Report of the Vermont State Auditor

March 5, 2015

STATE AGENCY ENERGY PLAN

EXTENT OF REDUCTIONS IN ENERGY USAGE UNCERTAIN

Douglas R. Hoffer
Vermont State Auditor
Rpt. No. 15-02

Mission Statement

The mission of the Auditor's Office is to hold state government accountable. This means ensuring that taxpayer funds are used effectively and efficiently, and that we foster the prevention of waste, fraud, and abuse.

Douglas R. Hoffer
STATE AUDITOR

STATE OF VERMONT
OFFICE OF THE STATE AUDITOR

March 5, 2015

The Honorable Shap Smith
Speaker of the House of Representatives

The Honorable John Campbell
President Pro Tempore of the Senate

The Honorable Peter Shumlin
Governor

Michael Obuchowski
Commissioner
Department of Buildings and General Services

Dear Colleagues,

Energy consumption reduction has long been a focus of state government. The first State Agency Energy Plan (SAEP) was prepared in the 1990s, and the Department of Buildings and General Services (BGS) was given primary responsibility for oversight of the 2005 and 2010 SAEPs. Recently, Act 40 (2011) required that each state entity reduce its energy consumption by 5 percent per year. Because of this decades-long focus, we determined to review implementation of the SAEP and progress toward meeting the Act 40 goal. Specifically, our two audit objectives were to 1) determine whether and how the State has assurance that the state agency energy plan is being implemented, and 2) determine whether state entities that are the largest consumers of energy met the Act 40 goal to reduce energy consumption by 5 percent in fiscal years 2012 and 2013.

The audit found that due to shortcomings in the 2010 and 2005 SAEPs, the State had limited information regarding whether, and the extent to which, its focus on reducing energy consumption resulted in reductions consistent with its goals. The 2010 SAEP included limited targets for expected performance and failed to establish a systematic mechanism to evaluate progress toward reducing energy consumption. In addition, required Agency Implementation Plans (AIPs) were not prepared by all state entities in 2005 and 2012. In 2012, only two of the four largest energy consumers—Agency of Transportation (AOT) and BGS—prepared AIPs. State government energy consumption has not been reported since 2011, and the results reported prior to 2011 were based on a BGS calculation that contained data and formula errors and had methodological flaws, including omission of energy consumption for leased space.

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It is unclear whether the Act 40 goal to reduce energy consumption by 5 percent annually has been met. This is because BGS's fiscal year 2012 energy consumption calculation for state government was flawed and contained data and formula errors and BGS did not calculate energy consumption in fiscal year 2013. In addition, the four state entities that were the largest consumers of energy in fiscal year 2012 (AOT, Military Department, Department of Corrections and BGS) did not evaluate the results of their efforts to reduce energy consumption compared to State goals.

BGS is taking steps to remediate some shortcomings in the implementation of the SAEP and the calculation of energy consumption. For example, BGS has plans to make some changes to the SAEP in the statutorily required 2016 update, including adding targets for annual energy reduction and GHG emissions. For the 2014 AIP update, BGS issued directions specifying that all entities prepare AIPs. BGS also has plans to use additional mechanisms to measure energy consumption for its operations, such as Portfolio Manager for building infrastructure, and is supporting other state entities with implementing this tool. In commenting on a draft of this report, BGS outlined various initiatives it planned to undertake in response to the recommendations.

Additional actions were recommended in the audit report, such as reporting energy consumption for state government operations subsequent to 2011 and obtaining and incorporating data on leased space into the tracking of energy consumption. These actions could provide increased assurance that the SAEP has been implemented and that data accurately represents the extent to which the State has met its goal to reduce energy consumption.

I would like to thank the management and staff at BGS as well as those of the Agency of Transportation, the Military Department and the Department of Corrections for their cooperation and professionalism during the course of the audit.

Sincerely,

Doug Hoffer

Doug Hoffer
Vermont State Auditor

Contents

Report

Introduction

For decades there has been significant focus by Vermont state government leadership on reducing energy consumption. Environmental conservation and renewable energy is one of eight priorities listed in Vermont's 2012-2015 strategic plan.

The Comprehensive Energy Plan (CEP), for state government and for the state as a whole, was first developed in the 1990s. The CEP addresses statewide use of electricity, heating and process fuels, and energy in transportation and land use decisions. Notably, in 2002, greenhouse gas emission reduction targets[1] were established by Executive Order 10-28 and codified in statute in 2006.

The first State Agency Energy Plan (SAEP) was prepared in the 1990s. According to the 2005 SAEP, this first plan was acted upon with varying degrees of success, but it was never updated nor carefully tracked for measurement against any specified objectives or goals. Statutory changes effective in 2004 and 2005 included energy goals codified in various statutes and executive orders. The Secretary of the Agency of Administration (AOA) and commissioners of the departments of Public Service (PSD) and Buildings and General Services (BGS) have been tasked with the development and oversight of the SAEP.

More recently, Act 40 (2011) established a goal that energy consumption be reduced 5 percent each year by each agency, board, department, commission, committee, branch, or authority of the State. Because of the decades-long focus on reducing energy consumption, we decided to review implementation of the SAEP and progress toward meeting the Act 40 goal. Specifically, our two audit objectives were to 1) determine whether and how the state has assurance that the state agency energy plan is being implemented, and 2) determine whether state entities[2] that are the largest consumers of energy met the Act 40 goal to reduce energy consumption by 5 percent in fiscal years 2012 and 2013.

Appendix I contains detail on our scope and methodology. Appendix II contains a list of abbreviations used in this report.

[1] A target is a desired numerical value related to a measure and is sometimes called a benchmark.

[2] For purposes of this report, "state entities" means agencies, boards, departments, commissions, or branches of the state. All are listed in Act 40(2011) as responsible for reducing energy consumption.

Highlights: Report of the Vermont State Auditor

State Agency Energy Plan: Extent of Reductions in Energy Usage Uncertain

(March 2015, Rpt. No. 15-02)

Why We Did this Audit	Energy consumption reduction has long been a focus of state government, with the first State Agency Energy Plan (SAEP) prepared in the 1990s. Recently, Act 40 (2011) required that each state entity reduce its energy consumption by 5 percent per year. Because of this focus, we determined to review implementation of the SAEP and progress toward meeting the Act 40 goal. Specifically, our two audit objectives were to 1) determine whether and how the State has assurance that the state agency energy plan is being implemented, and 2) determine whether state entities that are the largest consumers of energy met the Act 40 goal to reduce energy consumption by 5 percent in fiscal years 2012 and 2013.
Objective 1 Finding	The State had limited information about the extent to which the statutorily required SAEP was implemented and did not know the extent to which the SAEP objective to reduce energy consumption and greenhouse gas (GHG) emissions was met. This was because of shortcomings in 1) the 2005 and 2010 SAEPs, 2) the reporting of the status of state government energy consumption, and 3) BGS's calculation of energy consumption. Specifically, neither SAEP included targets associated with purchasing,[3] even though both plans cited purchasing as one of the areas where there was an opportunity to reduce energy consumption. Further, the 2010 SAEP included a single target for expected performance related to energy efficiency for state-owned buildings and failed to establish a process for state entities to evaluate whether energy consumption was reduced consistent with statutory goals. In addition, statutorily required Agency Implementation Plans (AIPs) for the SAEP were not prepared by all state entities in 2005 and 2012. Significantly, two of the four state entities that consumed the most energy did not prepare AIPs in 2012. Finally, energy consumption was not reported subsequent to 2011 and data reported prior to 2011 was incomplete and contained errors. According to the former energy engineer, BGS discussed setting targets in the 2010 SAEP but concluded that setting arbitrary percentage reduction targets could penalize users who were already doing a good job conserving. However, without targets the State cannot assess progress toward its objective to reduce energy consumption and GHG emissions. According to BGS, plans for the 2016 SAEP include specifying targets for annual energy reduction and GHG emissions. The failure to report energy consumption information subsequent to 2011 may have been related to disruption caused by Tropical Storm Irene and a period during which the energy engineer position was vacant. The energy engineer was assigned to

[3] Energy conservation in the purchasing area could occur by ensuring that the product to be purchased meets efficiency and environmental standards of the State and by operating devices in a manner that maximizes their energy efficiency features.

	finding leased space for employees displaced as a result of damage to state-owned buildings and the position was vacant for part of 2013 when the individual left the job. Energy consumption data provided prior to 2011 was not reliable because of methodological flaws and data and formula errors in BGS's calculation of energy consumption and GHG emissions. According to the United States Environmental Protection Agency, BGS's practice of using expenditures to estimate fuel use was the least accurate method for estimating consumption. In addition, energy consumed for leased space was not included in the department's energy consumption calculation. Based on BGS's managed space square footage data, about 16 percent of the 3.6 million square feet of building space managed by BGS in 2005 was leased space. Since 2005, according to BGS data, leased space has increased by nearly 60 percent which is likely to have exacerbated the effect of excluding the leased space from the energy consumption calculation. Subsequent to passage of Act 178 (2014), BGS developed procedures that require energy usage data be requested from existing landlords and new leases require that landlords have energy usage data available for the term of the lease. As of December 2014, some data had been collected regarding energy consumption in leased space.
Objective 2 Finding	The State did not know whether energy consumption was reduced consistent with the 5 percent target established in Act 40 because 1) BGS's fiscal year 2012 energy consumption calculation for state government was flawed and contained errors and 2) the department did not calculate energy consumption in FY2013. BGS appeared to be aware of the Act 40 goal and had the central responsibility of coordinating and reporting on SAEP implementation efforts, but the department did not incorporate analysis of progress toward the 5 percent goal in its evaluation of energy consumption for state government. None of the other three entities that consumed the greatest amount of energy in 2012 assessed progress toward meeting the 5 percent reduction although some of them monitored consumption and all of them appeared to be implementing projects designed to reduce energy consumption. Because of the lack of analysis of progress toward the 5 percent target, SAO compared the results of BGS's FY2011[4] and FY2012 energy consumption calculations for the Agency of Transportation, Department of Buildings and General Services, Department of Corrections, and the Military.[5] This comparison showed a 10.6 percent reduction. However, the results cannot be relied on because of the flawed methodology and errors in the calculation reported in the previous section.

[4] SAO reviewed BGS's energy calculations for 2004, 2008, and 2012 and found data omissions and errors in each. While 2011 was not reviewed, based on the results of the three years reviewed, similar issues may exist in the 2011 calculation.

[5] These four state entities consumed 76 percent of energy used by state government in FY2012.

Highlights: (continued)

(March 2015, Rpt. No. 15-02)

What We Recommend	We made various recommendations to BGS related to updating the SAEP in 2016, assessing and reporting energy consumption and GHG emissions for state government, and remediating BGS's energy consumption calculation. See page 28 for the list of recommendations.

Background

State Agency Energy Plan

3 V.S.A. §2291 requires the creation of the SAEP to provide state agencies with strategies to conserve resources, save energy, and reduce pollution from state government operations in three primary sectors: building infrastructure, state purchasing, and fleet management. The secretary of AOA and commissioners of PSD and BGS have been tasked with the development and oversight of the SAEP.

Statute requires the plan to be adopted by June 30, 2005 and readopted by the Secretary of the AOA on or before January 15, 2010 and each sixth year subsequent to 2010. The SAEP was issued in 2005 and reissued in 2010.

Statute also requires that state agencies prepare agency implementation plans and engage in a continuous planning process in a manner to be established and coordinated by the Commissioner of BGS. Per the 2005 SAEP, all state entities were required to create and adopt an implementation plan and to update it biennially. BGS was responsible for reviewing the initial implementation plans to ensure compliance with the SAEP, and AOA was required to approve the initial plans. Biennial updates are submitted to BGS for review.

