



VADOC 5-Year Strategic Energy Management Plan (EnMP)

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I. Preface to the Energy Management Plan

- A. Environmental concerns and the need to be globally competitive are providing a driving force for local industry to change the way energy use and energy costs are viewed. Rather than being an inevitable cost of doing business, energy is now considered to be a manageable input to the process, much like any raw material or other resource cost.
- B. The first step in managing energy costs is creating an energy management plan. It formalizes the thought process involved in understanding the relative magnitude of energy costs, the possible ways to reduce energy use, energy targets that are likely to be achievable, and other associated activities that need to occur. While stand-alone energy management projects are satisfying to complete, the energy management plan provides the “big picture” view as an ongoing framework for optimizing overall energy use and achieving success.
- C. Energy management planning is intended to be a process of “continuous improvement.” A closed-loop feedback approach is most effective in demonstrating results that will justify further investment in efficiency. The following diagram shows the circular steps that are recommended for adoption into the planning process:



1. **Plan:** Create the energy management plan ensuring budgets, resources, and timelines are established to meet the targets and objectives of the plan. Include tracking and monitoring processes within the plan to ensure effective reporting to management.
2. **Do:** Execute the plan by deploying the resources and budgets, prepare status reports, and implement the communication strategy.
3. **Check:** Measure and monitor performance of projects and programs against the desired outcomes as planned and report to management with recommendations for improvements and course corrections.
4. **Act:** Analyze the variances to the plan and their causes. Recommend improvements, course corrections, and modifications to the plan.

While the Plan focuses on electrical energy efficiency, it is important that the scope of the plan includes all energy sources such as natural gas, coal, diesel, and biomass or other renewable fuels in order to have a complete understanding of opportunities for energy cost reduction and self-generation optimization.

II. Executive Summary

- A. Strategic Energy Management (SEM) is a framework for aligning energy efficiency with business practices. Instead of managing energy saving projects one by one, SEM will allow the Virginia Department of Corrections (VADOC) to manage energy in a coordinated and strategic way across the organization. VADOC can achieve significant reductions in energy consumption without the cost of multiple major capital upgrades. SEM helps industries reduce energy intensity by providing organizational training, technical support for operations and maintenance (O&M) improvements, and energy monitoring and reporting tools. This plan will empower VADOC to implement energy management actions and achieve energy performance improvements. Strategic energy management allows for continuous energy performance improvement by providing the processes and systems





needed to incorporate energy considerations and energy management into daily operations.

A successful strategic energy management plan builds long-term relationships with energy users and targets persistent energy savings. The benefit of effective planning ensures continuous improvement of energy efficiency. The overall goal of the Commonwealth is to increase Virginia's reliance on sources of energy that, compared to traditional energy resources, are less polluting of the Commonwealth's air and waters and to establish greenhouse gas emissions reduction goals across Virginia's economy sufficient to reach net-zero emissions by 2045, including the electric power, transportation, industrial, agricultural, building, and infrastructure sectors.

All agencies and political subdivisions of the Commonwealth, in taking discretionary action with regard to energy issues, will recognize the elements of the Commonwealth Energy Policy and, where appropriate, will act in a manner consistent therewith. The Commonwealth should continue to establish a lead-by example energy efficiency target for state facilities,

B. Overall Goals of the Plan Include:

1. Establish baseline data for energy comparisons and tracking.
2. Maintaining a list of the facilities owned and leased by this agency, including buildings and interior spaces. Such list will indicate energy usage and any prior energy audit or energy saving performance contract.
3. Enter energy and water consumption and building-related information into the ENERGY STAR Portfolio Manager account for any building or facility over 5,000 square feet.
4. The DOC has set a goal of all DOC facilities being 100 percent with ENERGY STAR compliant by January 1, 2025
5. By January 1, 2025, or as each utility account is established (whichever is later), coordinate with the Department of Mines, Minerals and Energy (DMME) to link utility accounts to the state portfolio master account and to provide to DMME access to such ENERGY STAR Portfolio Manager account.
6. On an ongoing basis, identify priority buildings and spaces for energy audits or energy saving performance contracts. In determining priorities, the energy manager may consider how energy usage may be reduced and the feasibility of installing energy saving or on-site renewable energy systems.
7. Provide to DMME and executive leadership the priority buildings list on an annual basis to include estimated capital investment and projected savings.
8. Implement employee communication and training strategies as well as ongoing awareness training and campaigns.
9. Increase onsite solar and/or wind electric generation for large facilities through outright purchase or Power Purchase Agreements (PPOs).
10. Decrease overall energy use for the Agency by 15% compared to 2016 levels.

