

Larry Hogan
Governor
Boyd K. Rutherford
Lt. Governor



Ellington E. Churchill, Jr.
Secretary

MARYLAND DEPARTMENT OF GENERAL SERVICES
OFFICE OF THE SECRETARY

November 1, 2016

The Honorable Larry Hogan
Governor of Maryland
100 State Circle
Annapolis, Maryland 21401

Ben Grumbles
Chair, Commission on Climate Change
1800 Washington Boulevard
Baltimore, MD 21230

RE: 2016 Annual Report on the Status of Department of General Services' Programs that Support the State's Greenhouse Gas Reduction Efforts or Address Climate Change

Dear Governor Hogan and Chairman Grumbles:

The Department of General Services is pleased to submit the above-referenced report summarizing the status of programs that address greenhouse gas reduction and/or climate change, including implementation milestones, funding, challenges and estimated greenhouse gas emission reductions by program for the prior calendar year. The report was written in response to and in accordance with §2-1305 of the Environmental Article.

Should you have any questions or require additional information, please feel free to contact Mr. Barry Powell, Director of Energy Performance & Conservation, (410) 767-4375 or Barry.Powell@maryland.gov.

Sincerely,

A handwritten signature in blue ink, appearing to read "E. Churchill, Jr.", written over the typed name.

Ellington E. Churchill, Jr.



Annual Report on the Status of Department of General Services Programs that Support the State's Greenhouse Gas Reduction Efforts or Address Climate Change

November 1, 2016

In accordance with §2-1305 of the Environmental Article, the Department of General Services submits its annual report to the Governor and the Maryland Commission on Climate Change on the status of programs that support the State's Greenhouse Gas Reduction efforts or address Climate Change.¹ The report includes program descriptions and objectives, funding, challenges, and estimated Greenhouse Gas emissions reductions for calendar year 2015. The report also covers additional relevant information concerning renewable technologies as a way to deliver energy savings and emission reductions.

Background

The mission of the Department of General Services (DGS) is to provide leading-edge professional and technical services to keep State and local government working today and in the future. DGS functions to manage the state's work environments by designing, building, leasing, managing and maintaining facilities; leading energy conservation efforts; procuring goods and services; and providing essential functions such as fuel management, disposition of surplus property and records storage. DGS is one of Maryland's control agencies.

Within DGS, the Office of Energy Performance & Conservation (DGS Energy Office) is comprised of a small staff of technical, financial, and engineering energy experts. The Energy Office, *among other things*, works to:

- provide assistance with energy goals to state agencies;
- reduce, track, measure and verify energy use in state buildings and facilities;
- manage demand response to ensure system reliability;
- encourage consideration of energy efficiency in building design and renovation;
- evaluate and incorporate renewable energy options at state facilities and sites;
- integrate sustainability practices into agency operations;
- procure energy commodities in the deregulated market;
- promote environmentally preferable purchasing;
- train maintenance personnel in energy conservation practices;
- manage an electricity, gas, water, steam, chilled water, and fuel database;
- analyze the cost of all energy conservation measures and implement best practices; and
- analyze the cost and ensure the life cycle of equipment and controls that provide humidity, lighting, power, temperature, and ventilation.

¹ §2-1305 Environmental Article, Subtitle 13. Maryland Commission on Climate Change, Annotated Code of Maryland.

The DGS Energy Office regularly engages sister agencies, industry experts, advocates, and energy sector experts to provide advice and collaborate in crafting and improving upon its programs. The variety of perspectives has helped drive Energy Office initiatives to include Agency Energy Planning; Energy Performance Contracting; Energy Use Tracking, Energy Commodities Purchasing; Demand Response Planning; and Renewable Energy Sourcing. The suite of activities do not function independently; instead, they are intertwined and simultaneously executed to, *among other things*, comply with regulations and policies; meet energy efficiency and conservation goals; mitigate climate change and its causes; and support the State's greenhouse gas reduction efforts. This report will highlight how our Agency Energy Planning, Energy Performance Contracting and Demand Response Planning work together to abate environmental impacts while saving money.