Reporting on the energy reduction efforts by state government is the responsibility of BGS, which is statutorily required to submit a report to the Agency of Administration biennially on the status of the SAEP. The Climate Neutral Working Group (CNWG) also reported on state government energy consumption results, but it was replaced in 2012 upon the creation of Vermont's Climate Cabinet.[6] The Climate Cabinet, chaired by the Secretary of the Agency of Natural Resources (ANR), focuses on energy consumption statewide, rather than the efforts of state government operations.

[6] The Climate Cabinet is comprised of senior government officials including the secretaries of Administration; Agriculture, Food, and Markets; Commerce and Community Development; Natural Resources and Transportation; the commissioners of the departments of Economic, Housing and Community Development; BGS; and PSD. The cabinet is charged with advising the Governor, the legislature, and Vermonters on developing and implementing strategies that address the challenge of climate change. According to ANR's website, the Climate Cabinet is primarily engaged with implementing the recommendations of the CEP statewide.

There are multiple mechanisms for funding energy projects, including the capital bill, the annual budget appropriation, the State Resource Management Revolving Fund, and the Energy Revolving Fund, among others. See Appendix III for a description of the revolving funds and a list of the projects approved through December 2014.

Greenhouse Gas Emissions

In 2002, Governor Dean signed Executive Order 10-28, which established Vermont's greenhouse gas (GHG) emission reduction targets for state government consistent with those established for the New England region: 25 percent by 2012; 50 percent by 2028; and, if practicable, 75 percent by 2050. The same targets were re-established by Executive Order 10-30 in 2003 and codified as statewide goals in 2006 by Act 168 which asserted that Vermont would make an appropriate contribution to achieving the regional targets.

GHGs are gases, including water vapor, carbon dioxide (CO_2), nitrous oxide, and methane, which act like a blanket around Earth, trapping energy in the atmosphere and causing it to warm. According to the Environmental Protection Agency (EPA), this phenomenon is called the greenhouse effect and is natural and necessary to support life on Earth. However, the buildup of greenhouse gases can change Earth's climate and result in dangerous effects to human health and welfare and to ecosystems. Over the past century, human activities have released large amounts of carbon dioxide into the atmosphere.

According to the U.S. Energy Information Administration (EIA), CO_2 emissions are the main component of GHG emissions. In 2012, CO_2 accounted for about 82 percent of all U.S. greenhouse gas emissions from human activities, according to an EPA study.[7] GHGs tracked by Vermont state government address CO_2 emissions.

For combustion sources, which comprise the overwhelming majority of GHG emissions in state government, CO_2 emissions have a direct relationship to the quantity of fuel burned. In other words, CO_2 emissions can be estimated by simply knowing the amount and type of fuel combusted, the portion of fuel oxidized during combustion, and the carbon content of that fuel.

To compare or aggregate energy consumption across different energy sources like oil, natural gas, and electricity, a common unit of measure is used. Both

[7] *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012*, U.S. Environmental Protection Agency, April 2014.

the EIA and the State of Vermont use the British thermal unit (Btu)[8] as the common energy unit. A Btu is the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit. Because a Btu is such a small unit of energy, there are tens of thousands of Btus in even one gallon of gasoline. The State expresses its energy consumption in MMBtus (one million Btus).

To determine the CO_2 emitted by the energy sources, an emissions coefficient is applied to the amount of energy consumed. An emissions coefficient represents the maximum theoretical amount of CO_2 that could be released from an energy source (e.g., CO_2 emitted per Btu of fossil fuel consumed).

Table 1 shows the conversion factors needed to convert physical units to MMBtu and to determine the number of pounds of emissions generated by the fuel source.

[8] Btu is a measure of heat energy most commonly used for comparing fuels that are expressed in different physical units, such as gallons of gasoline, cubic feet of natural gas, tons of coal, or kilowatt hours for electricity.

Table 1: Conversion Factors Needed to Estimate Emissions Generated by Fuel Source

Energy Source	Physical Unit	Energy per unit in MMBtus[a]	Emissions Coefficient[a] (lbs/MMBtu)
Electricity	Kilowatt hour	0.00341	342.81
Natural Gas	Cubic Foot	0.00102	117.10
Propane	Gallon	0.09548	139.20
#1 Fuel Oil (kerosene)	Gallon	0.13500	161.40
#2 Fuel Oil	Gallon	0.13869	161.40
#4 Fuel Oil	Gallon	0.14500	161.40
#6 Fuel Oil	Gallon	0.14969	173.90
Diesel (average)	Gallon	0.13869	161.40
Biodiesel blend B20	Gallon	0.13459	129.12
Biodiesel	Gallon	0.11817	0.00
Gasohol (E10)	Gallon	0.12007	143.99
Gasoline (87 Octane)	Gallon	0.12500	156.40
Biodiesel blend B2	Gallon	0.13828	158.17
Aviation fuel	Gallon	0.12020	152.54

[a] Data provided by BGS and is based on information from EIA,US Department of Energy, and other sources.

To estimate energy consumption and GHG emissions, BGS obtained the expenditure data on various types of energy sources, such as natural gas, fuel oil, and gasoline, among others recorded in VISION, the state's financial system. Using an Excel spreadsheet, BGS performed the following steps to estimate consumption and GHG emissions:

1) Converted purchase costs recorded in VISION to physical units based on the state's average costs or contract prices (total dollar amount of purchase divided by average cost).
2) Applied an energy unit multiplier to the units calculated in the first step to determine energy consumed in MMBtus.
3) Applied an emissions coefficient to energy consumed calculated in second step to calculate GHGs.

To illustrate, according to BGS data, in FY2012 a state entity incurred $14,544 in expenditures for #2 fuel oil, which had a unit cost of $3.497. Dividing expenditures by unit cost yields an estimated 4,159 gallons of #2 fuel oil consumed. The average Btu content for a gallon of #2 fuel oil is 0.13869 MMBtus. Therefore, the number of MMBtus in the fuel oil consumed is 576.8 (4,159 x 0.13869). This would then be multiplied by the emissions coefficient of 161.4 to result in 93,095.5 pounds (or 46.5 tons) of CO_2 emitted from the entity's consumption of #2 fuel oil.

Objective 1: Limited Assurance that State Agency Energy Plan Was Implemented

The State had limited information regarding whether, and the extent to which, progress was made with respect to implementing the State Agency Energy Plan (SAEP). This was due to many factors. First, the 2010 and 2005 SAEPs had shortcomings.[9] In particular, the 2010 SAEP included limited targets for expected performance. Further, the 2010 SAEP stated that each state entity was responsible for monitoring energy consumption, but the plan provided no guidance on the type of information to monitor and did not establish a systematic mechanism for state entities to evaluate progress toward reducing energy consumption. Second, Agency Implementation Plans[10] (AIPs) were not prepared by all state entities in 2005 and 2012. Specifically, in 2012, two of the four state entities that consume the greatest amount of energy did not prepare AIPs. The other two largest energy consumers prepared AIPs in 2012, but did not include a systematic process to evaluate progress. Lastly, state government energy consumption has not been reported since 2011, and the results reported prior to 2011 were incomplete and contained some errors. As a result, the State had limited assurance that the SAEP was implemented and did not know the extent to which the SAEP objective to reduce energy consumption and greenhouse gas (GHG) emissions was met.

SAEP Shortcomings

The 2010 SAEP largely failed to include quantified targets for energy consumption reduction, with the exception of one target related to achievement of an Energy Star[11] rating of 75 for state-owned buildings. Notably, neither the 2005 or the 2010 SAEP included targets associated with purchasing,[12] even though both plans cited purchasing as one of the areas

[9] The 2005 SAEP was effective through January 2010 and the 2010 SAEP extends until January 2016.

[10] The intent of the AIP is for each agency to identify areas in which they can make significant energy reductions. The 2005 SAEP required that each component of the SAEP that is relevant to agency operations be addressed by implementing a systematic process to ensure steps are taken toward achieving the agency's goals.

[11] The Energy Star program is an EPA voluntary program that identifies and promotes energy-efficient products and buildings in order to reduce energy consumption, improve energy security, and reduce pollution through voluntary labeling of products and buildings that meet the highest energy efficiency standards.

[12] Energy conservation in the purchasing area could occur by ensuring that the product to be purchased meets efficiency and environmental standards of the State and by operating devices in a manner that maximizes their energy efficiency features.

where there was an opportunity to reduce energy consumption and statute specifically mentions it as well. In addition, the 2010 SAEP provided limited guidance for how to monitor energy use and did not establish a process to evaluate the impact of energy consumption reduction efforts. Lacking targets to compare to actual results and without a systematic process for entities and departments to track and evaluate energy consumption, the State had limited means to determine whether its goal to reduce energy consumption and GHG emissions was met.

Targets Largely Omitted from 2010 SAEP

The 2005 SAEP included goals with related strategies outlined by fuel consumption sector (i.e., infrastructure, transportation, and purchasing).[13] Further, the plan included targets to reduce energy consumption in the transportation sector by 10 percent and the infrastructure sector by 20 percent, with an overall target of 15 percent reduction by 2012 compared to a 2004 baseline. In contrast, the 2010 SAEP included goals and strategies but had only one target related to achievement of an Energy Star rating of 75 for state-owned buildings.

The following are additional examples of missing targets.

- Executive Order 10-30, which stated that Vermont's goal is to reduce GHG emissions by an amount consistent with the recommended reduction targets for the New England region,[14] was included as an appendix to the 2010 SAEP. However, the sections of the SAEP that addressed GHG emissions and monitoring and evaluating results did not include these targets or establish a baseline year to evaluate progress against and these sections do not reference the appendix.

- The requirement[15] to reduce the average fuel consumption of the state fleet[16] was included and some strategies were listed, such as, consider the use of alternative fuel vehicles, including natural gas and plug-in

[13] The Comprehensive Energy Plan outlined infrastructure, transportation, and purchasing as areas in which opportunities for efficient use of resources could be identified.

[14] The Conference of the New England Governors and Eastern Canadian Premiers Climate Change Action Plan established goals to reduce region-wide GHG emissions from a 1990 baseline by: 25 percent by 2012; 50 percent by 2028; and, if practicable using reasonable efforts, 75 percent by 2050.

[15] Per 3 V.S.A. §2291(c)(6).

[16] The state fleet is defined in 3 VSA 2291(a)(3) as passenger vehicles and light duty trucks for use by State employees in the conduct of official duties, excluding law enforcement vehicles assigned to sworn law enforcement officers, and shall be procured by the Commissioner of Buildings and General Services.

hybrid electric vehicles. However, no target was established for the amount to reduce the fleet's average fuel consumption. The 2005 SAEP strategies included monitoring and tracking fuel used by the fleet and "right-sizing" vehicles. However, right-sizing was not defined and according to the BGS Fleet Management Services[17] (FMS) division, the department did not have specific criteria to ensure right-sizing. FMS required departments requesting a vehicle to complete a justification form, and FMS calculated the minimum miles that the vehicle must be driven to be considered efficient. This is more limited than the approach used by the federal government. The U.S. Department of Energy's (DOE) federal fleet management handbook defines right-sizing as matching an entity's vehicle needs to its mission requirements. Since 2011, all federal executive agencies operating domestic fleets are required to establish and document a structured Vehicle Allocation Methodology (VAM) to determine the appropriate size and number of motor vehicles (i.e., optimize fleets to entity mission). The VAM includes developing minimum vehicle utilization criteria, which are used to validate the need for vehicles, such as per vehicle mileage, hours in service, and user/vehicle ratios, among others.

- Neither SAEP included targets associated with purchasing, but the 2005 plan indicated that considering total life-cycle cost[18] of environmentally preferable products and institutionalizing the use, reuse, and proper disposal of products would promote practices of resource conservation and pollution reduction. While these could be considered performance measures,[19] no targets were established that would allow evaluation of actual results. Federal agencies have established numerous performance measures and targets for purchasing, such as ensuring that 95 percent of entity electronic

[17] The BGS Commissioner has been given authority and responsibility for the purchase, use, storage, maintenance, repair, and disposal of all vehicles within the centralized fleet. By executive order, this authority and responsibility has been extended to all vehicles owned by the State.