III. Background

- A. VADOC employs more than 12,000 employees and operates 24 major institutions, eight field units, four work centers, 43 Probation and Parole districts, five Community Corrections Alternative Programs (CCAPs), three regional offices, and three Academy for Staff Development locations. In addition, Virginia Correctional Enterprises (VCE) maintains 20 different plants in 11 physical locations and the Agribusiness Unit operates 18 farms, 14 cattle operations, a swine operation, 3 food preparation facilities, a milking plant, a dairy processing plant, 2 orchards, 500 acres of vegetables, 50 greenhouses, and 2 aquaculture locations. Units coordinate their individual roles and





function and work closely together to promote the overarching oneness of the Department.

B. With the publishing of several Executive Orders as well as the state legislature's initiatives, VADOC has a direct focus specifically, on the energy efficiency of its agency-owned buildings.

C. Policy overview:

1. Energy Plan
2. Executive Order 43 (2019)
3. Virginia Clean Economy Act (VCEA, 2020)
4. VA Code Section 2.2-604.2 COV (2020), *Designation of officials; energy manager*
5. ACA Policy (5-ACI-1A-04)

The American Correctional Association (ACA) has a Sustainability Standard, which states: *"The facility/agency shall demonstrate they have examined within the audit cycle and where appropriate and feasible, implemented strategies that promote recycling, energy and water conservation, pollution reduction and utilization of renewable energy alternatives."* Correctional facilities and programs have the responsibility to implement strategies that allow correctional facilities to be managed in ways that are most cost-effective and deliver superior performance, while improving environmental responsibility and sustainability. This includes recycling (including paper, metal and plastic products), energy conservation (including building insulation, heating and ventilation, temperature controls, vehicle fuel efficiency, water economies, physical plant engineering, and energy measures), pollution reduction (including composting, sewer treatment, litter abatement, and carbon emissions), and utilization of renewable energy alternatives (biofuels, solar collection, turbine energy production and methane collection). To comply with this policy, the ACA's Bureau of Internal Audits and Standards Compliance has developed a Sustainability Standard checklist to be added to regularly scheduled internal audits."

IV. Energy Management Policy and Best Practices

A. Energy Sustainability Mission Statement:

The Virginia Department of Corrections is committed to enhancing the quality of life in the Commonwealth by improving public safety. Part of the Strategic Goals of the organization is to reinforce public confidence through operational excellence. This Plan works to fulfill the organizational objectives to be an outstanding steward of resources by safeguarding and managing our natural resources and to be fiscally responsible in its practices. Energy savings is an integral part of the Strategic Plan of the Virginia Department of Corrections.

B. Energy Goals:

1. The Five-Year Strategic Energy Plan sets forth the following goals:
 - a. Reduce electric consumption by 15%
 - b. Reduce Natural Gas and LP consumption by 15%
 - c. Reduce electricity consumption across all of buildings owned and operated by VADOC
 - d. Double the 2018 annual level of Energy Performance Contracting (EPC) investment
2. All measures will be based on 2006 baseline levels. The 15% energy savings goal will be achieved by January 1, 2026.

C. Benchmarking:

Benchmarking is a key component of strategic energy management. Tracking and monitoring building energy and asset information is an integrated element of data-driven energy management.





Without energy benchmarking we will not be able to establish where VADOC currently is with regards to energy use across all forms of energy throughout the Agency. Only once our data is benchmarked can the Agency fully implement the SEM Plan.

V. Action Plan (Areas of Opportunity/Impact)

A. Capital Energy Investment:

1. VADOC is committed to reducing electric and natural gas consumption by a combined 15% by 2026, based on 2006 baseline levels, through energy efficiency improvement projects, evaluation of alternative energy sources, and conscientious use of utilities.
 - a. Explore and, where possible, pursue alternative energy sources such as solar, wind, and geothermal.
 - b. Where possible, enter into Performance Contracts to reduce overall institutional energy consumption.
 - c. Review outdated and inefficient HVAC systems for replacement.

