Comprehensive Program to Manage Energy, Water, and Other Utility Use for State Agencies and State Institutions of Higher Learning

A Report to

Governor Roy Cooper

Pursuant to Executive Order No. 80, Section 8

December 1, 2024

Prepared by:

North Carolina Department of Environmental Quality

State Energy Office

Utility Savings Initiative

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Preface:

This report contains the Department of Environmental Quality's status update to Governor Cooper for the Comprehensive Energy, Water, and Utility Use Conservation Program pursuant to Executive Order No. 80, Section 8.

Table of Contents

List of Tables

List of Figures

Appendices

List of Acronyms

Abbreviation	Definition
BAS	Building Automation System
Btu	British Thermal Unit
DEQ	Department of Environmental Quality (formerly DENR)
DHHS	Department of Health & Human Services
DIT	Department of Information Technology
DMVA	Department of Military & Veterans Affairs
DNCR	Department of Natural & Cultural Resources
DOA	Department of Administration
DOC	Department of Commerce
DOI	Department of Insurance
DOJ	Department of Justice
DOR	Department of Revenue
DOT	Department of Transportation
DPI	Department of Public Instruction
DPS	Department of Public Safety
ECM	Energy Conservation Measure
EO80	Executive Order 80
ESCO	Energy Service Company
EUI	Energy Use Intensity
FCAP	Facility Condition Assessment Program

Abbreviation	Definition
FY	Fiscal Year
GESC	Guaranteed Energy Savings Contract
GHG	Greenhouse Gas
GS	General Statute
Gsf	Gross Square Feet
HB	House Bill
HVAC	Heating, ventilation, & air conditioning
kW	Kilowatt
kWh	Kilowatt Hour
LED	Light Emitting Diode
LGC	Local Government Commission
MM	Million
$MTCO_{2e}$	Metric Tons of Carbon Dioxide Equivalent
NCCCS	North Carolina Community College System
OSBM	Office of State Budget & Management
SB	Senate Bill
SEO	State Energy Office
SL	Session Law
UNC	University of North Carolina
USI	Utility Savings Initiative

1.0 Executive Summary

North Carolina General Statute (GS) §143-64.12 requires the State Energy Office (SEO) to develop a comprehensive program to manage energy, water, and other utility use for state agencies and state institutions of higher learning. The statute requires all state-owned buildings to reduce energy usage intensity (EUI)[1] by 30% based on fiscal year (FY) 2002-03 levels by 2015. On October 29, 2018, Governor Cooper issued Executive Order No. 80 (EO80) which extends these energy saving goals and requires a 40% FY2002-03 EUI reduction by 2025.

As part of these mandates, the Utility Savings Initiative (USI) program within the SEO was founded to annually collect utility consumption reports from state agencies, University of North Carolina (UNC) System schools and affiliates, and community colleges. The data collected from these governmental units is utilized to generate a report that describes the Comprehensive Energy, Water, and Utility Use Conservation Program (i.e., the "Comprehensive Program") along with a summary of efficiency gains as required every odd numbered year by statute. Additionally, in accordance with EO80, an annual status update is required for each cabinet agency's utility consumption, costs, and progress in reducing energy consumption. The purpose of this report is to meet EO80 requirements by summarizing the collective progress of state-owned buildings towards the 40% EUI reduction goal. This report also includes recommendations for further actions that may be necessary to meet the EO80 goal for state-owned buildings.

State-Owned Buildings Energy Use Intensity Reductions to Date

Accounting for all state-owned buildings includes utility consumption by cabinet agencies, other state agencies, and the University of North Carolina (UNC) System.[2] Collectively, for FY2023-24, all state-owned buildings attained an overall 32% reduction in EUI from the 2002-03 baseline. Without additional monetary investments to implement energy conservation measures, we are not on track to achieve the EO80 goal. Table 1 summarizes EUI reductions to date for cabinet agencies, other agencies, the UNC System, and the combined total for all state governmental units. This data emphasizes that significant energy conservation measures and resources are needed by all state sectors in order to achieve the EO80 40% EUI reduction goal by 2025.

Table 1: State Government Buildings Energy Efficiency Gains (FY03-FY24)

Participant		Cabinet Agencies	Other Agencies	UNC System	State Governmental Units Total
Gross Square Footage	% Change	-7%	+39%	+65%	+33%
Energy Usage Intensity (Btu/square foot)	% Change	-34%	-28%	-34%	-32%

[1] Represents energy consumption per gross square foot (Btu/gsf)
[2] Excludes leased buildings whose utility bills are not paid by state governmental entities.

Within state governmental units, the UNC System is a major contributor since they account for 72% of all energy consumed, 68% of the total gross square footage, and 71% of all utility spending. Fortunately, they have also proven to be the pinnacle of energy management considering that the UNC System currently shows a 34% reduction in EUI from the 2002-03 baseline. This accomplishment occurred despite increasing square footage by 65% over the same timeframe. Many UNC System constituents have designated full-time energy managers or energy management teams that consistently review bills, make energy retrofits, take advantage of federal or state funding opportunities, and plan for future initiatives. Such practices resulted in avoided utility costs of over $148 million for the UNC System alone in FY2023-24. In addition, cumulatively, the UNC System has avoided $1.4 billion in utility costs since the Comprehensive Program began. Avoided utility costs represent the amount that would have been paid if energy efficiency retrofits or upgrades were not implemented. The UNC System makes up approximately 73% of avoided utility costs for FY2023-24 and sets an example for all state governmental units; therefore, the strategic energy plans of the highest performing UNC System schools should be assessed to obtain insight into additional energy efficiency projects that may be implemented.

The remaining totals for state governmental units consists of State agencies (both cabinet and other). Together, these agencies represent approximately 28% of state-building energy consumption, 32% of total state-owned square footage, and 29% of total state-owned utility spending. Since FY2002-03, agencies have avoided approximately $51 million in utility costs while their gross square footage has increased by 28%. Despite the lower rate of increasing square footage compared to the UNC System, agencies have not achieved EUI reductions to the same level. For example, cabinet agencies and other agencies have achieved a 34% and 28% reduction in EUI since FY2002-03, respectively. This shows that state agencies must improve their energy conservation efforts to make significant contributions to the EO80 goal that are relative to their size and energy usage levels. While smaller contributors, other agencies should achieve higher reductions since their conservation efforts still impact the collective state-owned building EUI. This report will recommend definitive steps that these agencies can make to achieve greater reductions in energy usage and costs.

While USI has collected annual utility consumption and cost data from community colleges since FY2007-08, their progress is not included in state-owned building metrics since they are considered local governmental units. This should not devalue the need for their energy conservation efforts since community colleges represent over 30 million gross square feet and $50 million in annual utility spending. Since their unique 2007-08 baseline, community colleges have achieved a 21% EUI reduction despite a 45% increase in square footage. In addition, they have cumulatively avoided over $44 million in utility costs through implemented energy conservation measures. To further environmental stewardship and management of local taxpayer dollars, USI recommends that community colleges replicate successful efforts from the UNC System to reduce utility consumption and costs.

Cost Savings and Air Pollution Benefits Related to Energy Conservation

While most energy efficiency projects require upfront initial investments, they are accompanied by energy savings and avoided costs in future years. Table 2 summarizes utility costs and avoided costs for cabinet agencies, other agencies, the UNC System, and a combined

total for all state governmental units. Together these sectors spent $357 million on utilities which equates to approximately $978,082 per day. The avoided costs of $196 million in FY23-24 helped reduce this cost significantly; avoided costs represent the amount of money or emissions that would have been utilized if the entity did not implement any energy efficiency retrofits or upgrades compared to the baseline. As the data shows, the Comprehensive Program has achieved $2.37 billion in savings for North Carolina taxpayers since the FY2002-03 baseline. Further investments in building efficiency improvements can result in additional utility savings for all state-owned buildings, while furthering the EO80 energy reduction goal. Actual savings may be higher due to rising fuel and electricity costs.