[18] According to the 2005 SAEP, a life-cycle cost analysis would look at the entire cost of purchasing, installing, operating, maintaining, and disposing of a particular product, such as a hot water heater or copier.

[19] A measure is sometimes called a performance measure or performance indicator. It is a measurement for each aspect of performance under consideration. There are various types of measures, including those related to output, outcome, and efficiency.

product acquisitions are EPEAT-registered[20] and 95 percent of new contracts for products and services that are energy efficient.

The use of targets to provide a comparison of actual to expected performance is part of a performance measurement system required or recommended by the federal government, research and other organizations (e.g., the Governmental Accounting Standards Board, the Government Finance Officers Association, the Council of State Governments, the Urban Institute, and the National Academy of Public Administration), and other states. Further, according to the Urban Institute, the comparison of outcomes to benchmarks is a fundamental and essential element of performance measurement systems.

According to the former energy engineer at BGS, the department discussed setting targets during the development of the 2010 SAEP but concluded that setting arbitrary percentage reduction targets could penalize users who were already doing a good job conserving. However, without targets the State cannot assess progress toward its objective to reduce energy consumption and GHG emissions. Current BGS personnel suggested that the 2010 SAEP was meant to be very broad but indicated the 2016 SAEP will be more specific. BGS's plans for the 2016 SAEP include specifying targets for annual energy reduction, GHG emissions, use of renewable energy sources, and Btu usage per square foot.

Process To Evaluate Results Not Established in 2010 SAEP

According to 3 V.S.A. §2291(c)(4), appropriate provisions for monitoring resource and energy use and evaluating the impact of measures undertaken are to be included in the SAEP. Consistent with this requirement, the 2010 SAEP indicated that monitoring use would increase awareness of usage patterns and that monitoring would show progress. It also indicated that each entity was responsible for monitoring infrastructure and transportation owned by them and assessing results of energy consumption reduction efforts, while BGS was responsible for monitoring infrastructure and transportation totals for each entity statewide. However, the plan provided limited guidance on how to monitor consumption and did not establish a system to evaluate results.

In contrast to the 2010 SAEP, the 2005 SAEP required state entities to monitor and evaluate progress against goals established in the 2005 SAEP and adopted in AIPs and it required that report cards be submitted annually to

[20] EPEAT is a resource for purchasers and others wanting to find or promote electronic products with positive environmental attributes.

BGS through 2008. According to the 2005 SAEP, a score[21] was to be given by BGS based on comparing actual results to targets.

Based on information provided by BGS, the department tracked energy expenditures and calculated energy consumed and GHGs emitted by all state entities from 2004 to 2012. This approach enabled BGS to quantify energy consumption and GHG emissions, but the department did not provide evidence that it utilized this data to assess the extent to which the State had made progress toward reducing energy consumption. Further, quantifying energy consumed by each department did not identify reasons for gaps between actual performance and expected targets or whether energy reduction efforts at particular state entities had the intended effects.

The report card system was a mechanism that could have been used to track and evaluate energy consumption reduction efforts and results at state entities, but the tool had some limitations and there were problems with how it was implemented.

a. Actual total energy expenditure data on transportation and infrastructure was included on the report card, but the report card did not require state entities to compare this data with targets established in AIPs. Nor were state entities required to explain differences between targets and actual results. Without an assessment of actual results to targets and lacking narrative explanation, it is difficult to understand the causes of fluctuation in consumption or barriers to progress.

b. From 2005 to 2008, entities were provided FY2012 targets for total energy consumption reduction but annual targets were not included. Annual targets would have provided intermediate benchmarks to facilitate analysis of whether adequate progress was being made toward the 2012 target or whether changes were needed to energy reduction efforts.

c. Reporting Btus was not required in the report card process; rather entities were required to provide energy expenditure and consumption data to BGS, and the conversion was done by BGS following receipt

[21] Per the 2005 SAEP, the following scores were to be used: A – On target, B – Close to target, C – Making progress, D – No progress, F – Regressing.

of the report cards. It is not clear whether BGS provided Btu data to entities for use in assessing progress toward goals.

d. According to BGS, it facilitated semiannual meetings for various entities to assist with tracking and reporting energy consumption through the report card system. However, the report cards were accompanied by limited or no instructions on how to complete the form. Instructions that were provided did not include information on where entities could obtain the data required, such as usage and costs for the various consumption sources (e.g., gasoline, electricity, natural gas, propane). Without a process to disseminate consistent instructions to entities for collection of data and reporting via the report card, the data reported by entities may not have been a reliable representation of actual activity.

According to the former BGS energy engineer, some entities balked at providing information due to the grades that were to be provided. BGS discontinued the use of report cards in 2008 following completion of the semiannual meeting requirement that was part of the 2005 SAEP administration.

Despite the flaws in the State's use of the report card, this is an approach utilized by the federal government. Specifically, the federal Office of Management and Budget (OMB) manages a scorecard process to provide a means for entities to identify, target, and track energy consumption reduction efforts. The scorecards are graded based on sustainability plans submitted annually by federal agencies. Sustainability plans include identifying and prioritizing strategies to achieve specific federal goals and a narrative description of efforts or barriers to implementing strategies. The plans include specific numeric targets and metrics to measure success, including milestones to be achieved in the next 12 months. Included in the sustainability plans are graphs that summarize and trend, as percentages, entity progress toward meeting specific federal goals.

According to OMB, through the federal scorecard process, agencies are able to target and track the best opportunities to lead by example in clean energy and to meet a range of energy, water, pollution, and waste reduction targets. Additionally, agencies are held accountable for demonstrating continuous progress towards implementing statutory or executive order targets and goals reflected in their annual sustainability plans.

Incomplete Inventory of Agency Implementation Plans and Two Lacked Critical SAEP Component

In 2005, 11 of 48 entities that had energy expenditures recorded in VISION submitted AIPs to BGS for review and subsequent approval by the Secretary of the Agency of Administration (AOA). In 2012, eight entities submitted AIPs, two of which had not submitted in 2005. Four of the entities that submitted AIPs in 2005 accounted for most of state government's energy consumption,[22] which partially mitigates the fact that many entities did not prepare AIPs. However, in 2012, only two of the four largest energy consumers—Agency of Transportation (AOT) and BGS—prepared AIPs.[23] Further, despite BGS's responsibility for reviewing AIPs to ensure consistency with the SAEP, some entities failed to address all relevant components of the SAEP.

Per 3 V.S.A. §2291b, all state agencies must file an AIP with the Commissioner of BGS to ensure that the AIP remains consistent with the SAEP. The 2005 SAEP indicated that the plan affects all state entities and noted that each entity shall readopt and file its implementation plan biennially with the Commissioner.

All but one of the AIPs prepared in 2005 by the four largest energy consumers—AOT, BGS, Military Department, and the Department of Corrections (DOC)—addressed most of the relevant components in the 2005 SAEP. The 2005 AIPs included numerous strategies for energy reduction, as well as some timeframes for completing energy related projects. DOC's 2005 AIP was an outlier, as it addressed less than half of the relevant components in the SAEP. For example, the 2005 SAEP required entities to include the targets established for reducing energy consumption for transportation and infrastructure in the AIPs, but DOC failed to include these targets in its AIP.

BGS and AOT filed 2012 AIPs and both addressed about 40 percent of the relevant components of the 2010 SAEP. Significantly, neither established a process to assess at regular intervals whether energy reduction goals were being met. Without regular assessment of progress toward goals, entities lacked a means to determine if steps taken to reduce energy consumption produced desired results.

[22] Based on BGS data AOT, BGS, DOC, and the Military accounted for greater than 73 percent of energy consumption in 2005 and 76 percent in 2012.

[23] Appendix IV shows the various state entities that had energy expenditures and which submitted AIPs in 2005 and 2012.

The list of entities required to complete AIPs varied, according to the former BGS energy engineer. A former BGS commissioner explained to the energy engineer that some entities were exempt from the AIP requirement because they were too busy, understaffed, or consumed minimal amounts of energy. The next BGS commissioner (since succeeded) questioned why the list was not all inclusive and instructed the energy engineer to send everyone a notice that AIPs were to be completed. Later, however, the commissioner told the energy engineer to use the most current revised list.

Inconsistencies in the 2005 SAEP may also explain why only some entities were asked by BGS to provide AIPs. The SAEP included two matrices, which listed different entities required to prepare AIPs. One matrix identified 15 entities with responsibilities to meet the AIP requirements. The second matrix listed 23 entities with deadlines for adopting AIPs and reporting to BGS.

Regardless of BGS's reasoning for not requiring all entities to adopt an AIP, based on the criteria in statute and the 2005 SAEP written by BGS and approved by the Secretary of Administration, all state entities are required to file AIPs biennially. Without AIPs from all entities, in particular DOC and the Military in 2012, and with some incomplete AIPs, BGS and AOA were not assured that entities were taking steps to reduce energy consumption consistent with the SAEP. The current BGS Commissioner and energy engineer have noted their intent to follow statute and require all entities to prepare AIPs for the 2014 update and have issued communications to all state organizations consistent with their stated intent.

Data Not Reported Since 2011 and Energy Consumption Calculation Flawed and Contained Errors

Various reports and BGS's legislative testimony contained information about state government energy consumption prior to 2011. However, the data provided did not present an accurate portrayal of energy consumed by government operations because BGS's Excel spreadsheet calculation of energy consumption and GHG emissions contained flaws in the methodology, among which was the omission of energy used in office space leased by the State. In addition, the calculations for the 2004 baseline year[24] and subsequent years contained errors, such as an invalid mileage reimbursement rate and incorrect unit costs. As a result of the failure to report data subsequent to 2011 and the flaws in the data reported, the State

[24] The 2005 SAEP established 2004 as the year to compare subsequent years' results against.

did not have the information to know whether it was meeting its energy consumption reduction goals.

Data Not Reported Subsequent to 2011

Reports and legislative testimony from 2005 to 2011 provided by the Climate Neutral Working Group (CNWG)[25]and BGS contained energy consumption data. During this period, the CNWG produced biennial reports intended to document efforts and plans to meet Vermont's[26] greenhouse gas emission reduction goals. These biennial reports included energy consumption and GHG emission data for state government and analysis of actual energy consumption compared to targets for state government operations.[27] In addition, the State's 2005 SAEP and the 2010 SAEP and BGS's 2011 legislative testimony showed energy consumption, expressed in Btus. However, none of the reports disclosed that energy consumed by leased space was omitted from the energy data reported. As a result, the energy consumption and GHG emission data provided may have been misleading. BGS also produced statutorily required biennial reports[28] on the status of the SAEP implementation, but these reports did not include actual energy consumption data even though statute[29] requires that the SAEP include provisions for monitoring and evaluating the impact of energy consumption reduction efforts.

The lack of reporting subsequent to 2011 may be explained in part by the replacement of the CNWG with a state operations working group in 2012, and the failure to carry forward the biennial reporting requirement as a responsibility of this group. In addition, BGS's focus on energy initiatives waned in 2011 in the wake of Tropical Storm Irene, when the energy engineer was diverted to finding leased spaces for employees displaced by the devastation. The former duties of the energy engineer were resumed in January 2013 for about seven months, whereupon the position was vacated until early 2014.

[25] The CNWG was an interagency group established by Executive Order 10-28 in 2002, and chaired by the commissioners of BGS and the departments of Environmental Conservation and Public Service.

[26] The report addressed the state as a whole and was not limited to state government operations.

[27] The state government data contained within the CNWG reports was prepared by BGS.

[28] According to 3 V.S.A. §2291(f), BGS is required to report biennially the status of the SAEP to the Agency of Administration

[29] 3 V.S.A. §2291(c)(4).