B. Agribusiness:

1. The Agribusiness unit within VADOC will work closely with the Energy Manager in determining areas for potential alternative energy development. Some alternative energy sources may not require dedication of land for a period of 20 to 25 years like a dedicated solar farm would. Wind and geothermal energy, for example, can be installed and then the land released for grazing and/or low impact farming.
 - a. Other areas of potential cost reduction should be reviewed and identified such as the installation of solar paneling on existing roof structures for operations such as flash freeze, milking, etc., to potentially bring those individual operations to net zero.
 - b. Conduct a review of energy intensive operations to determine where investments can be made in new equipment to reduce energy consumption.
 - c. Establish a quarterly meeting between Agribusiness and the Sustainability Administrator to review conservation initiative projects and compliance.

C. Construction and Renovations:

1. While construction of new prisons is not expected to be a significant consideration, renovations will carefully consider utilizing renewable materials and LEED standards in the design. The following measures should be considered as part of any renovation project:
 - a. Pursue LEED Certification on all new construction and renovation processes wherever feasible—ensure analysis covers both upfront and long-term lifecycle operating costs when making decisions.
 - b. Have Project Manager review all designs and specs to ensure low lifecycle costs.
 - c. Publicize sustainable design and energy efficiency features to staff, inmates, and the community.
 - d. Ensure key staff remain up-to-date and informed on current green building standards and technologies through training opportunities.
 - e. Have key staff obtain, at minimum, LEED Green Associate credential.
 - f. Work with utility companies to take advantage of programs offered to assist with energy efficiency improvements.
 - g. Consider the installation of solar panels for either electric generation or hot water generation when any roof is repaired or replaced through Energy Performance contracts.

D. Purchasing and Budget:





1. Have a procurement policy/directive that favors energy efficient equipment and materials
 2. Provide adequate funding for energy tracking programs in order to provide accurate metrics for comparison and tracking as well as provide baseline measures for comparisons.
- E. Virginia Correctional Enterprises (VCE):
1. Virginia Correctional Enterprises serve to provide real world work experience to offenders, teaching them transferable job skills and work ethic to help them prepare for re-entry and employment. In order to continue mirroring real world experience, VCE efforts need to account for changes in the economy, which is increasingly becoming greener. To do so, VCE will need to focus on the following strategies:
 - a. Analyze how to make production processes more energy efficient.
 - b. Conduct a review of energy intensive operations to determine where investments can be made in new equipment to reduce energy consumption.
 - c. Where feasible, require an offender education component in Requests for Bids for any sustainability-related projects; and,
 - d. Establish a quarterly meeting between VCE and the Sustainability Administrator to review conservation initiative projects and compliance.
- F. Facility Maintenance:
1. Encourage each institution to have at least one maintenance staff member who has obtained Building Operator Certification or training under of ISO 17024.
 2. Have maintenance and other relevant staff at each facility conduct an informal but detailed annual energy audit of all agency owned buildings and make recommendations for low-cost improvements that can be accomplished by facility staff, such as: increased insulation; double-paned, insulated windows; programmable thermostats; efficient appliances; de-lamping and occupancy sensors; plug-in appliances; etc.
 3. Work with Information Technology to ensure that all computers and other electronic equipment are shut down or put into sleep mode while not in use.
 4. Adhere to any prioritization of energy savings task initiated by the Energy Manager; and,
 5. Be key players in the sharing of energy efficiency information and conservation at the Institutions. Act as leaders in applying the Strategic Energy Management Plan.
- G. Energy Manager:
1. Establish an online tracking system to baseline, track, and monitor all energy data.
 2. Continuously track and conduct monthly audits of all energy data. Report any variances to Warden/B&G & IEMU executive team for investigation and prioritization.
 3. Utilize Energy Star Portfolio Manager to comply with DMME reporting requirements.
 4. By 2025, 100% of VADOC buildings (clarification needed from DMME as not all of VADOC buildings are individually metered and some of our largest structures are water storage towers or tanks).
 5. Complete an energy baseline study for each VADOC owned Facility
 6. Perform ongoing and annual energy audits for each VADOC owned facility.
 7. Develop energy training as well as communication/awareness campaigns.
 8. Develop a reward/incentive program for facilities that meet incremental goals towards compliance.