Table 2: State Government Buildings Energy Costs and Savings (FY03-FY24)

Participant	Cabinet Agencies	Other Agencies	UNC System	State Governmental Units Total
Actual Utility Costs in FY24	$101 million	$2 million	$254 million	$357 million
Avoided Utility Costs in FY24	-$47 million	-$1 million	-$148 million	-$196 million
Cumulative Avoided Utility Costs (FY03-FY24)	-$617 million	-$16 million	-$1.74 billion	-$2.37 billion

Energy efficiency improvements have also provided air pollution benefits by avoiding fuel combustion directly at the buildings or indirectly at central electric power plants. FY2023-24 estimates show that the program avoided 1,058,164 metric tons of carbon dioxide equivalent ($MTCO_{2e}$)[3] in greenhouse gas (GHG) emissions for state governmental units. Cumulatively since FY2002-03, approximately 12.7 million $MTCO_{2e}$ of GHGs have been avoided for state governmental units which is equivalent to annual CO_2 emissions from the electricity consumed in 1,653,158 homes annually, or 3.3 coal-fired power plants in one year.[4]

[3] *$MTCO_{2e}$ is metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential. Carbon dioxide equivalents are commonly expressed as "metric tons of carbon dioxide equivalents ($MTCO_{2e}$)."*
[4] *See Appendix B for sources and assumptions used in calculating greenhouse gas amounts.*

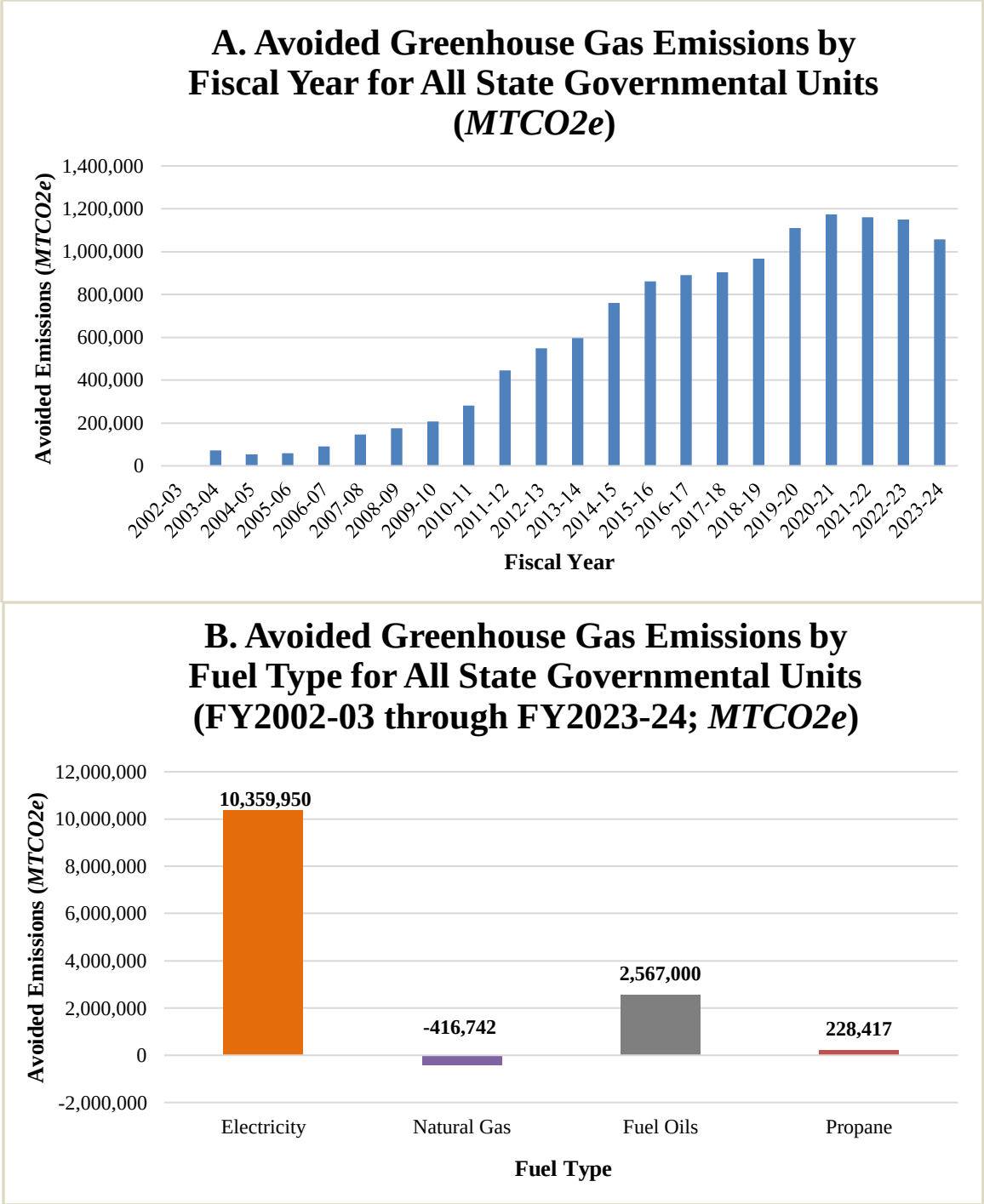


Figure 1: Avoided Greenhouse Gas Emissions for All State Governmental Units *($MTCO_{2e}$)* by (A) year and (B) fuel type.

Recommendations to Meet the 40% Goal by 2025

USI consistently works with all government sectors to identify and suggest energy efficiency improvements. Some of these improvements are well-defined such as increasing building envelope insulation or converting to LED lighting, while other measures such as building controls and HVAC improvements are more abstract and can be harder to gain support for implementation. This is where all governmental sectors need to focus in order to achieve greater EUI reductions. Energy efficiency prioritization, reinforcement, and funding are needed to meet the energy reduction goal. A prudent step would be integrating the EO80 directive into statute to provide more legislative authority regarding this work. In addition, shifting the focus towards broad energy management concepts will help ensure energy efficiency becomes a cultural change with long-term commitments and results. This includes concepts such as the following:

- Offsetting competing energy priorities *(i.e., electric vehicle charging infrastructure vs. energy efficiency improvements)* with clean energy sources
- Designating full-time energy managers
- Investing in more sophisticated data collection, reporting, and analysis systems
- Considering alternative strategies for financing energy projects
- Utilizing Guaranteed Energy Savings Contracts
- Ensuring the content in utility management plans meets USI's best practices
- Establishing a mandate against purchasing non-LED lamps or fixtures (with exceptions incorporated, as needed)
- Evaluating whether to opt in or out of electric utility rebate programs
- Applying for federal grant or stimulus funding opportunities

To understand how operational and cultural changes are effective and ensure that the EO80 goal is achievable, state agencies can employ several methods used by the UNC System to reduce energy intensity. The UNC System utilizes full-time energy managers, takes advantage of performance contracting, improves building controls, converts to LED lighting, looks for rebate and funding opportunities, and continuously promotes and implements both large and small energy efficiency measures. These same initiatives and strategies should be utilized by all governmental sectors wherever and whenever possible. As an example of the scope and savings that these type of ECM projects can yield, NCSU has an ongoing GESC for a 'Combined heat and power co-generation installation at the Cates Plant, and installation of two (2) new packaged boilers at the Yarbrough Plant.' This effort is a 16.1-year amortized project that has a guaranteed savings of $103,005,060.00, and it is currently in year 11 and yielded an annual savings of $8,931,133.00. Another illustration of the cost savings offered by ECMs is evident in a performance contract executed by the Department of Transportation (DOT) in 2021. This ongoing 15-year amortized project guarantees savings exceeding $51,000,000, with over $16 million in realized savings to date. The contract generates a yearly return of over $3.2 million in guaranteed savings, covering a total of 122 buildings, 4485 fixtures, and more than 10,000 roadway fixtures.