Agency Energy Planning and Energy Performance Contracting

Agency Energy Planning directly links recommended energy policies to energy programs. The plan minimizes taxation, the effects of market fluctuations, adverse externalities, and threats to energy security and system reliability. At the same time, it maximizes the state's unique mix of energy resources, energy conservation measures, reliability standards, and environmental mitigation strategies to advance energy efficiency efforts.

Planning entails devising comprehensive, practical, strategic goals that are formulated into programmatic actions to help guide agency energy decisions, investment incentives, and energy conservation guidelines. The framework of the plan encompasses current trends to include renewable energy technology; system reliability; sustainability; economic development; environmental quality; and energy security. It further incorporates fuel demand, supply, and price characteristics. Since most of the State's infrastructure drawing on energy consumption was built years ago, periodic plan updates are necessary to ensure the state achieves its energy performance standards. Updated plans also make sure challenges to new risks and vulnerabilities are incorporated and protect critical infrastructure to increasingly severe weather events.

In a nutshell, Agency Energy Plans are intended to target positive, transformative change and provide a structure for buy-in. Well-developed plans result in quantifiable and achievable energy reduction goals, reduce carbon emissions, and link financing mechanisms to each goal in order for each goal to be implemented. The DGS Energy Office works with state agencies, through designated Agency Energy Coordinators (AECs), to produce Agency Energy Plans by identifying energy consuming units and recommending energy conservation measures and climate mitigation strategies with the greatest potential for energy savings.

While the DGS Energy Office leads the planning process, it collaborates with other state agencies to develop individual plans and to encourage and leverage agency expertise and resources. Also, together with the Maryland Energy Administration (MEA), it ensures state energy policy objectives are aligned and implemented across state government. In developing and carrying out the Agency Energy Plan, each agency must consider alternative financing

opportunities: (a) in shared savings and (b) performance contracting to include an analysis of the payback and cost advantage to the state of shared savings and performance contracting.²

Since its inception, the DGS Energy Office and MEA have put in place several new tools and resources to help agencies move beyond planning and on to building energy retrofits. Some state agencies have engaged in large energy performance contracting projects. An Energy Performance Contract (EPC) is a financing technique that allows state agencies to acquire energy savings and facility improvements without up-front capital expenses. A state agency partners with an Energy Service Company (ESCO) to explore and install selected energy conservation measures; the ESCO's performance is paid back out of the guaranteed energy savings. The DGS Energy Office provides guidance and technical expertise to enable state agencies to create and implement EPCs to significantly reduce energy and operating costs and make progress toward meeting sustainability and system reliability goals.

Enhancement Opportunities and Challenges

The MEA and the DGS Energy Office jointly produced a roadmap to energy efficiency to move beyond the round of large EPCs to focusing on the thousands of state facilities that were not included in the larger EPCs. The first round of EPCs targeted the largest size state facilities with the greatest number of opportunities for energy efficiency improvements and did not customarily include an agency's entire portfolio of buildings. The task was performed in this manner because comprehensive energy plans were not needed to initiate the first round of energy performance contracts.

The goal continues to focus Maryland state agency attention on energy efficiency in small and medium sized buildings that are not likely to be included in large energy performance contracts. The DGS Energy Office works to expand energy savings beyond large EPCs by targeting the state's 2,000 plus buildings up to 20,000 square feet in size. Targeting the smaller projects requires more effort and unique strategies (e.g., procuring firms to complete energy efficiency projects, creative financing) for achieving the agency's energy savings goals for the stock of smaller buildings that were not included in a large energy performance contract.

Major objectives are to:

- 1) educate and encourage state agency decision-makers to use the opportunities, incentives and financing available to retrofit small and medium-sized state building/structures/facilities;
- 2) educate and encourage state facility personnel to incorporate energy efficiency technologies and practices into their facilities; and
- 3) conduct energy audits and inspections of atypical facilities, with the intent to replicate the findings across many similar buildings.