9. Conduct detailed review of wastewater, water, and boiler plants for immediate energy reduction (either through fuel reduction or actual energy consumption) that can be completed through adjustments in operational controls.
10. Review previous energy audits and information performed by outside contractors for immediate implementation.
11. Participate in the Sustainable Prisons Partnership Project with the Department of Energy (DOE) using available federal funds for energy efficient upgrades (currently ongoing).
12. Participate in the CPower Energy Savings Program to earn money from small light replacement projects (approximately \$2,000 per year per Institution for 4 years, currently ongoing).
13. Potentially participate in the Emergency Load Reduction Program with the Department of Mines Minerals and Energy and their official partners with Institutions that have newer Emergency generators (>2009) to earn funds for future energy projects (would go into energy fund and not back to the Institutions).
14. Work with the VADOC Grant Administrator to identify grant programs for energy efficient upgrades and projects.
15. Implement employee awareness campaigns and official Operating Procedure regarding energy use in the Department.
16. Review of previous energy audits to identify low-cost energy savings that can be immediately implemented.

VI. Energy Team

- A. It is very important to have an energy team so that all aspects of energy are addressed and to ensure that all units are working together in accomplishing a common goal for the Department. This table lists individuals that have an impact on energy use and potential energy projects, identifying whether it is their basic job function or if they are co-champions for this effort.
- B. This team will meet at least quarterly to review goals, successes and failures.
- C. The importance of having a senior executive as a regular participant and sponsor of the energy team is highly recommended. This ensures that the executive management team is well informed of ongoing projects and progress toward energy management goals.

<i>Name</i>	<i>Position</i>	<i>Energy Champion</i>	<i>Percent of Time on Energy Team</i>
Austin Humphrey	Energy Manager	Yes	80%
Tony Parnell	Assistant Director for Infrastructure	Yes	20%
Kenny Raiford	Director Agribusiness	No	10%
Marie Vargo	Chief Executive Officer of VCE	Yes	10%
TBD	Recycling and Sustainability Administrator	Yes	25%
Mark Fitzpatrick	Boiler Plant Operations Manager	Yes	5%
Steve McClung	B&G Director	No	10%
Robert Tolbert	Lead Environmental Manager	Yes	5%
TBD	Budget/Financial Services	No	2%
TBD	Regional Administrator	Yes	2%
TBD	Operational Security Specialist	No	2%

VII. Energy Baseline

- A. The Department’s first step is to account for and document all energy sources. Additionally, the





Department needs to inventory all energy purchased and generated on-site (electricity, gas, steam, waste fuels) in physical units (kWh, mMBtu, Mcf, lbs of steam, etc.) and on a cost basis. In order to benchmark and normalize, it will also be necessary to collect energy related data for all facilities and operations as well such as building size, HVAC system, existing energy savings programming and features, etc.

- B. Estimated Cost: \$44,850 annually. (Example, the Ohio Department of Rehabilitation identified \$380,000 plus in savings after the first year across 500 accounts).
- C. When this plan is updated, this section will include charts/graphs on baseline energy data to demonstrate the ongoing success of the plan.

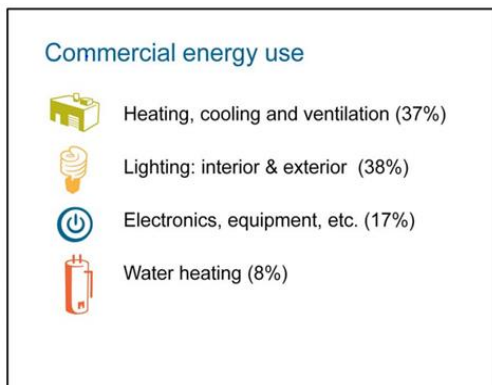
VIII. Identified Energy Conservation Capital Projects

A. Electricity Savings Capital Projects:

- 1. Window replacement projects throughout the State - ongoing
- 2. HVAC replacement projects throughout the State - ongoing

IX. Operational Savings and Employee Awareness Plan

- A. Opportunities to improve energy intensity and competitiveness through operational and employee awareness programs should not be overlooked and an energy management plan would not be complete without addressing these opportunities.
- B. Operational savings are typically achieved through non-capital improvements to control systems. Optimizing the operation of a system from an energy perspective can often produce significant and measurable savings while maintaining or improving the system reliability and throughput.
- C. Employee awareness programs identify and target everyday actions that employees can be encouraged to do, with the intent that the actions become second nature for the savings to persist well past the initial push for awareness. This type of activity integrates well with operational savings. System operators will often have ideas for optimizing their system and eliminating wasteful idling or other unnecessary run time but need the environment to encourage the development of these opportunities.