In summary, the EO80 goal can only be achieved with immediate investment and implementation of substantial energy efficiency improvements within the next fiscal year (i.e., FY2024-25). State governmental units should make the necessary changes to prioritize energy efficiency, enlist the support of leadership and designate energy managers, and explore any and all pathways to funding these critical improvements. The remainder of this report's narrative provides the following: significant changes from FY22-23's report; background on the USI program; reporting

requirements; recommendations for state governmental units to reduce energy consumption; and the conclusion. Additionally, the appendices to this report contain: (A) detailed agency-specific energy performance data; (B) sources and assumptions used to calculate greenhouse gas offsets; (C) utility management plans; (D) the text of EO80; (E) statutory authority; and (F) suggested revisions to general law.

2.0 Background on the USI Program

In February 2002, North Carolina's governor issued an executive order to create the *Commission to Promote Government Efficiency and Savings on State Spending*. At the time, the State was challenged with two sequential years of expenditures exceeding incoming revenue. By July 2002, the Commission recommended the establishment of a Statewide initiative for utility savings. Therefore, on July 17, 2002, North Carolina's Governor issued a memorandum to the Council of State members, Cabinet Secretaries, University of North Carolina (UNC) System president, and UNC Chancellors formally establishing the USI program in the State Energy Office.

Senate Bill 668 (Session Law 2007-546, Section 3.1.(a)) was a landmark bill that ratified the USI's goals, mission, and requirements into statute. The purpose of this action was to permanently promote energy efficiency, eliminate waste, and to reduce utility expenditures in state-owned buildings. The legislation required that State agencies and the UNC System develop and implement a management plan, as well as providing annual updates that are consistent with the USI's Comprehensive Program. In addition, the legislation required that the energy consumption per gross square foot in all state-owned buildings be reduced relative to fiscal year 2003-04 levels as follows: (1) 20% by 2010; and (2) 30% by 2015. Furthermore, community colleges were required to submit an annual written report to the State Energy Office containing utility consumption and costs for review.

Senate Bill 845 (Session Law 2008-198, Section 11.1) revised the base fiscal year for the EUI reduction requirements in state-owned buildings to 2002-03 levels. The base year has remained unchanged since that time.

House Bill 1292 (Session Law 2010-196, Sections 1 and 2) permitted institutions in the UNC System to credit unused General Fund appropriations into the next fiscal year for realized energy savings accrued by implementing energy conservation measures. Of the savings achieved, 60% must be utilized for future energy conservation measures. The savings were designed not to affect the recommended continuation utility budget requirements by the Director of Budget. To receive the credit balance, affected institutions were required to submit annual updates to their utility management plans regarding the use of funds using the criteria in GS §143-64.12(a)(1) through (a)(4). For FY 2023-24, eleven UNC System schools asked to carry forward over $22.8 million in savings and reported spending an additional $11.4 million for new energy efficiency projects.[5] These funds are specifically designated for energy efficiency improvements.

Senate Bill 734 (Session Law 2014-120, Section 55) revised the requirement that state-owned facilities provide updates regarding their utility usage and costs, as well as the implementation of management plans from an annual to a biennial-basis.

[5] *The values in this report reflect the most accurate tabulation of the "savings claimed" and "cost of new projects" for FY2022-23 based on datasets provided by participating UNC System schools.*

In October 2018, Governor Cooper's EO80 (Section 8) built on the statutory requirements in GS §143-64.12(a) by directing cabinet agencies to collectively strive to reduce energy consumption per square foot by at least 40% of fiscal year 2002-03 levels by 2025. The EO required that the DEQ's USI program update the Comprehensive Program with strategies to assist state-owned buildings in reducing energy consumption to meet the EO80 goal. In addition, the USI program was tasked with encouraging and assisting, upon request, the UNC System, K-12 schools, and local governments in reducing energy consumption. To meet the EO80 goals, the EO required that cabinet agencies designate an *"Agency Energy Manager"*, prepare a biennial *"Agency Utility Management Plan"*, submit utility data and progress towards the EO80 goal, and required the USI program to provide an annual progress report to the Governor's Office.

2.1 Roles and Responsibilities of Key Entities

Table 3 provides a breakdown of responsibilities that entities involved with the Comprehensive Program are required to perform with reference to the corresponding legislation or executive order.

Table 3: Roles and Responsibilities of Key Entities

Basis	Responsibility	Reference	Assigned Entity
EO80	Encourage and assist, as requested, higher education institutions, K-12 schools, and local governments in reducing energy consumption per square foot in state-owned buildings by at least 40% from FY 2002-03 levels by 2025.	EO80 Section 1(c) and 8	Cabinet Agencies; DEQ USI
	Designate an Agency Energy Manager that serves as an agency's primary point of contact.	EO80 Section 8(a)	Cabinet Agencies
	Implement strategies to support the energy consumption goal in EO80 and submit an Agency Utility Management Plan to the DEQ's USI program by March 1st of every odd-numbered year. The plan should describe the proposed strategies to reduce energy consumption per square foot in state-owned buildings by at least 40% from FY 2002-03 levels by 2025.	EO80 Section 8(b)	Cabinet Agencies
	Submit an Agency Utility Report to the DEQ's USI program by September 1st of each year. The report should contain the consumption, costs, and progress achieved towards meeting the statutory and EO80 directives.	EO80 Section 8(c)	Cabinet Agencies
	Assess the adequacy of agency Utility Management Plans and their compliance with EO80. Develop annual report describing the Comprehensive Program and summarize each cabinet agency's utility consumption, costs, and achieved reductions, completed by December 1st.	EO80 Section 8(b) and 8(d)	DEQ USI
	Develop and annually-update a Comprehensive Program to manage energy, water, and other utilities for state agencies and institutions of higher learning.	GS §143-64.12(a)	DEQ USI