² State Finance and Procurement Article §4-806 (2) (iii).

The DGS Energy Office and MEA continue to offer energy audits on identified state buildings with a small footprint. Historical energy audits led to the development of a list of economically attractive Energy Conservation Measures (ECM), (e.g., lighting, HVAC and insulation upgrades) to be installed during a building retrofit. These audits provided cost estimates, payback figures, and information on utility rebates. Building retrofits are made available for agencies through a competitive process by a utility partner contractor.

However, most agencies have not been able to create an Agency Energy Plan that focuses on the agency's inventory of smaller buildings. The DGS Energy Office continues to provide an agency with assistance in amending and updating its Agency Energy Plan to focus on smaller building stock. Completing the modified Agency Energy Plan to include each agency's complete inventory of buildings allows the agency to create multi-year budgets and retrofit plans to achieve its energy reduction and conservation goals.

Funding

The DGS Energy office receives no general funds to implement energy efficiency and conservation projects which, therefore, constrains its ability to increase efforts to reduce greenhouse gas emissions. Also, energy audit funding has been exhausted; the lack of funds hampers an agency's ability to identify energy conservation opportunities, which would diminish variables that affect climate change. Furthermore, state agency loan funding is no longer readily available because the funding stream has been exhausted due to the increased use by state agencies.

Most of the energy retrofit work in the state has been carried out through EPC projects that included approximately 500 buildings. These EPCs also included several other energy efficiency upgrades such as street lighting and other non-building measures. Financing for an EPC is carried out by the State Treasury's Office Master Lease Program where vendor financing rate and terms are compared to the rate and terms of the EPC Master Lease.³ The comparison is performed to ensure the lowest cost of financing. This financing could have been partially offset if funds were available through the Maryland Energy Administration's State Agency Loan Program.

The DGS Energy Office works with MEA to evaluate agency projects and find financing via the State Agency Loan Program (SALP). The SALP program is funded each year with a capital budget appropriation and is generally self-sustaining; however, the SALP was infused with federal Stimulus Funds to expand its ability to finance projects. SALP has been used to lower the borrowing costs of the state's energy performance contracting program. The SALP is administered by the MEA, which works with the DGS Energy Office to encourage the use of SALP for smaller projects in state facilities that are not suitable for larger energy performance contracts. However, total financing for the smaller projects on the remaining buildings in the state is less clear. Whereas, an EPC comes with contractually guaranteed energy savings, the

³ State Finance and Procurement Article, §12-301 (b) (2).

smaller projects, although expected to produce cost savings, do not. An EPC is a self-funding financing mechanism that does not require additional capital investment, whereas financing smaller projects will require additional funding.

Estimated Greenhouse Gas emissions reductions

Energy Service Companies, partnered with state agencies to perform energy performance contract projects, are important contributors to the development of clean energy, sustainability and climate change mitigation strategies. In 2015, DGS continued to help Maryland state government substantially reduce energy consumption through the management of 23 completed Energy Performance Contract projects. These projects are contractually guaranteed to deliver energy and operational savings of approximately \$194 million over the life of the contracts or approximately \$14.9 million in annual cost savings. This savings corresponds to 66.3 tons of annual CO₂ reduction.

Demand Response

Starting in 2009, the DGS Energy Office has been participating in the Pennsylvania, New Jersey, Maryland (PJM) Demand Response Program, which is designed to promote changes in electric usage by state agencies in response to: 1) changes in the price of electricity over time; or 2) incentives designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized. PJM Interconnection is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia. Acting as a neutral, independent party, PJM operates a competitive wholesale electricity market and manages the high-voltage electricity grid to ensure reliability for more than 65 million people.⁴ Reducing peak demand through energy conservation reduces the need for utilities to turn on their least-efficient, most expensive, power plants to meet electricity demand, and also reduces the need to build more physical capacity in the future.

