operations by February 1, 2021. This baseline and a plan for meeting the goals of this Executive Order shall be posted online. Every two years thereafter, the state shall report annual energy use, sources, greenhouse gas emissions, and progress on the plan to the Governor, the Legislature and post the report for the public.

III. ENERGY & EFFICIENCY PLAN

State agencies shall by February 1, 2021 coordinate with the Leadership Committee to develop and implement a sustainability plan to meet or exceed the state’s renewable energy and greenhouse gas reduction timelines and targets. This plan shall consider policies including, but not limited to:

Prioritizing energy and fuel efficiency when upgrading building systems (e.g., lighting, HVAC, water, information technology), appliances and vehicle fleets;

Installing renewable energy generation and energy storage on state property or procuring energy from low-carbon sources;

Promoting electric vehicle adoption and installing electric vehicle charging stations on state property; and

Reducing employees’ vehicle mileage by encouraging video

conferencing; commuting by carpool, public transit, bike and foot; reviewing telework options as outlined in Resolves 2019, ch. 37; and offering preferred parking, bike storage, and other incentives to encourage these options.

DAFS shall update the Augusta Master Plan for state facilities to address the transition to renewable energy, reduced energy consumption, and reduced carbon emissions, with the goal of achieving the policy goals set out in this Order. This Master Plan shall promote sustainability in all aspects of facility construction, maintenance and use by state agencies as part of the state's responsibility to steward the natural environment and provide a healthy environment for state employees and the public.

IV. RESPONSIBLE PROCUREMENT

All state agencies shall reduce their impact on the environment and enhance public health by procuring environmentally preferable products and services whenever such products and services are readily available, perform to satisfactory standards, and represent best value to the State of Maine. In doing so, procuring agencies will help conserve natural resources, reduce waste, reduce carbon emissions, protect public health and the environment, and promote the use of clean technologies, recycled materials and less toxic products. Environmentally preferable products shall include, but not be limited to, products and services that: contain recycled materials; conserve energy or water; minimize waste and packaging; are less toxic and hazardous; reduce the generation, release or disposal of toxic substances; protect open space; and/or otherwise lessen the impact of such products or services on public health and the environment. Agencies shall consider the total cost of ownership, including all costs associated with the production, purchase, transportation, use, operation and disposal of such products or services. Agencies shall consider Maine-sourced products and services when total costs are competitive.

V. WASTE MANAGEMENT

All state agencies shall encourage practices that lead to healthier and less wasteful workplaces. Such practices may include, but not be limited to: improving

recycling and composting; reducing the use of plastic, foam, and single-use products; providing information to state employees about reducing their workplace carbon footprint and reducing solid waste in the workplace; and annual recognition may be made of agencies, projects, or employees that are leading by example.

VI. RESILIENT STATE FACILITIES

State agencies shall account for climate change projections including, but not limited to sea level rise and increased precipitation and temperature, when siting and designing new state facilities and other construction projects. When procuring leased space, state agencies shall make every available effort to increase the resiliency of these facilities and infrastructure. Agencies shall consider continuity of operations and resilience in building system design for critical facilities including, but not limited to battery storage and microgrid strategies.

VII. COORDINATION

The following entities shall further undertake the following tasks:

A leadership team comprised of the sustainability coordinators from GOPIF/GEO, DEP, EMT, DAFS, and DOT shall meet regularly to lead development and implementation of plans, seek consistency and cost efficiencies where appropriate, and track progress.

GOPIF and GEO shall designate a state sustainability coordinator to facilitate and support activities across agencies.

Each state agency shall designate an internal sustainability coordinator and may establish internal sustainability teams. Such coordinators and teams will receive information and ideas from the leadership team identified above in sub-section A and will work with that team on additional ideas and plans.

GEO shall coordinate with EMT to create a program to promote and fund projects that reduce emissions and costs or increase low-carbon energy adoption and efficiency.

VIII. EFFECTIVE DATE

The effective date of this order is November 26, 2019.

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