Basis	Responsibility	Reference	Assigned Entity
GS	Submit a utility management plan consistent with the DEQ USI Comprehensive Program biennially. The plan should address findings or recommendations from the Department of Administration energy audits. In addition, the plan should include supporting strategies to reduce energy per gross square foot by at least 30% from FY 2002-03 levels by 2015.	GS §143-64.12(a) and (b1)	All state Agencies; UNC System
	Submit a biennial written report of utility consumption and costs.	GS §143-64.12(a)	Community Colleges
	Carry out the construction and renovation of facilities to further the energy conservation measures and ensure the use life-cycle cost analyses.	GS §143-64.12(a1)	All state Agencies; UNC System
	Create and implement the policies, procedures, and standards to ensure that state purchasing practices improve efficiency regarding energy, water, and utility usage. The cost of such products should be considered regarding their economic life. Administer the Building Energy Design Guidelines that include energy-use goals and standards, economic assumptions for life-cycle analysis, and other criteria on building systems and technologies. Modify the design criteria for constructing and renovating state buildings and the UNC System to require that a life-cycle cost analysis be conducted in accordance with GS §143-64.15.	GS §143-64.12(b); and GS §143-64.15	DOA
	Identify and recommend low-cost energy conservation maintenance and operating procedures that reduce energy consumption within state-owned buildings as part of the Facility Condition Assessment Program (FCAP). Consult with the DEQ USI program to develop an energy audit and procedure for conducting such audits. Conduct an energy audit for all state agencies and the UNC System every five years. The energy audit should serve as a preliminary energy survey.	GS §143-64.12(b1)	DOA
	Implement recommendations from Department of Administration and maximize the interchangeability and compatibility of energy management equipment components.	GS §143-64.12(b1)	All state Agencies; UNC System
	Conduct detailed system-level energy surveys every five years.	GS §143-64.12(b1)	DEQ USI
	Submit a report of the energy audit required in accordance with GS §143-64.12(b1) to the affected state agency or the UNC System.	GS §143-64.12(b1); and GS §143-64.12(b2)	DOA

Basis	Responsibility	Reference	Assigned Entity
GS	Review each energy audit conducted by the Department of Administration and consult with the affected state agency or the UNC System to incorporate the findings into the management plan required by GS §143-64.12(a).	GS §143-64.12(a); and GS §143-64.12(b2)	DEQ USI
	Identify and recommend facilities of state-agencies or the UNC System that are suitable for either: (1) building commissioning to reduce energy consumption; or (2) guaranteed energy savings contracts pursuant to GS §143-64.17.	GS §143-64.12(h); and GS §143-64.17.	DOA
	Develop a biennial report on the Comprehensive Program to the Joint Legislative Energy Policy Commission; the Oversight Committee on Agriculture and Natural and Economic Resources; and the Fiscal Research Division by December 1st of odd-numbered years. The report should contain the elements set forth in GS §143-64.12(j)(1) through (j)(5)	GS §143-64.12(j)	DEQ USI

3.0 Significant Changes from FY22-23 Report

The Department of Public Safety (DPS) and the Department of Adult Correction (DAC) officially became separate entities in January 2023 as per Session Law 2021-180. DAC was established as a new cabinet-level agency distinct from DPS. The process of separating DAC from DPS took over a year, culminating in the final effective date of January 1, 2023. This division necessitates that reporting from the two agencies be handled separately, with FY2023-24 marking the first full fiscal year following this change. DPS has informed USI about the challenges they face in collecting data sets and have expressed their commitment to providing timely updates in the future. The separation has affected the EUI figures reported by each agency, primarily due to the significant difference in square footage and the absence of historical/baseline data, especially for DAC as a newly established independent entity.

The State Energy Office did not receive FY2023-24 energy usage information from the Department of Transportation (DOT) for the second time in as many years. Due to the lack of data, the SEO duplicated DOT's data from their FY2021-22 usage to provide consistency in DOT's weight among agencies in the state. More information on this can be found in Appendix A of this report.

During fiscal years 2022-24, staff turnover was a common occurrence within various government entities, including the USI program. However, thanks to federal funding and strong leadership from the SEO, the North Carolina Department of Environmental Quality (DEQ) has successfully onboarded a new State Energy Office Deputy Director, as well as a team of dedicated SEO and USI staff members. This includes a new USI supervisor, all of whom have been trained to offer technical support and guidance to any agency or entity in need.

4.0 Comprehensive Program and Executive Order 80 Update

4.1 Primary Focus Areas of the Comprehensive Program

GS §143-64.12(a): *"The Department of Environmental Quality through the State Energy Office shall develop a comprehensive program to manage energy, water, and other utility use for state agencies and state institutions of higher learning and shall update this program annually"*

While state agencies and the UNC System are collectively mandated by GS §143-64.12(a) to achieve a 30% reduction in Btu's per square foot by the year 2015, some participants have encountered challenges in meeting this target individually. USI remains committed to supporting these participants in reaching the specified goal. Moreover, EO80 has introduced a new objective for state-owned buildings, requiring a 40% EUI reduction by 2025 compared to a 2002-03 baseline. Cabinet agencies are instructed to designate an Energy Manager responsible for overseeing utility data collection, reporting, and the development and execution of the agency's utility management plan, in alignment with GS §143-64.12(a) and EO80, Section 8. These plans should incorporate effective strategies that align with legal obligations and executive directives aimed at reducing energy consumption in state-owned buildings.

The USI program provides the Governor with an annual update on utility consumption and progress towards EUI reduction goals set by affected reporting entities under EO80. USI conducts individual site visits to identify best practices and ensure that governmental units maintain their achieved savings. Meeting the required EUI reduction targets will enhance the State's infrastructure value, increase cumulative utility cost savings, and decrease environmental pollution linked to fuel and electricity consumption.

Below are the primary focus areas of the Comprehensive Program managed by the USI:

Best Practices & Training

The USI team's site visits continue to be a crucial source of support for local and state government facility managers. USI offers initial energy audits, evaluations of projects, and guidance on implementation strategies. The team also examines utility bills and encourages participation in current energy-saving programs. An essential aspect of the USI program is providing relevant energy efficiency training for facility managers in local and state government agencies. This training typically includes the Energy Management for State Employees course (EM4SE) also known as the Energy Management Diploma series (offered by North Carolina State University's Office of Professional Development). The training covers topics such as creating utility management plans, analyzing utility bills, and teaching about building systems and programs to enhance efficiency. USI promotes collaboration with community user groups and stakeholders, as well as facilitates discussions and the sharing of best practices among government entities.

Another unique training opportunity is launching in early 2025. The North Carolina State Energy Office (NCSEO) and the Division of Water Infrastructure (DWI) are partnering together to offer a no-cost energy efficiency training course for wastewater operators in North Carolina. The intended audience of this course is operators from distressed systems in more rural parts of the

state. The goals of the course are to introduce wastewater operators to basic concepts of energy management principles (i.e. energy bills, demand, rates, basic energy conservation measures or ECMs), followed by an in-depth focus on energy efficiency opportunities specific to wastewater treatment plants (i.e. aeration, motors/VFDs, process improvements) while maintaining operations and enhancing productivity. The course will emphasize both identification and implementation of ECMs unique to each participating system. The training is ultimately designed to identify energy efficiency opportunities for each attendee's system but is also intended to empower attendees with the knowledge needed to continually find and implement opportunities for improved energy efficiency at their systems long after the training has concluded.

Cost Estimates & Financial Options

USI assists state and local government building owners with developing cost estimates and prioritizing energy saving projects. Once project scopes are established, USI can then assist with recommending various types of funding mechanisms based on the situation. These often include equipment rebates, federal or state grants, tax incentives, Guaranteed Energy Savings Contracts (GESCs), and an assortment of utility provider programs. In addition, USI can review project proposals to ensure they best fit the needs of governmental units. On a more granular level, USI will review utility bills to look for saving opportunities such as rate classification changes or peak shaving. USI continuously seeks additional resources to expand energy efficiency programs within state and local government buildings.

Reporting Requirements

The USI team regularly updates and submits reports on the progress of key initiatives, including the Comprehensive Program, EO80 Section 8, GESCs, HB1292 credits, and utility management plans, to stakeholders for review. This provides a status update on significant achievements.