The failure to report energy consumption data subsequent to 2011 may have occurred absent the interruptions caused by Tropical Storm Irene. Once the CNWG was replaced with another group, BGS's biennial reporting of the implementation of the SAEP was the only required reporting relative to state government energy use, and this reporting never incorporated actual energy consumption data.

Calculation Had Flawed Methodology and Contained Errors

BGS's methodology for calculating energy consumption excluded energy consumed in leased space and used energy expenditures to estimate consumption which, according to the United States Environmental Protection Agency (EPA), is fundamentally prone to errors. In addition, the calculation contained data errors and incorrect formulas.

Methodology

Based on BGS's managed space square footage data, about 16 percent of the 3.6 million square feet of building space managed by BGS in 2005 was leased space. By 2013, the effect of excluding leased space from the calculation of energy consumption was likely exacerbated because leased space had increased by nearly 60 percent since 2005[30] from 576,635 square feet to 915,125 square feet according to BGS.[31]

The 2005 AIP for BGS indicated that BGS would begin the task of quantifying the energy used in leased facilities. As of December 2014, BGS had obtained energy usage data only on the leased space where BGS pays the utility bills, but had not incorporated the information into its analysis of energy consumption. According to the former energy engineer, a former BGS Commissioner wanted to set standards for leased facilities and to try to help landlords understand what they could do to become more efficient. However, some landlords were resistant to providing the data or making changes in order to lease with the State.

The current BGS Commissioner indicated that the department requested the legislature address requirements for tracking energy consumption for leased space during the 2014 legislative session. Act 178 (2014) was passed, requiring BGS to develop a set of criteria and guidelines to evaluate and incorporate the use of energy efficiency measures, thermal energy conservation measures, and renewable energy resources in buildings leased

[30] During this same period, BGS-owned space increased by 2 percent.

[31] Square footage information is from the BGS Space Book which is an annual compilation by BGS Property Management Division of lands and buildings owned or leased by BGS. Other properties under the control of various state agencies and departments are not contained in the Space Book.

by the State. In response, BGS developed procedures, effective August 1, 2014, requiring that energy usage data be requested from existing landlords and that new lease conditions require landlords to have energy usage data available to BGS for the term of the lease.

An additional flaw in BGS's methodology related to the use of the dollar amount spent on energy to estimate energy consumption. According to the EPA, using the dollar amount spent on a type of fuel is the least accurate method of determining fuel use and is not recommended for reporting.[32] The EPA cited several factors that could lead to differences between the amount of fuel purchased and the amount of fuel combusted during a reporting period, such as changes in fuel storage inventory, fugitive releases or spills of fuel..

According to the former energy engineer, BGS utilized expenditures from the State's VISION accounting system to estimate energy consumption because this was the only data that was consistently available across all state entities. Although VISION contained fields for recording units purchased, such as gallons of fuel, these fields were not available for all types of units of measure and those available were not used by all state entities.

The Chief Performance Officer at AOA noted that VISION was the primary tool provided to all state entities for use in tracking energy consumption. She confirmed that the fields available to record quantities purchased were not consistently used by state entities. A February 2014 operational review conducted by the Department of Finance and Management showed that entities' use of VISION purchase order fields for quantity and unit price was inconsistent and concluded that the purchasing/consumption data were unreliable for potential downstream users such as BGS energy staff. The operational review did not provide a recommendation to address the inconsistent use of the fields for quantity and unit price. However, according to the State internal control guidance, on-going training is a key control that helps ensure that objectives are achieved and training on the use of these fields may improve the reliability of the data.

According to BGS, the department plans to continue to download expenditures from VISION and to use them as the primary input to the Excel spreadsheet used to calculate energy consumption and GHG emissions until a suitable replacement is found. However, BGS has implemented the use of

[32] When price data is converted to physical units using a standard energy unit multiplier, a price variance may lead to an inaccurate estimate of quantity purchased.

EPA's Portfolio Manager (PM),[33] to which energy consumption data is input for all state-owned buildings managed by BGS, including DOC's correctional facilities. The Agency of Transportation is implementing the use of PM for the buildings it owns as well. PM calculates metrics that can help the state understand how individual buildings or the overall portfolio is performing. For transportation and purchasing, BGS is looking for alternatives to the spreadsheet format for tracking energy consumption and is considering software to track energy consumption that would complement the existing Energy Star Portfolio Manager accounts. Given that the current calculation utilizes a method considered to be the least accurate by the EPA to estimate energy consumption, to the extent the State has consumption data available, it should be used. For example, the software system used by BGS FMS[34] provides data, including gallons of gas purchased and miles each vehicle has driven, that would allow BGS to calculate fuel usage and emissions from the state's fleet without using expenditures as the starting point. According to BGS FMS, other state entities that manage fleets, such the Department of Public Safety and AOT, utilize the same software as BGS FMS.

Errors

Errors in the calculation of the 2004 energy consumption baseline included the use of an incorrect formula and five invalid conversion factors,[35] which resulted in an overstatement of the amount of energy consumed. This inaccurate baseline was used to compare to actual results through 2008 and was cited in the 2005 SAEP as the amount against which to gauge reduction efforts.

Errors also existed in the calculation of actual energy consumed and GHGs emitted for fiscal years 2008 and 2012.[36] The errors included omitting fuel sources from the calculations, using an invalid mileage reimbursement rate, and incorrect unit costs, resulting in an understatement of energy consumption for 2008 and an overstatement in 2012.

[33] Portfolio Manager is an interactive online energy management tool that allows tracking and assessing energy and water consumption across a portfolio of buildings.

[34] According to the Fleet Services Manager, FMS collects fuel use data by providing vehicle users with a WEX Fleet Credit Card for gas purchased. Information is collected at the time gas is purchased, including the odometer reading, units purchased, price per gallon and total purchase price. A credit card statement is provided to FMS by WEX, which allows FMS to track the fuel purchases by vehicle. BGS Fleet also uses a software system called FleetFocus M5 for tracking the odometer reading, which is used to calculate miles per gallon.

[35] Conversion factors are factors used to convert energy data between units of measure, such as cubic feet of natural gas to Btus.

[36] BGS prepared calculations for FY2004 through FY2012. SAO selected the calculations from three of the nine years (2004, 2008 and 2012) to review in order to gauge the reliability of BGS's data.

Table 2 compares state government energy consumption as calculated by BGS to an amount adjusted by SAO for identified errors, for fiscal years 2004, 2008, and 2012 expressed in MMBtus and GHGs.

Table 2: Comparison of BGS and SAO Calculation of Energy Consumption

	2004	2008	2012	Percent decrease from 2004 to 2012
MMBTU per BGS	1,301,342	1,139,503	1,050,033	19.3%
MMBTU per SAO	1,259,448	1,171,539	1,033,461	17.9%
GHG per BGS	112,948	98,071	94,305	16.5%
GHG per SAO	107,682	100,605	87,407	18.8%

The BGS data indicates that MMBtus declined 19.3 percent from 2004 to 2012 while the SAO adjusted data show a 17.9 percent decline, although neither calculation includes energy use by leased space. A 1.4 percent difference may not be significant, but when considered with the inherent flaws associated with using expenditure data to estimate energy consumption and the exclusion of the energy consumed by leased space, the BGS data has not been a reliable representation of state government energy consumption.

The errors in the calculation may have occurred because BGS did not implement a process to require someone other than the user/developer of the spreadsheets to inspect the logic of formulas within the spreadsheets and the validity of inputs, such as conversion factors and to document the results of this review. Nor was there a documented review that demonstrated that changes to the calculations were tested and approved, independent of the developer of the changes. The lack of a documented independent review of logic in the spreadsheet formulas and changes to the spreadsheet increases the risk of errors in which inaccurate formulas may be created and improper results generated. Consequently, errors in the spreadsheets used to track and report energy consumption went unnoticed.

According to the State internal control guidance, proper documentation of policies and procedures is critical to the daily operations of a department. It is a key training tool that helps to ensure adequate and consistent understanding of the key inputs, formulas, and outputs, which among other things would provide guidance to less experienced employees on the process design and its implementation. Written documentation is also critical to ensure that formulas in the spreadsheets are updated in accordance with current conversion factors and reduces the likelihood of errors or omissions. However, BGS did not have formal written policies and procedures supporting its assumptions and calculation processes.

A PricewaterhouseCoopers, LLP white paper on spreadsheet controls[37] indicates that strong operational controls over key spreadsheets are essential for any organization to prevent and detect errors. Such controls include, but are not limited to, process documentation, access controls, and logic checks of formulas. Numerous field studies conducted on spreadsheets used in organizations have demonstrated that the vast majority of spreadsheets contain at least one major user error.

Objective 2: No Certainty on Whether Energy Consumption Was Reduced by 5 Percent Each Year

It is not clear whether the Act 40 goal[38] to reduce energy consumption by 5 percent annually has been met. This is because 1) BGS did not calculate energy consumed by state government in FY2013 and the department's FY2012 calculation was flawed and cannot be relied upon and 2) the four state entities that consumed the most energy did not assess their energy consumption compared to the Act 40 goal. SAO's comparison of the results of BGS's FY2011[39] and FY2012 calculations shows a 10.6 percent reduction for AOT, BGS, DOC, and the Military, the four state entities that consumed 76 percent of total energy used by state government. However, as noted in the previous section, the calculation included a method to estimate fuel usage that is the least accurate, according to the EPA, omitted energy consumed by leased space, and contained errors. The lack of reliable energy consumption data from BGS was exacerbated by the failure of individual entities to consistently monitor and evaluate the results of their efforts to reduce energy consumption compared to State goals. The four largest consumers of energy described many projects intended to reduce consumption, and a couple monitored energy consumption. However, none performed an assessment of energy consumption compared to the Act 40 goal.

BGS Energy Consumption Calculation Flawed

BGS did not calculate energy consumption in FY2013, but SAO's comparison of its energy consumption calculation for FY2011 and FY2012

[37] PricewaterhouseCoopers, *The Use of Spreadsheets: Considerations for Section 404 of the Sarbanes-Oxley Act*, July 2004.

[38] Effective May 20, 2011, state government's goal is to reduce energy consumption by each agency, board, department, commission, committee, branch, or authority of the State by 5 percent each year.

[39] SAO reviewed BGS's energy calculations for 2004, 2008 and 2012 and found flaws in each. While 2011 was not reviewed, based on the results of the three years reviewed, flaws may exist in the 2011 data as well.

shows that AOT and BGS significantly exceeded the 5 percent target, while DOC and the Military fell well short. See Table 3 for a comparison of energy consumed by AOT, BGS, DOC, and Military for infrastructure and transportation in FY2011 and FY2012 according to BGS's calculation.

Table 3: Comparison of BGS's Energy Consumption Calculation Results for FY2011 to FY2012 for Four Largest State Government Energy Consumers

	FY2011[a]	FY2012	MMbtu Increase/ (Decrease)	Percent Increase/ (Decrease)	SAO Comment
AOT	273,537	226,008	-47,529	-17.38%	BGS analysis did not include narrative explanation of changes in energy consumption or include energy efficiency measures such as consumption per square foot.
BGS	402,543	317,049	-85,494	-21.24%	
DOC	120,601	143,778	23,177	19.22%	
Military	101,886	116,328	14,442	14.17%	
TOTAL	898,567	803,163	-95,404	- 10.62%	

[a] SAO did not review the 2011 calculation. However, based on the results of the three years reviewed (2004, 2008, 2012), flaws may exist in the 2011 data as well.

In addition to excluding leased space, which was about 20 percent of the space managed by BGS in FY2012, and using expenditures to estimate fuel usage, there were also errors in BGS's calculation of energy consumed. For example, fuel sources were omitted and an invalid mileage reimbursement rate was used.