D. For example, it takes about 435 kilowatt hours (kWh) of electricity to power a computer for 8 hours a day, 5 days a week, for 50 weeks. That adds up to more than \$33 worth of electricity. Turning that same computer off for 2 hours a day could reduce operating costs about \$8 a year. It doesn't sound like much, but multiplied by 10,000 employees, that one change could reduce our annual operating costs by \$80,000 and saving over 1 million kWh annually.

E. That amount of energy is equivalent to the TOTAL energy use of a small facility for just two months out of the year (ex. HVCC in March and April 2018 used 915,700 kWh of electricity in just 2 months). This paired with other reduction efforts and education could significantly reduce energy use in the Department.

- F. In a typical commercial building, the biggest energy users are Space heating, cooling and ventilation; lighting; electronics, computers and other equipment; and water heating.





X. Energy Conservation Targets

Using the potential energy savings identified for each fuel source in the previous sections, set annual conservation targets for five years. Include stretch targets in high/medium/low scenarios for estimated savings.

A. Electricity Savings Targets

1. These targets need to be 15% within the next 1.5 years.

<i>Year</i>	<i>Savings High (MWh)</i>	<i>Savings Medium (MWh)</i>	<i>Savings Low (MWh)</i>
<i>1</i>			
<i>2</i>			
<i>3</i>			
<i>4</i>			
<i>5</i>			

B. Alternative Fuels Savings Targets:

Additional targets will be set after a baseline of Facilities has been completed and will be done with input from the Energy Team and/or additional Executive Orders and legislative requirements.

XI. Action Plan

- A. Identify any barriers to the implementation of each capital project and think about what strategies could eliminate the barriers. Provide an assessment of the ease of implementing each identified project.
- B. In addition to identified capital projects, list the approach and strategies to identify further conservation opportunities that may exist including those relating to:
 1. *behavior*
 2. *organizational*
 3. *maintenance; and*
 4. *other*
- C. Resolve to bring the energy project team together on a regular basis to systematically work through approval and implementation of the action plan.

XII. Opportunity Identification and Analysis

Potential projects identified by the Energy Manager in conducting a general energy assessment of a facility. This will be completed after the baseline data is gathered.

XIII. Immediate Implementation Budget

- A. Explore and, where possible, pursue alternative energy sources such as solar, wind, and geothermal. Where possible, enter into Performance Contracts to reduce overall institutional energy consumption, potentially no cost.
- B. Energy baseline and tracking software required for baseline and tracking; estimated \$45k annually.
- C. Detailed Energy Audit of one WWTP, one VCE Industrial process, and -2 Agribusiness Industrial Process \$15k to \$45k (not including cost of application of recommendations) to identify overall adherence to variances from industry standards and implementation recommendations for reduction of energy use and cost. This could potentially be duplicated at other similar facilities.
- D. Immediate ban (via Operating Procedure or equivalent) on replacement of lighting that is non-LED,





this would be at a building/Institutional level, many of these are comparable to normal halogen replacements with the exception of high-mast lighting which can increase the cost by 2x or 3x deepening on the type of lighting.

- E. Immediate implementation of OP requiring specific temperature settings, turning on and off of lighting, etc.; free.
- F. Immediate rollout of employee education programs for energy conservation; cost to create posters, etc. minimal cost.

XIV. For Further Reading

- A. NRCan offers the comprehensive “Energy Efficiency Planning and Management Guide” available at https://oee.nrcan.gc.ca/sites/oee.nrcan.gc.ca/files/pdf/publications/infosource/pub/cipec/Managementguide_E.pdf
- B. The International Standards Organization (ISO) has an energy management standard (ISO 50001) that will address energy management planning: <http://www.iso.org/iso/home/standards/management-standards/iso50001.html>
- C. The Department of Energy EnergyStar Program: <https://www.energystar.gov/buildings/program-administrators?s=mega>
- D. ODRC Energy Dashboard Example: <https://drc.ohio.gov/cam>
- E. The Energy Trust of Oregon Strategic Energy Management: <https://energytrust.org/commercial/strategic-energy-management/>