4.2 Overview of Utility Use and Efficiency Gains for all State Governmental Units and Community Colleges

GS §143-64.12(j)(1) reads: [The report shall contain:] *"A comprehensive overview of how state agencies and state institutions of higher learning are managing energy, water, and other utility use and achieving efficiency gains."*

EO80 Section 8 reads: "*DEQ shall develop an annual report that describes the Comprehensive Program and summarizes each cabinet agency's utility consumption, utility costs, and achieved reductions in energy consumption. DEQ shall complete this report for publication on its website and for the Council to submit to the Governor by February 1, 2019, and annually thereafter beginning December 1, 2019."*

The following sections, including tables and graphs per sector, provide a collective summary of energy and water reduction progress for the UNC System, cabinet agencies, and community colleges. Agency-specific narratives and their associated utility data are provided in Appendix A.

Table 4: State Agency and State Institutions of Higher Learning Efficiency Gains

Participant		Cabinet Agencies	Other Agencies[1]	UNC System[2]	State Governmental Units Combined Total
Gross Square Footage	Baseline 2002-03 (Mgsf)	46	1	57	104
	Current 2023-24 (Mgsf)	43	1	94	137
	% Change	-7%	+39%	+65%	+33%
EUI	Baseline 2002-03 (Btu/gsf)	135,967	75,305	168,835	153,452
	Current 2023-24 (Btu/gsf)	89,773	54,591	111,030	103,926
	% Change	-34%	-28%	-34%	-32%
Water	Baseline 2002-03 (gal/gsf)	76	15	49	61
	Current 2023-24 (gal/gsf)	56	11	24	34
	% Change	-27%	-21%	-51%	-45%

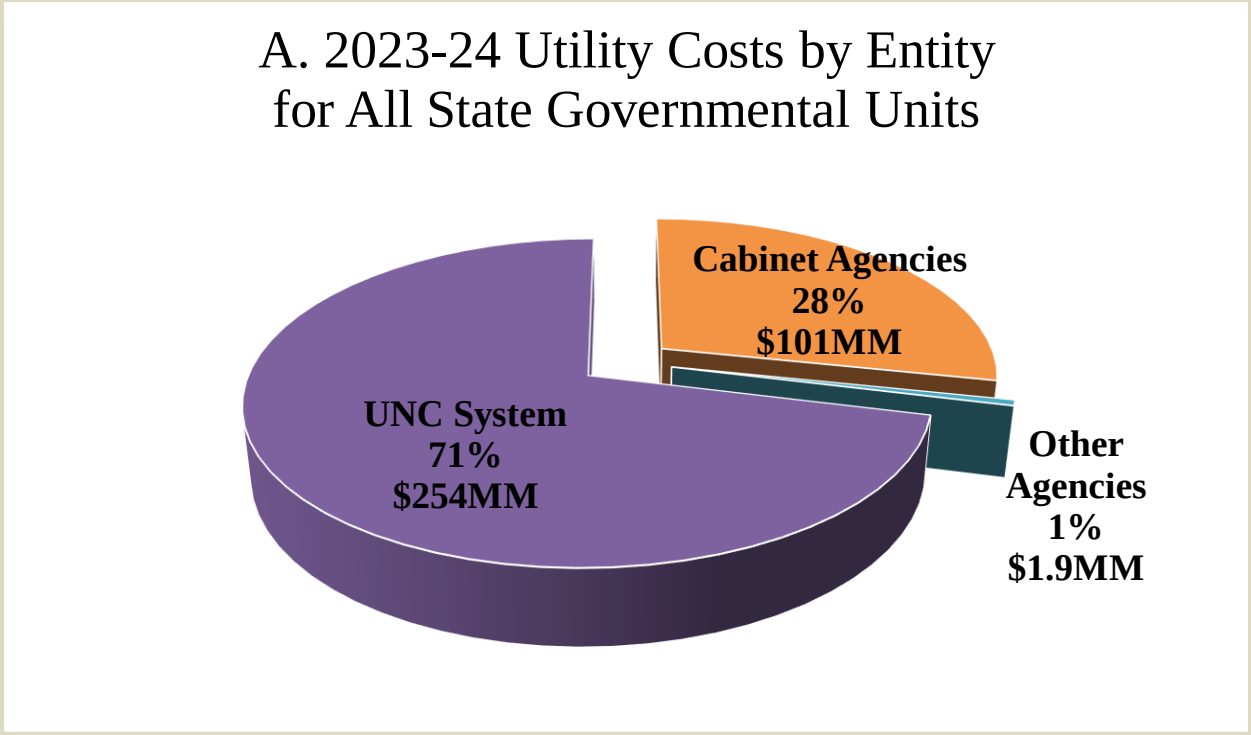
[1]The main WRC campus was not built until 2005-06, and thus, is not included in baseline (FY03)

[2]UNC School of the Arts data was not reported prior to FY2005-06 and was assumed to be constant for all fiscal years prior

Energy Consumption and Savings Highlights from Table 4

- EUI (BTUs/gsf)
  - The Cabinet Agencies are at a **34%** reduction from baseline, an improvement from **31%** in FY2022-23
  - Other Agencies are at a **28%** reduction, an improvement from **21%** in FY2022-23
  - The UNC System is at a **34%** reduction. The UNC System was at a **36%** reduction from baseline in FY2022-23.
  - Total combined state-owned buildings are at a **32%** reduction from baseline.

- Change in Square Footage and Water Usage
  - Total combined state-owned building area has decreased by 7% compared to baseline; much of this can be attributed to the gsf changes experienced by both DAC and DPS given that this is their first full fiscal year as separate agencies, therefore their data reflects changes to both their baseline and current gsf
  - Total combined water usage has decreased by 45% from the baseline