Tracking total energy consumption as the only measure of the State's progress on energy reduction is problematic because on its own it may not present sufficient information to assess progress. The data tracked by BGS did not include energy usage per square foot, which may be used to assess energy efficiency and allows comparisons over time regardless of the amount of space occupied. Further, BGS's analysis did not include narrative that would explain the cause of differences in energy consumed from year to year. As a result, it is not clear whether changes in consumption relate to changes in infrastructure or improvements in energy efficiency. Because of these shortcomings in BGS's analysis, the influence of extreme weather events on state government's energy consumption, such as Tropical Storm Irene in 2011, were not addressed. For example, the devastation of the Waterbury State Complex by Tropical Storm Irene necessitated relocation of personnel into leased spaces. According to BGS, because of the storm leased space increased by approximately 220,000 square feet (36 percent) in FY2012. Because leased space is excluded from BGS's calculation of energy consumption, relocating personnel from owned to leased space may have

accounted for some of BGS's decrease in consumption from FY2011 to FY2012.

According to the Government Accounting Standards Board, narrative information can provide explanations of the performance data and the possible effects of influential factors on performance. However, no narrative accompanied BGS's analysis so it is not possible to discern the impact that relocating personnel to leased space had on energy consumption. BGS officials have indicated that they intend to utilize energy consumption per square foot as an additional measure of the extent of progress toward reducing energy consumption.

Four Entities Consuming the Most Energy Did Not Assess Progress Toward Act 40 Goal

BGS, AOT, DOC, and the Military indicated that they were implementing, or had implemented, projects designed to reduce energy consumption and had conducted some monitoring of energy consumption. However, none assessed progress toward meeting the goal to reduce energy consumption by 5 percent annually.

Among the projects completed or underway, entities cited the following:

- BGS made upgrades to light-emitting diode (LED)[40] lighting and mechanical systems at several BGS facilities, and did a major renovation with geothermal heating and cooling system at the Bennington district courthouse.
- AOT performed energy audits on over 30 cinderblock garages and upgraded the garages with energy improvements, completed lighting retrofit projects on traffic signals, and was conducting net metering solar projects.[41]
- DOC replaced all the windows at the Chittenden Regional Correctional Facility to reduce the use of air conditioning and heating

[40] Light-emitting diodes are semiconductor devices that produce visible light when an electrical current passed through them.

[41] Net metering requires electric utilities to permit an individual customer or group of individual customers (referred to as group net metering) to generate their own power using small-scale renewable energy systems and qualified combined heat and power systems using non-renewable fuels. The excess power they generate can be fed back to the utility for credit.

systems and is replacing all the metal halide[42] light fixtures with LED fixtures.

- The Military constructed a near net-zero building that houses an engagement skills trainer (i.e., computer simulated warfighter) which, they reported, is almost energy neutral at 95 percent.

BGS and Military have consistently tracked energy consumption for their operations. According to AOT, energy usage for its operations was tracked through 2007. DOC appeared to have tracked energy usage for some of its correctional facilities.

- BGS tracked its own utility costs and kilowatt hours in an Excel spreadsheet through FY2012. Subsequently, BGS has used the Energy Star software to track energy consumption, including the information on electricity usage gleaned from the sub-meters installed on various state buildings. A separate energy management system is used that records sub-metering data for electrical and condensate meters.[43]

- The Military (Army National Guard), uses two databases: 1) Army Energy and Water Reporting System (AEWRS), which is an online system for entering all the fuel oil (in barrels) and megawatt hours of energy used for all the federally supported square footage of building stock at the Military; and 2) UM PRO, which is a local database that resides on a server at the Military used daily to enter all energy bills, except those for fleet which are tracked on spreadsheets. UM PRO compiles all the utility bills on a monthly basis for all the Military's facilities, which is used to report up the chain to the National Guard Bureau through the AEWRS system. The Military tracks energy consumption because it is required to provide energy consumption data to the federal government. Military noted that it also reported the data to the State until the energy engineer at BGS left the position in 2013. The Military's energy contact noted that it would not be difficult to report as long as the State provides sufficient guidelines to put the report together and provides the contact information so the Military knows to whom reports should be submitted.

[42] Metal halide lamps are high-intensity discharge lamps that use mercury and other additives as light-producing elements.

[43] A condensate meter measures the amount of steam used in a building.

- AOT's operations division tracked energy usage on Excel spreadsheets up to 2007, but they were not subsequently updated. AOT prepared a spreadsheet of energy expenditures for FY2011, FY2012, and FY2013 and converted the expenditures to Btus using factors from the U.S. Energy Information Administration (EIA) when we asked if there was any tracking more recent than 2007. However, the spreadsheet had not been used by the agency for tracking and evaluating results, and it did not provide a complete accounting of AOT's energy consumption results, as it omitted aviation fuel.

- DOC provided SAO various reports used to track energy information from four of seven correctional facilities. However, the report format was inconsistent and the four facilities tracked information during different periods of time. According to DOC's financial director, the information was used for budgeting purposes but he was unaware if it had been consolidated and used for tracking energy consumption.

The State's efforts may have had the intended effect of reducing energy consumption. However, without comparison of actual results to targets such as the 5 percent annual reduction goal established by Act 40 (2011), individual entities and the State does not know whether the goal has been met. BGS appeared to be aware of the Act 40 requirement because it was listed in its 2011-2015 Strategic Plan, but the department did not communicate the requirement to entities. It is not clear why BGS did not incorporate analysis of progress toward the 5 percent goal in its evaluation of energy consumption. None of the four entities had the Act 40 goal included in the 2012 AIP updates which may explain why they did not assess progress toward meeting the goal.

Conclusion

The State had limited knowledge regarding the extent to which its decades-long focus on reducing energy consumption and greenhouse gas emissions resulted in reductions consistent with its goals.

In part, this was due to inadequacies in the 2005 and 2010 SAEPs. In particular, the 2010 SAEP had limited targets for expected performance. Without targets, it is difficult to measure the extent to which progress has been made. Further, the 2010 SAEP did not establish a systematic mechanism for state organizations to evaluate progress toward reducing energy consumption, unlike the 2005 SAEP which implemented a periodic report card system. An important part of the SAEP was the Agency Implementation Plans (AIP), but the 2012 update was not prepared by DOC

and the Military, two of the state entities that consumed the greatest amount of energy.

The lack of reporting state government's energy consumption subsequent to 2011 also adversely impacted the State's knowledge about whether energy consumption reduction goals were achieved. The end of this reporting corresponded with the dissolution of the Climate Neutral Working Group, as its reporting obligations were not transferred to the group that replaced it. In addition, BGS's operations in 2011 were significantly impacted by Tropical Storm Irene, which likely contributed to a lack of focus on reporting energy consumed by state operations. Regardless of the reason that reporting ceased, energy consumption results reported prior to 2011 were not reliable because BGS's method of calculating energy consumption was flawed and the department's calculation contained data and formula errors.

BGS has plans to make some changes to the SAEP in the statutorily required 2016 update, including adding targets for annual energy reduction and GHG emissions. Moreover, for the 2014 AIP update, BGS issued directions specifying that all entities prepare AIPs. BGS also has plans to use additional mechanisms to measure energy consumption for its operations, such as Portfolio Manager for building infrastructure, and is supporting other state entities with implementing this tool. The department plans to continue the same approach using expenditure data as the basis for calculating energy consumption and GHG emissions for each state entity until it identifies suitable replacements. However, the department does not appear to have plans to develop a systematic process, such as the federal scorecard system, to be used by all entities for monitoring and evaluating progress toward the State's energy consumption reduction goals.

BGS is taking steps to remediate some shortcomings in the implementation of the SAEP and the calculation of energy consumption. Additional actions could provide increased assurance that the SAEP has been implemented and that data on energy consumption accurately represents the extent to which the State has met its goal to reduce energy consumption and GHG emissions.

Recommendations

We make the following recommendations to the Commissioner of BGS and describe the related issues in Table 4:

Table 4: Recommendations and Related Issues

Recommendation	Report Page	Issue
1. Ensure that the 2016 update to the State Agency Energy Plan specifies: a. targets for energy consumption and GHG emission reduction by energy sector (transportation, infrastructure, and purchasing/contract administration); b. a baseline year in order to measure the extent of energy consumption and GHG emission reductions; and c. a systematic process, including written guidance, for state organizations to utilize to track and evaluate progress toward reducing energy consumption.	9-12	The 2010 SAEP included a target for expected performance related to energy efficiency for state-owned buildings, but did not include targets for energy consumption reduction for the energy sectors (transportation, infrastructure, and purchasing) that were listed in the 2005 SAEP with targets for percentage reductions by 2012. Executive Order 10-30, which included the New England region GHG emission reduction targets, was an appendix to the 2010 SAEP, but the SAEP sections on GHG emissions and monitoring and evaluating failed to include targets, did not specify a baseline year to evaluate progress against, and did not reference the appendix. In addition, the 2010 SAEP did not establish a process for state entities to evaluate whether energy consumption was reduced consistent with statutory goals and had limited guidance on how to monitor energy use.
2. Define right-sizing of a vehicle and develop a structured method that includes consistent criteria to determine the appropriate size and number of motor vehicles to ensure right-sizing the State's passenger fleet vehicles, in order to reduce average fuel consumption.	10-11	Strategies to reduce average fuel consumption for the state fleet were listed in the SAEPs and included monitoring and tracking fuel used by the state fleet and "right-sizing" vehicles. However, right-sizing was not defined and according to the BGS FMS division, the department did not have specific criteria to ensure right-sizing for vehicles in the state fleet.

Recommendation	Report Page	Issue
3. Require submission of periodic progress reports (e.g., report card) by state entities to BGS, including comparison of targets to actual results, narrative explanation and reporting energy consumption in Btus. Develop written instructions for state entities for data collection and reporting via the progress report.	12-14	The 2010 SAEP did not include provisions for evaluating the impact of measures undertaken to reduce energy consumption. In contrast, the 2005 SAEP required state agencies and departments to monitor and evaluate progress against goals established in the 2005 SAEP and adopted in AIPs and it required that report cards be submitted annually to BGS through 2008. This tool had some limitations and there were problems with how it was implemented. State entities were not required to compare actual results to targets or to provide narrative explanation for significant changes to energy consumption and to explain the difference between actual results and targets. In addition, state entities did not report energy consumption in Btus and BGS provided limited instruction on how to complete the report cards.
4. Work with the AOA to obtain AIPs from all state entities.	15	In 2005, 11 of 48 agencies that had energy expenditures submitted AIPs to BGS for review and subsequent approval by the Secretary of the Agency of Administration. In 2012, eight agencies submitted AIPs to BGS and only two of the four largest energy consumers—Agency of Transportation and BGS—prepared AIPs.
5. Establish a process to review AIPs that ensures the relevant components of the current SAEP are addressed.	15-16	BGS has responsibility for reviewing AIPs to ensure consistency with the SAEP, but some state entities failed to address all relevant components of the SAEP. In particular, BGS and AOT prepared 2012 AIPs and both addressed about 40 percent of the relevant components of the 2010 SAEP. Significantly, neither established a process to assess at regular intervals whether energy reduction goals were being met.