Implementation and milestones

In the early stages of the Demand Response Program, the State of Maryland was an active participant. With the knowledge of electric meter data, the DGS Energy Office's technical staff performed in-house, real-time monitoring of PJM grid demand to discover potential "peak load" days. Assisted with this "day-ahead" and "real time" peak load data, staff was knowledgeable about the most opportunistic days to perform load-shifting and, therefore, could determine how much electric resources should be committed for the day. Staff could then curtail the use of electricity on peak demand days by changing electric building control systems to reduce energy demand. Data collected from these meters were used to determine savings from an analysis of energy consumption through a rate engine and comparison of costs.

⁴ PJM Fact Sheet. "Retail Electricity Consumer Opportunities for Demand Response in PJM's Wholesale Markets," "Demand Response and Why It's Important." Accessed October 21, 2016. <https://www.pjm.com/~media/markets-ops/dsr/end-use-customer-fact-sheet.ashx>

The results translated to thousands of dollars of bill payments and credits for state agencies and no financial penalty for enrolling in the Demand Response Program but not curtailing energy use.

Enhancement Opportunities and Challenges

In the last two years of the 10-year Demand Response Program (November 1, 2017 – October 31, 2019), participating state agencies will be able to curtail peak demand electricity use from just the summer months, to year-around. Thus, the DGS Energy Office will have to collaborate with state agencies on strategies and improvements for load shifting and to capture additional benefits. To manage a 365/24/7 Demand Response Program will take additional DGS Energy Office technical experts, fully trained energy systems operators, and reliable backup generators at all facilities pre-selected to participate. The DGS Energy Office is determining whether to participate with these new program requirements.

Funding

The state has limited financial resources to install or replace aging and improperly working back-up generators. Back-up generators are used to prevent the interruption of operations and critical infrastructure facilities like, health care and water treatment facilities, telecommunications networks, and emergency response agencies, to name a few. Backup generators are powered-up when the electric grid is interrupted or when the reliability of the system is so constrained, the state is alerted to shift its load. Therefore, highly efficient, backup generators are a requirement for continuity of operations of state facilities when participating in the PJM Demand Response Program. Budget constraints to repair, replace or supplement existing backup generators make it highly improbable the state will be able to participate in any year-around, demand response opportunities.

Estimated Greenhouse Gas emissions reductions

Because Maryland's electricity generation is still primarily coal, any behavior modification activity that uses less electricity when the system is constrained will inherently reduce CO₂ in the electric sector. As such, DGS Energy Office curtailment activities resulted in 120.6 tons of avoided CO₂ emissions. Used effectively, the Demand Response Program has resulted in reduced energy cost and greenhouse gas generation.

Additional Relevant Information

The DGS Energy Office continues to engage in comprehensive energy solutions including energy auditing, designing and implementing energy performance contracting projects as well as performing retrofits and overseeing the installation of energy conservation measures. Retrofitting all buildings identified as having higher than average energy use and installing energy conservation measures directly correlates to the reduction of greenhouse gases. Thus, Maryland, like most other states, focuses on energy efficiency as its first choice to meet mandates for greenhouse gas reduction. As with savings mandates, energy performance contracting projects enable agencies to meet greenhouse gas mandates that are not accompanied by capital budget increases. Maryland also incorporates onsite generation

vis-a-vis renewable energy technologies as a practical initiative in pursuit of sustainable energy and to mitigate climate change. The DGS Energy Office is exploring the capability of state agencies partnering with energy service companies to devise energy performance contracting projects that will incorporate renewable energy technologies. Because renewable technologies are still costly, the development of a comprehensive energy performance contract to include renewables must seek to include energy efficiency savings over and above the energy savings to date. Launching energy performance contracting projects that include renewables has the potential to deliver substantial energy savings and emission reductions.