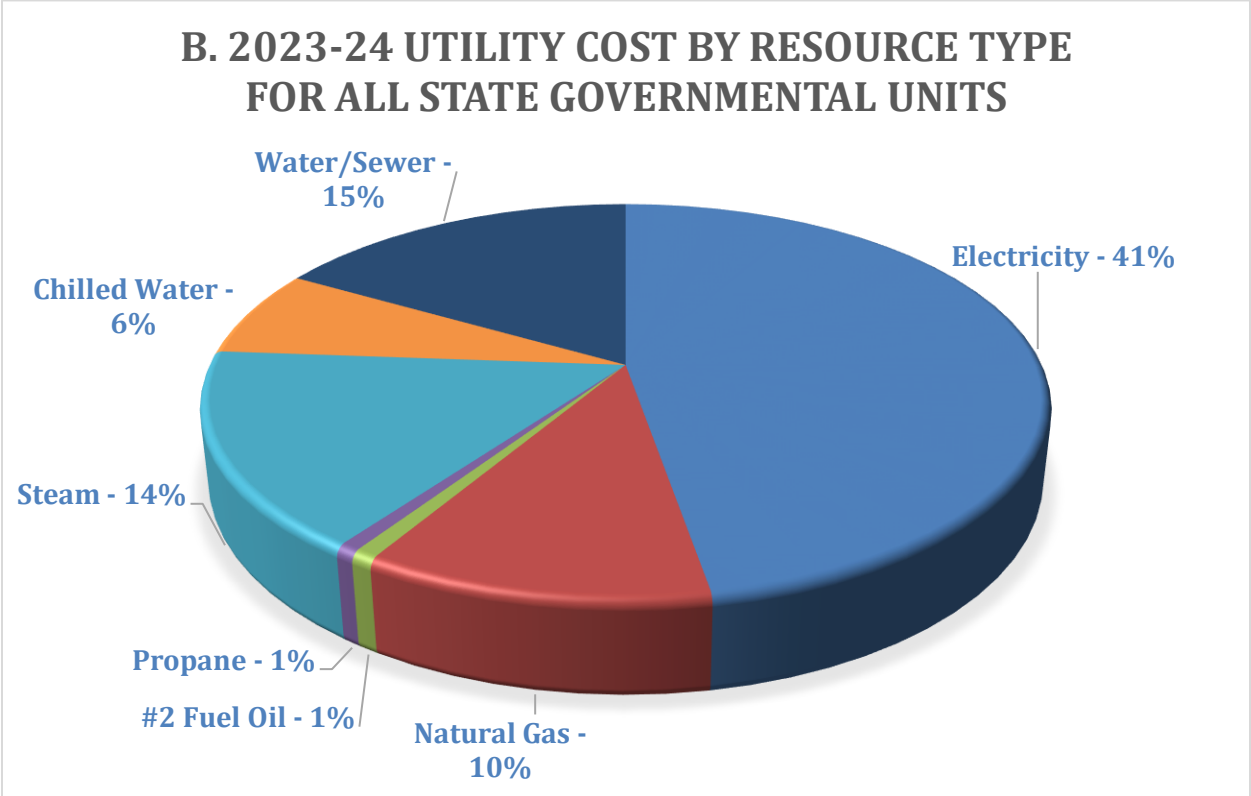


Figure 2: Total Utility Cost for All State Governmental Units ($357MM) by (A) Entity and (B) Resource Type.
These figures exclude totals from community colleges

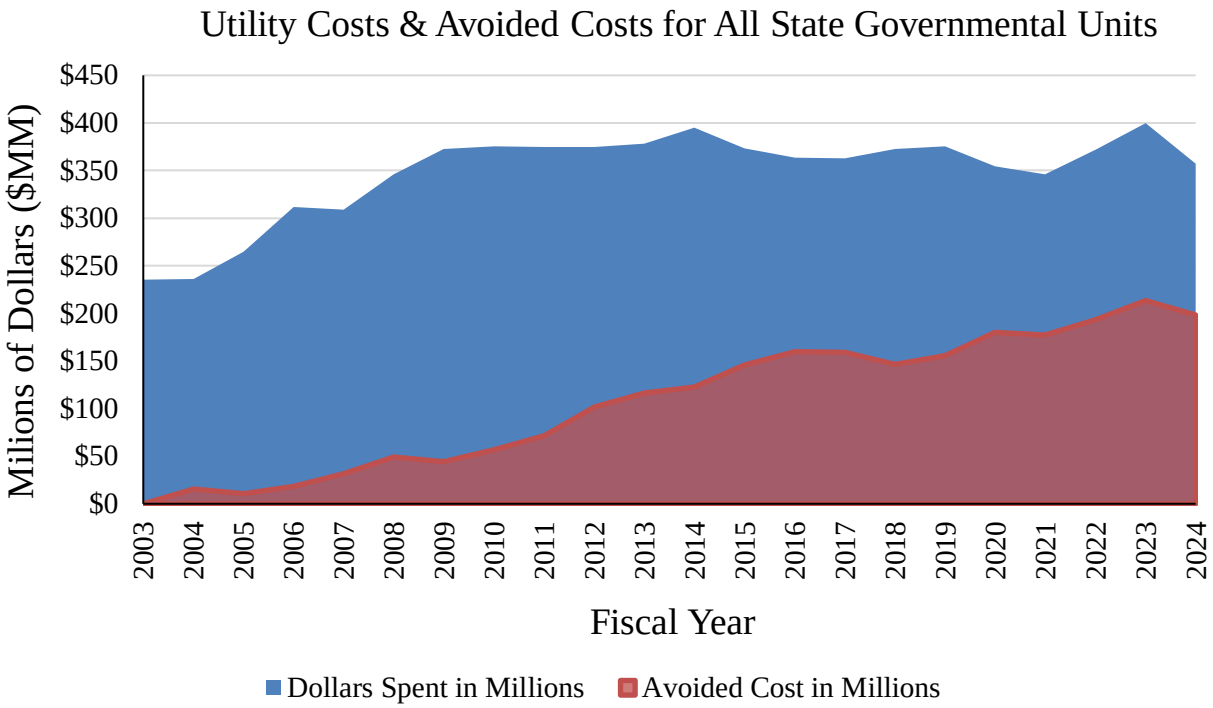


Figure 3: Avoided Utility Costs for All State Governmental Units

Utility Cost Highlights *(See Table 2 in the Executive Summary Section)*

- Avoided Utility Costs
  - Approximately $196 million in avoided utility costs in FY2023-2024.
  - Approximately $2.37 billion avoided in utility costs since FY2002-03.

- Expenditures
  - Approximately $357 million in total utility costs for all state-owned buildings during FY2023-2024. Over two-thirds of this amount is attributed to the UNC System.

UNC System

The UNC System continues to lead the charge in achieving EO80's 40% energy reduction goal; during FY2023-24, the UNC System achieved a 34% reduction from the 2002-03 baseline. Although this is a slight reduction from FY2022-23's 36% reduction, the UNC System is still leading all three USI sectors. The UNC System avoided nearly $148 million during FY2023-24; avoided costs represent the amount of money that would have been utilized if the UNC System did not implement any energy efficiency retrofits or upgrades compared to the 2002-03 baseline. Western Carolina University, Appalachian State University, and UNC Wilmington led the UNC System in FY2023-24 EUI reductions by achieving 56%, 49.5%, and 49.48% reductions from baseline, respectively. The SEO will continue to look to these leaders in the UNC System for guidance and leadership in energy management and energy reduction best practices and policies.

Each year, members of the USI team and the SEO attend the annual Appalachian Energy Summit hosted at Appalachian State University; this Summit is designed for faculty, staff, and students at institutions of higher learning, as well as local and state government staff, to share information, resources, and best practices surrounding energy and sustainability efforts across higher education campuses in North Carolina. This Summit has been in place since 2012 and provides a valuable opportunity for institutions of higher learning to come together, network, and share insights on their sustainability and energy efficiency journeys, proving that knowledge sharing is critical for successful energy management programs. Additionally, the USI team meets with UNC System contacts on a quarterly basis to discuss program updates, potential funding opportunities, and highlight guest speakers or topics related to energy efficiency best practices.

Table 6 shows a summary of the UNC System's utility metrics as compared to the 2002-03 baseline. Square footage has increased by 65% while utility costs have increased by 88%. The UNC System had a 34% EUI reduction from baseline this fiscal year, a slight decrease from last year's 36% EUI reduction. Water usage has decreased by 51%, which is significant considering water costs have increased by 238% over the same timeframe.