Recommendation	Report Page	Issue
6. Expeditiously report energy consumption for state government operations subsequent to 2011 to the legislature, including analysis of actual energy consumption compared to targets and narrative explanation for differences between targets and actual results, and disclose that energy consumed by leased space is omitted.	16-18	Energy consumption data was not reported subsequent to 2011. From 2005 to 2011 the CNWG produced biennial reports which included energy consumption, analysis of actual energy consumption compared to targets, and GHG emission data for state government. The 2005 SAEP, 2010 SAEP and BGS's 2011 legislative testimony also included energy consumption data, expressed in Btus. Only the 2005 SAEP disclosed that energy consumed by leased space was omitted from the energy data reported. As a result, the energy consumption and GHG emission data provided may have been misleading.
7. Commencing with the next biennial report on the status of the SAEP, incorporate energy consumption data and an evaluation of the impact of energy consumption reduction efforts into the report.	18	BGS produced statutorily required biennial reports on the status of the SAEP implementation. However, these reports did not include energy consumption data or an evaluation of energy consumption reduction efforts even though statute requires that the SAEP include provisions for monitoring and evaluating the impact of energy consumption reduction efforts.
8. Expeditiously obtain energy consumption data for all leased space according to BGS procedures effective August 2014 and include energy consumption from leased space into the tracking and reporting of energy consumption in state government operations.	18-19, 23	Leased space was about 16 percent and 20 percent of the building space managed by BGS in 2005 and 2012, respectively, but energy usage by leased space has not been included in the calculation of state government energy consumption. The 2005 AIP for BGS indicated that BGS would begin the task of quantifying the energy used in leased facilities. As of December 2014, BGS had collected some energy usage data on its leased space, but had not incorporated the data into its energy consumption analysis. BGS developed procedures, effective August 1, 2014, requiring that energy usage data be requested from existing landlords and that new lease conditions require landlords to have energy usage data available to BGS for the term of the lease.

Recommendation	Report Page	Issue
9. Work with AOA to determine whether the functionality that exists within the VISION system for recording quantity and unit price of energy sources (e.g., fuel, electricity, etc.) purchased is sufficient or whether enhancements are required. To the extent VISION is found adequate, AOA and BGS should collaborate to provide training to state entities to ensure consistent and appropriate use of VISION purchase order fields for quantity and unit price.	20	BGS utilized expenditures from the State's VISION accounting system to estimate energy consumption because this was the only data that was consistently available across all state entities. Although BGS and other state entities have implemented or are implementing energy consumption tracking systems, as an interim measure, VISION expenditures represent an information source that may be used to estimate energy consumption for those departments that do not have tracking in place. Although VISION contains fields for recording units purchased, such as gallons of fuel, these fields were not available for all types of units of measure and those available were not used by all state entities. A February 2014 operational review conducted by the Department of Finance and Management showed that agencies' use of VISION purchase order fields for quantity and unit price was inconsistent and concluded that the data were unreliable for potential downstream users such as BGS energy staff. The operational review did not provide a recommendation to address the inconsistent use of the fields for quantity and unit price. However, according to the State internal control guidance, on-going training is a key control that helps ensure that objectives are achieved and training on the use of these fields may improve the reliability of the data.
10. Continue to implement alternatives to using expenditure data from VISION for calculating energy units used and energy consumption via an Excel spreadsheet.	19-20	According to the EPA, using the dollar amount spent on a type of fuel is the least accurate method of determining fuel use and is not recommended for reporting. BGS plans to continue using expenditure data from VISION input to the Excel spreadsheet to calculate energy units (e.g. gallons of fuel, kw hours, etc.) used, Btus consumed and GHG until a suitable replacement is found. BGS has implemented the use of EPA's Portfolio Manager for state-owned buildings it manages. AOT is implementing the use of PM for the buildings it owns as well. For transportation and purchasing, BGS is looking for alternatives to the spreadsheet format for tracking energy consumption and is considering software to track energy consumption that would complement the existing Energy Star Portfolio Manager accounts.

Recommendation	Report Page	Issue
11. Implement strong operational controls, such as process documentation, access controls, logic checks of formulas, and a review by someone other than the preparer, for the spreadsheet utilized by BGS to calculate energy consumption and GHG emissions.	20-22	Errors in the calculation of the 2004 energy consumption baseline included the use of an incorrect formula and five invalid conversion factors. Errors also existed in the calculation of actual energy consumed and GHGs emitted for fiscal years 2008 and 2012. These errors included omitting fuel sources from the calculations, using an invalid mileage reimbursement rate, and incorrect unit costs. The errors in the calculation may have occurred because BGS had not implemented a process to require someone other than the user/ developer of the spreadsheets to inspect the logic of formulas within the spreadsheets and the validity of inputs, such as conversion factors, and to document the results of this review. Nor was there a documented review that demonstrated that changes to the calculations were tested and approved, independent of the developer of the changes. Further, BGS did not have formal written policies and procedures supporting its assumptions and calculation processes.
12. Assess the State's progress toward meeting the Act 40 goal to reduce energy consumption by 5 percent annually and for the periods that energy consumption from leased space is not included, disclose its omission.	22-26	BGS, AOT, DOC, and the Military, the four state entities that consumed the most energy in FY2012, did not assess their energy consumption compared to the Act 40 goal. SAO's comparison of the results of BGS's FY2011 and FY2012 calculations shows a 10.6 percent reduction for AOT, BGS, DOC, and the Military, but the calculation omitted energy consumed by leased space
13. Ensure that state entities incorporate the Act 40 goal to reduce energy consumption by 5 percent each year into their 2014 update to AIPs and include it as a goal in the 2016 SAEP.	26	BGS appeared to be aware of the Act 40 requirement because it was listed in its 2011-2015 strategic plan, but it's not clear why the department did not incorporate analysis of progress toward the 5 percent goal in its evaluation of energy consumption. In addition, none of the four had the Act 40 goal included in their 2012 AIP updates which may explain why they did not assess progress toward meeting the goal.

Management's Comments

The Commissioner of the Department of Buildings and General Services provided written comments on a draft of this report in a letter dated February 23, 2015. The comments are reprinted in Appendix V. In addition, our evaluation of the comments may be found in Appendix V.

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In accordance with 32 V.S.A. §163, we are also providing copies of this report to the Commissioner of the Department of Finance and Management and the Department of Libraries. In addition, the report will be made available at no charge on the state auditor's website, http://auditor.vermont.gov/.

Appendix I
Scope and Methodology

To address our first audit objective—to determine whether and how the State has assurance that the state agency energy plan is being implemented—we met with officials from the Agency of Administration (AOA), Department of Buildings and General Services (BGS), Agency of Natural Resources (ANR), and Public Service Department (PSD) to understand 1) their roles in overseeing the implementation of the State Agency Energy Plan (SAEP) and their perspective on the status of the SAEP and whether energy consumption reduction goals have been met and 2) how and to what extent the entities responsible for the Comprehensive Energy Plan and those responsible for SAEP interact and collaborate to ensure that the goals for state government are being met.

We obtained a copy of the Public Service Board's Order of Appointment with the Vermont Energy Investment Corporation and met with officials from Efficiency Vermont (EVT) to obtain an understanding of the role that EVT has with respect to the State's efforts to reduce energy consumption.

We compared the original 2005 SAEP framework to the 2010 SAEP to identify significant changes. We assessed the 2005 and 2010 SAEPs against the criteria found in statutes, session laws, and executive orders to identify any gaps in the SAEPs. We identified energy consumption reduction goals established in statute, session law and executive orders to determine whether goals were incorporated into the SAEPs. We met with the newly hired BGS energy engineer to gain his perspective on future plans for the energy program and the status of the 2016 SAEP. Additionally, we examined BGS's biennial reports to the legislature for FY 2007-2013, the BGS Strategic Plan for FY 2011-2015, BGS environmental accomplishment reports, and BGS energy newsletters from 2006-2013 for energy related activities and information pertinent to our audit.

We obtained all Agency Energy Implementation Plans (AIPs) submitted to BGS in FY 2005 and 2012 to determine if BGS received all required AIPs from state entities. We assessed whether the 2005 and 2012 AIPs prepared by the largest energy consumers—BGS, Department of Corrections (DOC), Agency of Transportation (AOT), and the Military—incorporated the required elements from the 2005 and 2010 SAEPs. We evaluated whether the 2005 and 2012 AIPs prepared by these four entities contained targets and energy reduction strategies for meeting energy goals and whether data was collected to track and report actual results. We reviewed strategic plans, annual performance reports submitted with the entities' annual budgets, EVT agency project reports and facility condition assessments.

We met with officials from BGS, including the former energy engineer to obtain an understanding of the policies, guidance, training and data gathering

tools provided to state entities for preparing the AIPs. We reviewed the minutes from BGS's semiannual energy meetings held through 2008 and the 2005-2008 report cards used by entities to report energy reduction results to BGS to assess whether they provided a mechanism to meet the monitoring and evaluation requirements in the 2005 SAEP.

In order to determine whether BGS reported the status of the SAEP as required by 3 V.S.A. §2291(f), we obtained all reports BGS submitted to the legislature during FY 2005-FY 2013, which included the 2005 and 2010 SAEPs and biennial SAEP progress reports prepared by BGS. The reports were evaluated to determine 1) whether information reported was inclusive of all state government, 2) whether actual or estimated results were reported, 3) the extent to which data on state government's progress toward the State's energy reduction goals was included, and 4) whether the information reported was consistent with the data in BGS's energy consumption calculations. We determined BGS provided certain energy data for inclusion in the biennial reports of the Climate Neutral Working Group, so we traced the data to BGS's documentation to assess the consistency of the data.

We assessed the reasonableness of the methodology and the accuracy and completeness of the Excel spreadsheet calculation prepared by BGS to estimate physical units used (e.g., gallons, kilowatt hours, cord, ton), energy consumption and CO_2 emission for FY 2008 and FY 2012. We used guidance from the U.S. Energy Information Administration (EIA), Environmental Protection Agency (EPA), Department of Energy (DOE) and Wisconsin State Energy Statistical reports. To test the calculation of estimated physical units used, we downloaded the FY 2008 and FY 2012 energy expenditures from VISION, the State's financial accounting system, for all business units and energy related expense codes and compared this data to the expenditure data used by the BGS energy engineer to calculate estimated physical units used. Further, we compared the average price data used in the calculation to supporting documentation, Oil Price Information Service rack pricing schedules, and vendor fuel markups. Finally, we recalculated physical units by source (e.g., propane, heating oil #2, diesel oil) and checked all formula references in the spreadsheet. To test the calculation of energy consumption and CO_2 emissions, we compared the energy unit multipliers and emission coefficients used by BGS to data from the EIA and US Department of Energy, recalculated MMbtus and CO_2 emissions and reviewed all related formulas in the spreadsheet.

We obtained the BGS space books for FY 2005 and 2012, which show the total square footage of BGS-managed space, and calculated the percentage that leased space occupied for which energy usage was omitted from the

calculation that estimated physical units used, energy consumption and CO_2 emissions.

We met with the Performance Officer from AOA to understand VISION capabilities to capture energy related data.

To address our second objective—to determine whether state entities that are the largest consumers of energy met the Act 40 (2011) goal to reduce energy by 5 percent each year—we reviewed the Act 40 requirements contained in session law.

We interviewed officials from BGS, BGS's Fleet Management Services, DOC, AOT, and the Military Department. To the extent available, we obtained energy tracking and evaluation tools maintained by these entities.

We used this information to assess whether entities 1) established targets for energy reduction in their AIPs consistent with the Act 40 goals; 2) measured actual results against targets; 3) tracked and monitored energy results; and 4) experienced barriers that impeded entity energy reduction efforts. We compared the data from BGS's FY 2011 and FY 2012 energy consumption spreadsheets to assess whether the data indicated that the four entities met the 5 percent reduction goal.

Our audit work was performed between March and November 2014 and included site visits to BGS and AOT in Montpelier, DOC in Williston, and the Military Department in Colchester. We conducted this performance audit in accordance with generally accepted government auditing standards, which require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusion based on our audit objectives.

Appendix II
Abbreviations

AEWRS	Army Energy and Water Reporting System
AIP	Agency Implementation Plan
ANR	Agency of Natural Resources
AOA	Agency of Administration
AOT	Agency of Transportation
BGS	Department of Buildings and General Services
Btu	British thermal unit
CEP	Comprehensive Energy Plan
CNWG	Climate Neutral Working Group
CO_2	Carbon Dioxide
DOC	Department of Corrections
EIA	U.S. Energy Information Administration
EPA	U.S. Environmental Protection Agency
EVT	Efficiency Vermont
FMS	Fleet Management Services
GHG	Greenhouse Gas
Military	Military Department
MMBtu	One million British thermal units
OMB	Office of Management and Budget
PM	Portfolio Manager
PSD	Department of Public Service
SAEP	State Agency Energy Plan
SAO	State Auditor's Office
SERF	State Energy Revolving Fund
SRMRF	State Resource Management Revolving Fund
VAM	Vehicle Allocation Methodology
VISION	Vermont's financial system

Appendix III
Energy Revolving Funds

The following table summarizes BGS's guidelines and procedures for the State Resource Management Revolving Fund (SRMRF) and the State Energy Revolving Fund (SERF). This information is provided for informational purposes, and SAO has drawn no conclusions from this data.

Table 5: Summary of SRMRF and SERF Guidelines and Procedures

	SRMRF	SERF
Date Established	June 8, 2004	June 9, 2014
Enabling Statute	29 V.S.A. §168 (b)	29 V.S.A. §168 (c)
Purpose	To provide revenue for implementation of resource conservation measures anticipated to generate a life cycle cost benefit to the State.	To finance energy efficiency improvements and the use of renewable resources in state buildings and facilities anticipated to generate a cost savings to the State.
Spending Authority	Current annual cap is $1.5 million.[1]	Up to $8 million.
Administered by	Buildings and General Services	
Eligibility Criteria	• All state agencies responsible for development and operations and maintenance of state infrastructure shall have access to funds on a priority basis[2] established by the BGS Commissioner. • $5,000 minimum loan	State agencies and departments shall have access to the funds on a priority basis[2] established by the BGS Commissioner and the State Treasurer.
Application Requirements[3]	• Project description • Project cost • Implementation plan including project schedule and start date • Life cycle cost benefit to the State including net present value and lifetime return on investment • Simple payback period calculations that incorporate financial incentives, e.g., rebates from Efficiency Vermont (EVT) • Annual reduction in energy usage[4] • Annual reduction of greenhouse gas emissions[4] • Resources conserved, including water usage and waste reduction[4]	
Approval Process	Project applications shall be reviewed by BGS's energy division and submitted to the Commissioner of BGS for final approval.	Project applications shall be reviewed by BGS's energy division and submitted to the Commissioner of BGS for final approval. All approved projects will be submitted to the Treasurer's Office for funding approval.
	All projects funded are subject to review by the Commissioner of BGS, Commissioner of Finance and Management and the State Treasurer.	

Appendix III
Energy Revolving Funds

	SRMRF	SERF
Repayment Terms	The Treasurer's Office and Department of Finance and Management shall establish a repayment schedule consisting of 100% of the estimated annual value of energy saved or waste reduced and an administrative fee of 0.5% of the outstanding balance payable to BGS.	The Treasurer's Office and Department of Finance and Management shall establish a repayment schedule consisting of 100% of the estimated annual value of energy saved, waste reduced or power produced, a 2% interest rate payable to the Treasurer's Office and an administrative fee of 2% of the outstanding balance payable to BGS.
Legislative Reporting	On or before January 15, 2015, BGS Commissioner shall report to the Senate Committee on Institutions and the House Committee on Corrections and Institutions on the expenditure of funds from SRMRF and SERF and annually thereafter. For each fiscal year, the report shall include a summary of each project receiving funding and the State's expected savings.	

[1] Annually, on Sept 1st, the commissioners of BGS and Finance and Management, after consultation with the State Treasurer, will jointly recommend to the Secretary of AOA the overall fund cap.

[2] Per BGS's guidelines and procedures, priority will be based on how well a project meets criteria requested in the fund application. Projects with a shorter payback period will be considered first.

[3] Application requirements were effective October 7, 2014.

[4] Applicant must include calculations to support energy savings and associated financial savings. Energy savings provided by EVT, Burlington Electric, or Vermont Gas will be accepted as supporting documentation.

The following table, based on information compiled by BGS, summarizes the energy projects approved to date and financed by SRMRF, along with loan repayments received since the funds' inception through December 1, 2014. According to BGS, no loans had been approved under the SERF. This information is provided for informational purposes, and SAO has drawn no conclusions from this data.

Table 6: Summary of Energy Projects Financed by SRMRF

Requester	Project		Loan		Loan Repayments as of 12/1/14
Agency/ Department	Description	Approval Date	Approved	Borrowed	Amount
ANR	VFD at Fish Hatchery	9/21/05	$7,000	$7,000.00	$7,035.00
AOT	Lighting upgrade in Garages	5/5/06	$100,000	$100,000.00	$100,500.00
ANR	Bald Hill boiler (amendment)	4/9/07	$65,000	$64,822.30	$65,146.41
AOT	Traffic Signal LED lighting	8/13/08	$130,000	$107,120.00	$107,655.60
BGS	Pittsford Woodchip feeder system replacement	8/14/08	$100,000	$100,000.00	$100,500.00
DOC	NSCF Package - lighting, refrigeration motors, VFD's, motor	2/18/09	$55,000	$5,218.60	$5,218.60
BGS	Williston NB VFD's	~7/2/09	$25,000	$23,590.60	$23,708.55
DOC	SSCF lighting	12/28/09	$9,000	$4,247.99	$4,269.23
ANR	Ed Weed recirculating aquaculture system	2/16/10	$130,000	$126,803.04	$127,437.06
BGS	Statehouse HVAC upgrade	4/22/11	$160,000	$137,740.00	$138,428.70

Appendix III
Energy Revolving Funds

Requester	Project		Loan		Loan Repayments as of 12/1/14
Agency/ Department	Description	Approval Date	Approved	Borrowed	Amount
ANR	Bald Hill WW Heat Recovery System	6/10/11	$9,000	$6,007.58	$6,037.62
AOT	Rutland Airport - net metering for multiple projects	9/13/11	$175,000	On Hold- Pending Federal Approval	
ANR	Bald Hill PV	8/24/12	$80,000	$56,690.00	$39,500.61
ANR	Ed Weed Recirc Phase II	9/6/12	$260,000	$237,297.53	$109,810.51
BGS	Williston Info Ctr LED	10/5/12	$25,000	$21,615.54	$8,646.22
BGS	Energy Leadership Challenge audit	4/29/13	$22,000	$5,354.38	$5,381.15
BGS/DOC	SSCF Gym Lighting	4/13/14	$16,435	$9,192.59	$0
AOT	Chimney Corners Park and Ride LED Retrofit	12/15/14	$57,830	-	-
BGS	State House Air Sealing and Insulation	11/10/14	$21,000	$21,000.00	$0
BGS/DOC	NWSCF Pumps and Boiler Replacement	Pending DOC Approval	$170,000	-	-

Appendix IV
State Entities That Prepared Agency Implementation Plans

The following table shows the state entities with energy expenditures that prepared AIPs in 2005 and 2012.

Table 7: State Entities That Prepared AIPs in 2005 and 2012

	STATE ENTITIES WITH ENERGY EXPENDITURES	AIPs 2005	AIPs 2012
	Elected Officials		
1	Governor – Executive Office		
2	Lieutenant Governor		
3	Auditor of Accounts		
4	State Treasurer		
5	Secretary of State		
6	Attorney General		X
	Agencies		
1	Administration		
2	Agriculture, Food & Markets	X	X
3	Commerce & Community Development	X	
4	Education		
5	Human Services	X	
6	Natural Resources	X	X
7	Transportation	X	X
	Departments		
1	Aging and Independent Living		
2	Buildings and General Services	X	X
3	Finance & Management		
4	Financial Regulations (formerly BISHCA)		
5	Children and Family Services		
6	Corrections	X	
7	Health		
8	Human Resources		
9	Information & Innovation		
10	Labor	X	
11	Libraries		
12	Liquor Control		
13	Mental Health		
14	Military	X	
15	Public Safety	X	X
16	Public Service Department		X
17	Tax		
18	VT Health Access		
19	Vermont Veterans' Home	X	X
	Boards, Commission and Other State Entities		
1	Center of Crime Victims' Services		
2	Criminal Justice Training Council		

Appendix IV
State Entities That Prepared Agency Implementation Plans

	STATE ENTITIES WITH ENERGY EXPENDITURES	AIPs 2005	AIPs 2012
3	Enhanced 911 Board		
4	Governor's Commission on Women		
5	Human Rights Commission		
6	Natural Resources Board		
7	Office of the Defender General		
8	Public Service Board		
9	State's Attorneys and Sheriffs		
10	State Labor Relations Board		
11	VOSHA Review Board		
12	Vermont Lottery Commission		
	Legislative Branch		
1	Legislative Council		
2	Joint Fiscal Office		
3	Sergeant at Arms		
	Judicial Branch		
1	Judiciary		
48	**TOTAL**	**11**	**8**

Appendix V
Comments from the Commissioner of the Department of Buildings and General Services and Our Evaluation

VERMONT

Department of Buildings & General Services
Office of the Commissioner
2 Governor Aiken Ave.
Montpelier, VT 05633

[phone] 802-828-3519
[fax] 802-828-3533

Agency of Administration

February 23, 2015

RECEIVED
FEB 25 2015
VERMONT
STATE AUDITOR

Mr. Douglas Hoffer
State Auditor
Office of the State Auditor
132 State Street
Montpelier, VT 05633

Dear Vermont State Auditor Hoffer,

The Department of Buildings and General Services thanks you for your efforts in preparing the draft report entitled State Agency Energy Plan: Extent of Reductions in Energy Usage Uncertain. We have found this report to be both insightful and supportive.

BGS agrees with the general findings that the 2010 State Agency Energy Plan does not provide sufficient energy reduction targets per sector and the method used to track all State Government energy usage was insufficient which may have led to the lack of reporting on the 5% energy usage reduction goal set forth in ACT 40 of 2011. BGS has been working diligently over the last year to establish a systematic approach to gathering energy consumption data within our department. Through our efforts we now have the ability to properly track energy consumption associated with BGS owned and operated buildings, leased space in which BGS pays the utility bills, fuel purchased and used by BGS that is not associated with a building and fuel used by vehicles under the jurisdiction of Fleet Management Services.

The largest barrier BGS has encountered in tracking all State Government energy usage is the lack of capacity to implement a State wide energy tracking and management system. In order for State Government to fully realize the opportunities available through energy efficiency and conservation practices we must establish a fully functioning energy management division that would employ multiple energy experts. Until State Government is able to fund such a venture, BGS will continue to provide these services to the best of its ability.

Although this report focuses on the necessary improvements needed in State Governments ability to track and report on energy usage reductions, the State of Vermont can be confident that BGS has and will continue to implement energy efficiency, energy conservation and renewable energy projects. One of the many examples of our efforts is the State solar initiative that is currently underway. This initiative will produce more than 7 million kilowatt hours of energy for state buildings each year, abate over 8,000 metric tons of carbon dioxide equivalent emissions and provide over $2.5 million in taxpayer savings over 20 years.

Appendix V
Comments from the Commissioner of the Department of Buildings and General Services and Our Evaluation

BGS would also like to thank the Auditor's Office for acknowledging the impact Tropical Storm Irene has had on the operational procedures of our department and the effect it had on the matters outlined in this report. It should be noted that one of the positive outcomes of the storm will be the completion of the new Waterbury State Office Complex which will be the first State owned LEED® certified campus in Vermont.

Attached please find BGS's responses to the Vermont State Auditor's recommendations.

Respectfully Submitted,

Michael J. Obuchowski

Michael J. Obuchowski, *Commissioner*
Department of Buildings and General Service

cc: Wanda L. Minoli, Deputy Commissioner

Attachment

Appendix V
Comments from the Commissioner of the Department of Buildings and General Services and Our Evaluation

The Department of Buildings and General Services Response to The Vermont State Auditor's Recommendations:

1) Ensure that the 2016 update to the State Agency Energy Plan specifies:
   a. targets for energy consumption and GHG emission reduction by energy sector (transportation, infrastructure, and purchasing/contract administration);
   b. a baseline year in order to measure the extent of energy consumption and GHG emission reductions; and
   c. a systematic process, including written guidance, for state organizations to utilize to track and evaluate progress toward reducing energy consumption.

BGS will incorporate all of these recommendations into the 2016 State Agency Energy Plan. The 2016 SAEP will be incorporated into the 2016 comprehensive Energy Plan and the goals and targets put forth in the SAEP will be strategically aligned with those set forth in the CEP. One of the 17 topic areas to be incorporated into the CEP is State Government leading by example.

2) Define right-sizing of a vehicle and develop a structured method that includes consistent criteria to determine the appropriate size and number of motor vehicles to ensure right-sizing the State's passenger fleet, in order to reduce average fuel consumption.

Fleet Management Services will adopt the U.S. Department of Energy's definition of right-sizing and develop vehicle allocation methodology appropriate for our Fleet utilization by January 2016.

3) Require submission of periodic progress reports (e.g., report card) by state entities to BGS, including comparison of targets to actual results, narrative explanation and reporting energy consumption in Btus. Develop written instructions for state entities for data collection and reporting via the progress report.

It is the recommendation of BGS that the State focus on centralized energy tracking systems for each sector. For example: the Energy Star Portfolio Manager (PM) allows BGS to track energy consumption across our entire portfolio of State owned buildings, establish energy reduction targets over time and produce reports that detail progress. If each agency responsible for State buildings were to utilize the Portfolio Manager they could easily produce an annual or biennial report that summarizes a baseline, targets and progress for individual buildings, groups of buildings or the entire portfolio. The Environmental Protection Agency provides online training several times a year such as, ENERGY STAR resources for state and local governments, the Federal Guiding Principles Checklist, and how to use the Portfolio Manager tool. BGS intends to recommend to all agencies that would benefit from the PM and are not currently using the tool to do so.

Comment 1

BGS recognizes that the portfolio manager will not satisfy progress reporting for other sectors of energy usage. We believe that the Agency Implementation Plans are the appropriate place for agencies to state their intended energy targets in all sectors outlined in the SAEP, compare these targets to measured results and reevaluate their targets if necessary for the next two years. This requirement is already in place and requiring more frequent reporting or additional documentation from State entities with limited resources may not be realistic.

4) Work with the AOA to obtain AIPs from all state entities.

BGS worked directly with the former Secretary of Administration to request that all State Government entities provide BGS with their AIP. All State entities were given ample time to

contact BGS for direction and produce an AIP. Those entities that reached out to BGS during the time allotted received help in producing this document. BGS intends to refine this process and put forth guidelines for drafting this document in the form of a sample plan that will address the goals and targets put forth in the SAEP. For those State entities responsible for paying utility bills and/or purchasing fuel, an in depth AIP will be required that focusses specifically on the energy usage of that entity, their established baseline year, their targets as required by statute and those set forth in the SAEP, progress toward previous targets and a strategic plan to meet the targets.

For other State entities that are not responsible for paying utility bills or purchasing fuel, a template will be provided with recognized recommendations for behavioral changes, energy saving tips and resources for further information on how to help the State reduce its carbon footprint. The State entities using the template will be required to assign an energy champion responsible for engaging fellow employees and reporting to BGS with questions. BGS will provide Portfolio Manager reports to the energy champion to show any progress from their efforts.

5) Establish a process to review AIPs that ensures the relevant components of the current SAEP are addressed.

The SAEP will be drafted and reviewed by the State Operations Working Group. Many of the members of this group are also responsible for drafting their respected agencies' AIP. Interagency collaboration and review will be an integral component of establishing strong reporting documents and creating synergy across the State's energy program.

Two formats for AIPs must be established and agreed upon by stakeholders; one format for those entities in State Government that purchase energy and a second format for those entities that don't. BGS would recommend that the responsibility of reviewing the AIPs to be placed on the State Operations Working Group as they are an appropriately qualified group. BGS does not currently have the resources available to review all AIPs.

6) Expeditiously report energy consumption for state government operations subsequent to 2011 to the legislature, including analysis of actual energy consumption compared to targets and narrative explanation for differences between targets and actual results, and disclose that energy consumed be leased space is omitted.

Comment 2

In order for BGS to accurately report energy consumption for all state government operations, an energy tracking system must be put in place that is used by all entities that purchase energy. BGS has jurisdiction over buildings that are owned and operated by BGS. We do not have jurisdiction over properties owned by AOT, ANR, Military or any other State entities. BGS recommends that the legislature require all State entities be responsible for tracking the energy they use and reporting energy consumption data to BGS.

7) Commencing with the next biennial report on the status of the SAEP, incorporate energy consumption data and an evaluation of the impact of energy consumption reduction efforts into the report.

Comment 2

Until all State entities are required to track the energy they use and do so, BGS does not have means to accurately report on energy usage across state government. BGS will continue to report on energy consumption associated with our Department and advise the rest of State government on how to track their usage.

Appendix V
Comments from the Commissioner of the Department of Buildings and General Services and Our Evaluation

8) Expeditiously obtain energy consumption data for all leased space according to BGS procedures effective August 2014 and include energy consumption from leased space into the tracking and reporting of energy consumption in state government operations.

BGS has created guidelines and procedures to collect this data. Due to the nature of leasing building space and the relationship between landlord and tenant, some utility information for leased space may not be attainable. BGS will make every effort to gather the energy consumption data for leased space in which we pay the utilities and enter these buildings into the Portfolio Manager. BGS has partnered with Efficiency Vermont to help in this process. BGS has set the goal of completing this process by January 2016.

9) Work with AOA to determine whether the functionality that exists within the VISION system for recording quantity and unit price of energy sources (e.g., fuel, electricity, etc.) purchased is sufficient or whether enhancements are required. To the extent VISION is found adequate, AOA and BGS should collaborate to provide training to state entities to ensure consistent and appropriate use of VISION purchase order fields for quantity and unit price.

Comment 3

BGS has requested that quantity and unit price of energy be recorded in VISION to AOA. If this were to occur Vision would only serve as a central location for data entry and storage. VISION is a financial tool, not an energy tracking and measuring tool. All VISION training is conducted through the Department of Finance and Management.

10) Continue to implement alternatives to using expenditure data from VISION for calculating energy units used and energy consumption via an Excel spreadsheet.

BGS will continue to use the Energy Star Portfolio Manager for tracking building energy consumption and the WEX Fleet Purchase Card Statements combined with the Fleet Focus M5 for tracking energy consumption related to transportation. Other agencies must be willing and able to track their energy consumption using these or similar tools. BGS will advise other State agencies to use these tools in order to establish a consistent approach to energy tracking across State Government. For energy consumption that can't currently be tracked by either system (fuel purchased for lawn mowing, off-road equipment, snow removal, etc.) BGS will develop a method for tracking by January 2016.

11) Implement strong operational controls, such as process documentation, access controls, logic checks of formulas, and a review by someone other than the preparer, for the spreadsheet utilized by BGS to calculate energy consumption and GHG emissions.

BGS has partnered with Efficiency Vermont to help develop and implement the State Energy Management Program. BGS will consult with Efficiency Vermont regarding support for implementing operational controls.

12) Assess the State's progress toward meeting the Act 40 goal to reduce energy consumption by 5 percent annually and for the periods that energy consumption from leased space is not included, disclose its omission.

Appendix V
Comments from the Commissioner of the Department of Buildings and General Services and Our Evaluation

Comment 4

BGS recommends that the appropriate funding and resources be established by the legislature in order to develop a State wide energy tracking and management system. Currently in order for BGS to properly assess the State's progress toward meeting the ACT 40 goal to reduce energy consumption by 5 percent annually, all state entities responsible for purchasing consumable energy must engage in tracking the energy consumption associated with their agency and share this information with BGS.

13) Ensure that state entities incorporate the Act 40 goal to reduce energy consumption by 5 percent each year into their 2014 update to AIPs and include it as a goal in the 2016 SAEP.

BGS requested that all State entities submit their AIP by July 31, 2014. This recommendation cannot be implemented for the 2014 AIP updates but BGS will ensure that it will be included in the 2016 SAEP. The BGS and AOT 2014 AIPs both included this goal.

Appendix V
Comments from the Commissioner of the Department of Buildings and General Services and Our Evaluation

The following presents our evaluation of comments made by the Department of Buildings and General Services.

Comment 1	Preparation and biennial re-adoption of AIPs is statutorily required (3 VSA §2291b), and AIPs could be used by state entities to periodically report progress. However, statute does not specify the content for AIPs other than to require that they ensure state agency compliance with the SAEP. Further, the sole reference to AIPs in the current SAEP (prepared in 2010) is its inclusion in a list of documents that should be prepared annually, unless another deadline has been established. As we noted in our findings, the 2010 SAEP provided limited guidance on how to monitor consumption and did not establish a system to evaluate results. BGS noted that it intends to prepare a sample plan (i.e., AIP) as guidance for drafting AIPs and the sample will address goals and targets in the SAEP (See BGS response to SAO recommendation #4) and reporting progress toward previous targets. Regardless of the mechanism used to periodically report progress to BGS, the department should develop guidelines for state entities regarding data collection requirements and reporting.
Comment 2	In its response to recommendations 6 and 7 BGS suggested that it does not have authority to require state entities to track energy use and report energy consumption to BGS. However, 3 VSA §2291(c)(4) requires that the SAEP include appropriate provisions for monitoring resource and energy use and evaluating the impact of energy reduction efforts. 3 VSA §2291(c) provides BGS the authority to establish and implement the SAEP. Taken together, these provisions appear to give BGS the discretion to require state entities to track energy use and report it to the department. In fact, the 2005 SAEP required state entities to monitor and evaluate progress against goals established in the 2005 SAEP and adopted in AIPs, and it required that report cards be submitted annually to BGS through 2008. BGS stated that it will report on energy consumption associated with its own operations and advise the rest of state government on how to track energy usage. 3 VSA 2291(f) requires BGS to report on the implementation of the SAEP, so BGS does not appear to have the discretion to report solely on their energy consumption. BGS indicated that it does not have the means to accurately report on energy usage across state government and that it will not until all state entities track their energy usage. As we noted in our findings,

	there were flaws in the energy consumption calculation prepared by BGS through 2012, including the omission of energy consumed by leased space. However, as BGS reported, alternative systems for tracking energy consumption are being used or being implemented at the state entities that are the largest consumers of energy. BGS has also developed procedures to obtain data associated with leased space. BGS is using Portfolio Manager for infrastructure that it owns and manages and could use data from its fleet management system for tracking energy consumption related to transportation. Further, BGS is assisting AOT with implementing Portfolio Manager. Other state entities, including AOT, utilize the same fleet management system as BGS and could utilize the data to track energy consumption. Military has systems in place to track energy consumption and regularly reports this data to the federal National Guard Bureau. As the state entities with the greatest energy use put mechanisms in place to track energy consumption, the use of the energy consumption calculation to estimate consumption could be limited to state entities that consume less energy and for those fuel sources that are not tracked via another mechanism.
Comment 3	We agree that VISION is a financial tool and that it is not an energy tracking and measuring tool. We clarified the use of VISION as a source of energy expenditure data in our description of the issue that resulted in the recommendation.
Comment 4	BGS did not address our recommendation that progress toward the Act 40 goal be assessed. Rather, BGS recommended that the legislature establish funding and resources to develop a state-wide energy tracking and management system. If BGS believes that funding and additional resources are needed, the department may request this via the budgeting process. BGS also suggested that state entities responsible for purchasing consumable energy must track energy consumption and provide the data to BGS in order for BGS to assess progress toward the Act 40 goal. See SAO comment 2 for discussion of BGS's authority with regard to the SAEP and tracking and reporting energy consumption.