Table 5: UNC System Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	56,806,527	93,626,704	+65%
Total Utility Cost	$135,311,298	$254,134,490	+88%
Energy Usage (Btu/gsf)	168,835	111,030	-34%
Energy Cost ($/MMBtu)	$13.00	$21.67	+67%
Water Usage (gal/gsf)	49	24	-51%
Water Cost ($/kgal)	$3.80	$12.84	+238%

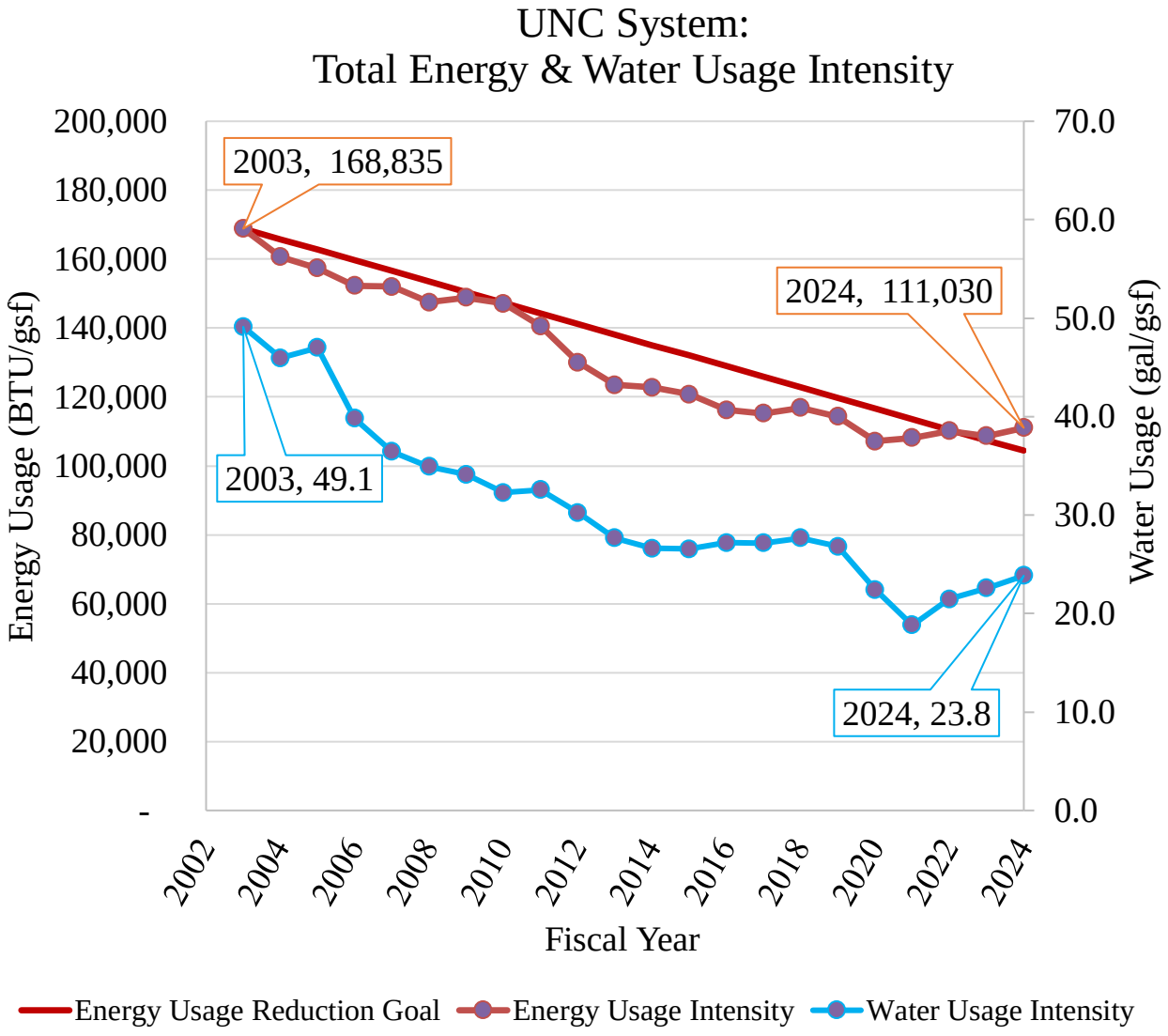


Figure 4: UNC System Utility Usage Over Time

Cabinet Agencies

As required in EO80, all cabinet agencies have appointed an energy manager to oversee the agency efforts in achieving the EO80 goal, however most of these designated energy managers, with the exception of DAC, continue to have other full-time jobs and responsibilities beyond energy management. Cabinet agencies spent nearly $101 million on utility costs during FY2023-24; the lack of full-time staff dedicated to energy management and energy efficiency improvements is negatively impacting the program's overall ability to meet the energy reduction goal of EO80. Many agencies struggle with deferred maintenance, outdated equipment, antiquated technology, aging infrastructure, limited staff and most importantly, the financial resources required to make major comprehensive energy improvements. Many cabinet agencies provided funding requests to address some of these energy related needs, but more dedicated resources to these efforts, as

specifically outlined in Section 5.1, would help reduce utility spending and increase the likelihood of achieving EO80's energy reduction goal. USI staff at the SEO will continue to work alongside cabinet agency energy managers to reduce utility spending and implement energy efficiency improvements as resources allow.

DOT, DHHS, DPS, DAC, and DOA are the five largest agencies in terms of total utility spend, making up nearly 90% of the cabinet agency expenditures for FY2023-24. Figure 5 below demonstrates this spread across the ten (10) cabinet agencies during FY2023-24:

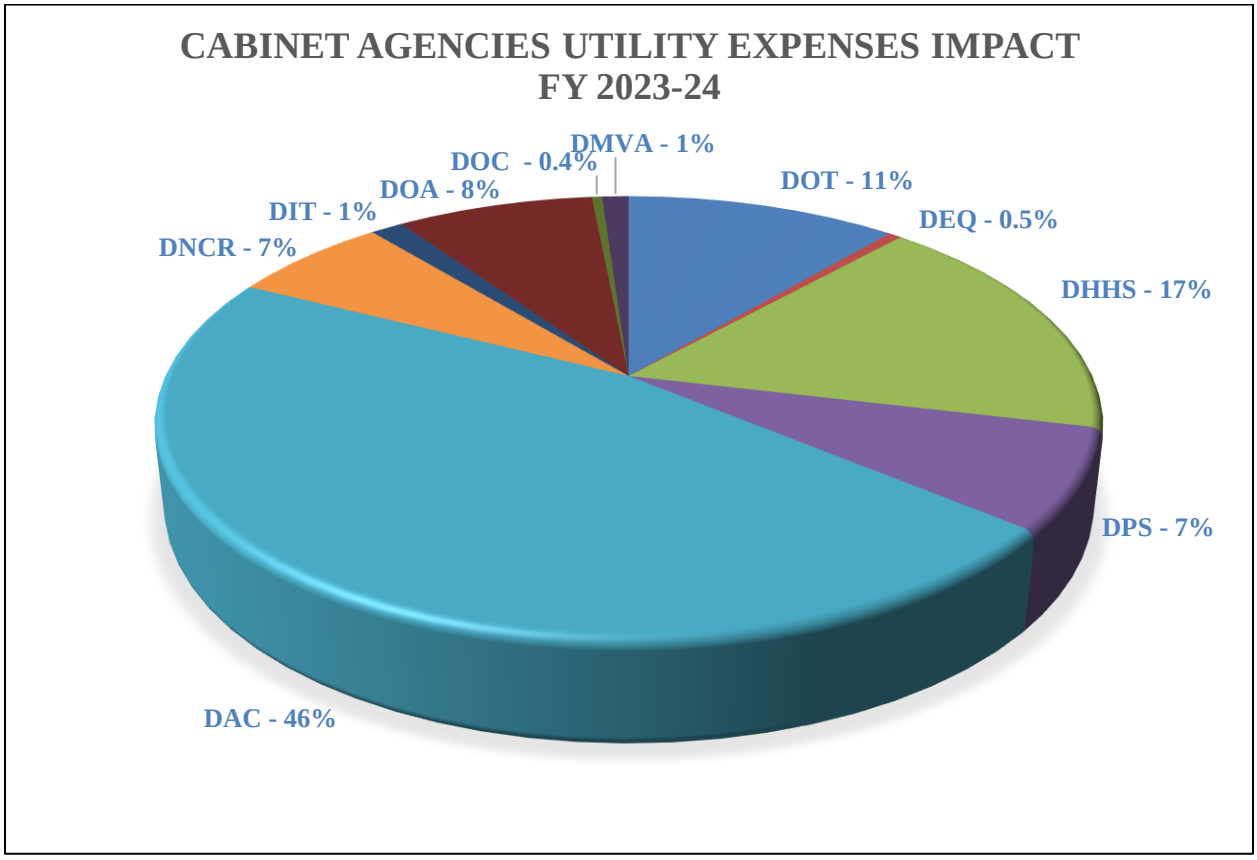


Figure 5: Cabinet Agencies Utility Expenses Impact, FY 2023-24

Table 7 shows a summary of the cabinet agencies' utility metrics as compared to the 2002-03 baseline. Square footage has decreased by 7% while utility costs have increased by only 2%. The EUI for all cabinet agencies has decreased by 34% compared to the baseline, an improvement from FY2022-23's 31% reduction from baseline. Water usage has decreased by 27% while water costs have increased by 101%. More detailed information about individual agencies' utility data can be found in Appendix A. Several important items should be noted:

- DOT did not submit a utility consumption report for FY2023-24 or FY2022-23. DOT's utility consumption from FY2021-22 has been duplicated for FY2022-23 and FY2023-24 in order to provide consistency across the cabinet agency sector;
- This was the first complete fiscal year where DPS and DAC were separate and distinct

agencies; this split occurred in January 2023. The associated changes in DPS and DAC's profile and historical consumption data, most notably changes in square footage, had a significant impact on the overall outlook for cabinet agencies;

- DMVA did submit utility consumption data for FY2022-23 and FY2023-24, however there is no historical data available beyond these two fiscal years, therefore they are excluded from Table 7 and Figure 6 due to the lack of baseline data; their individual agency profile and associated narrative can be found in Appendix A.

Table 6: Cabinet Agencies Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	45,878,893	42,538,079	-7%
Total Utility Cost	$99,378,556	$100,986,311	+2%
Energy Usage (Btu/gsf)	135,967	89,773	-34%
Energy Cost ($/MMBtu)	$12.31	$18.37	+49%
Water Usage (gal/gsf)	76	56	-27%
Water Cost ($/kgal)	$6.48	$13.00	+101%

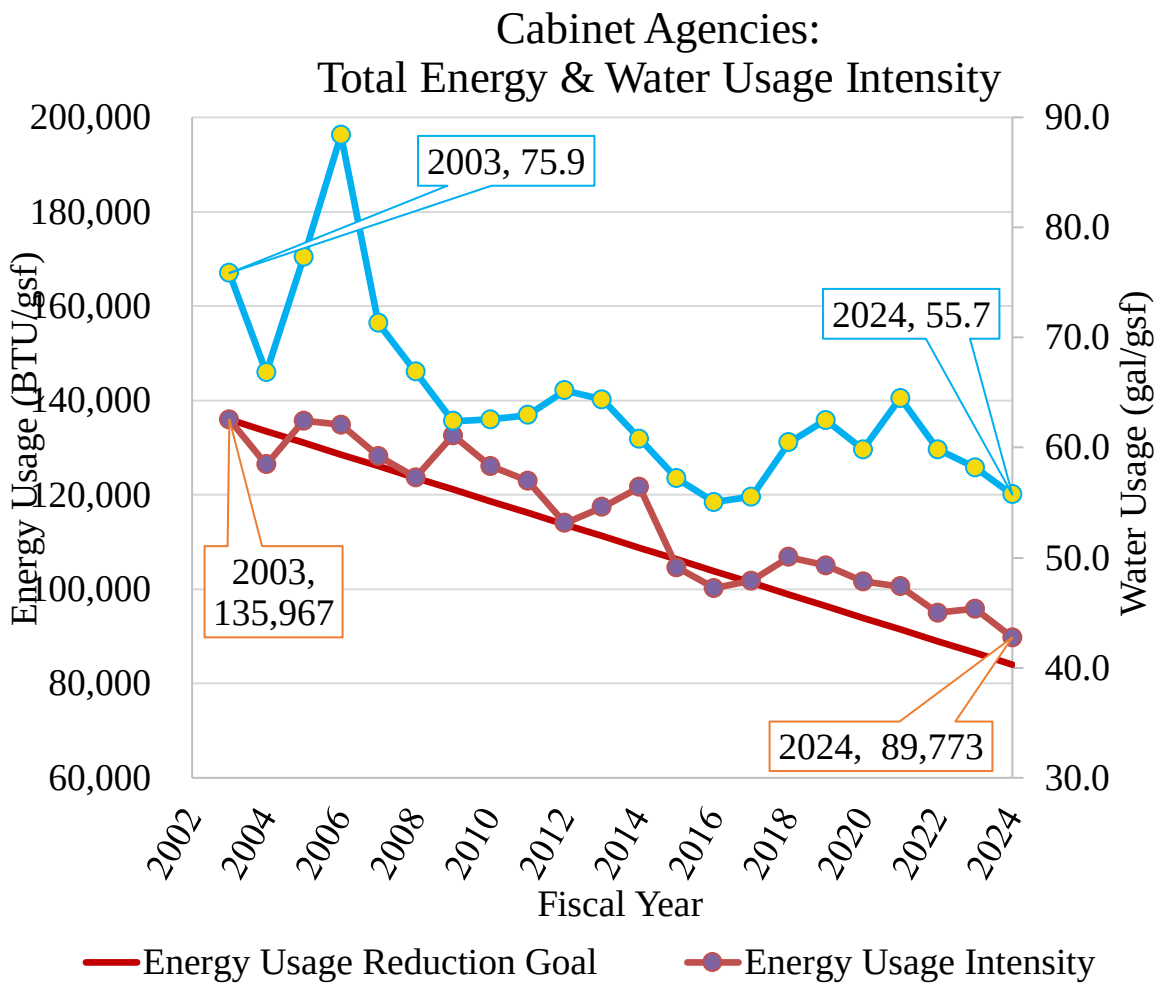


Figure 6: Cabinet Agencies Utility Usage Over Time

Other Agencies

While EO80 applies directly to the cabinet agencies, other state agencies are encouraged to adopt the same 40% EUI reduction goal. Such agencies include the Department of Agriculture and Consumer Services (DA&CS), the Department of Justice (DOJ), the Department of Public Instruction (DPI), and the Wildlife Resources Commission (WRC). A dedicated energy manager for each of these agencies, as well as robust strategic energy plans, would be decisive steps toward improving their current 28% reduction in EUI from the baseline. DA&CS recently completed an energy assessment with Waste Reduction Partners for their Farmers Market Restaurant facility where nearly $4,000 in annual energy savings were identified; as discussed more in Section 5.1, energy assessments through WRP are a valuable tool that agencies like the DOJ, DPI, WRC, and DA&CS should use to help understand the energy efficiency opportunities available at their facilities.

Table 8 shows a summary of these four (4) agencies' utility metrics as compared to the 2002-03 baseline. Since 2002-2003, square footage and total utility costs have increased by 39% and 89% respectively. Water usage has decreased by 21% while water costs have increased by 52% when compared to the baseline. It should be noted that the main WRC campus was not built until 2005-06, therefore it is not included in the 02-03 baseline.

Table 7: Other Agencies Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	917,553	1,279,112	+39%
Total Utility Cost	$1,017,407	$1,925,736	+89%
Energy Usage (Btu/gsf)	75,305	54,591	-28%
Energy Cost ($/MMBtu)	$13.45	$25.47	+89%
Water Usage (gal/gsf)	15	11	-21%
Water Cost ($/kgal)	$6.59	$10.01	+52%

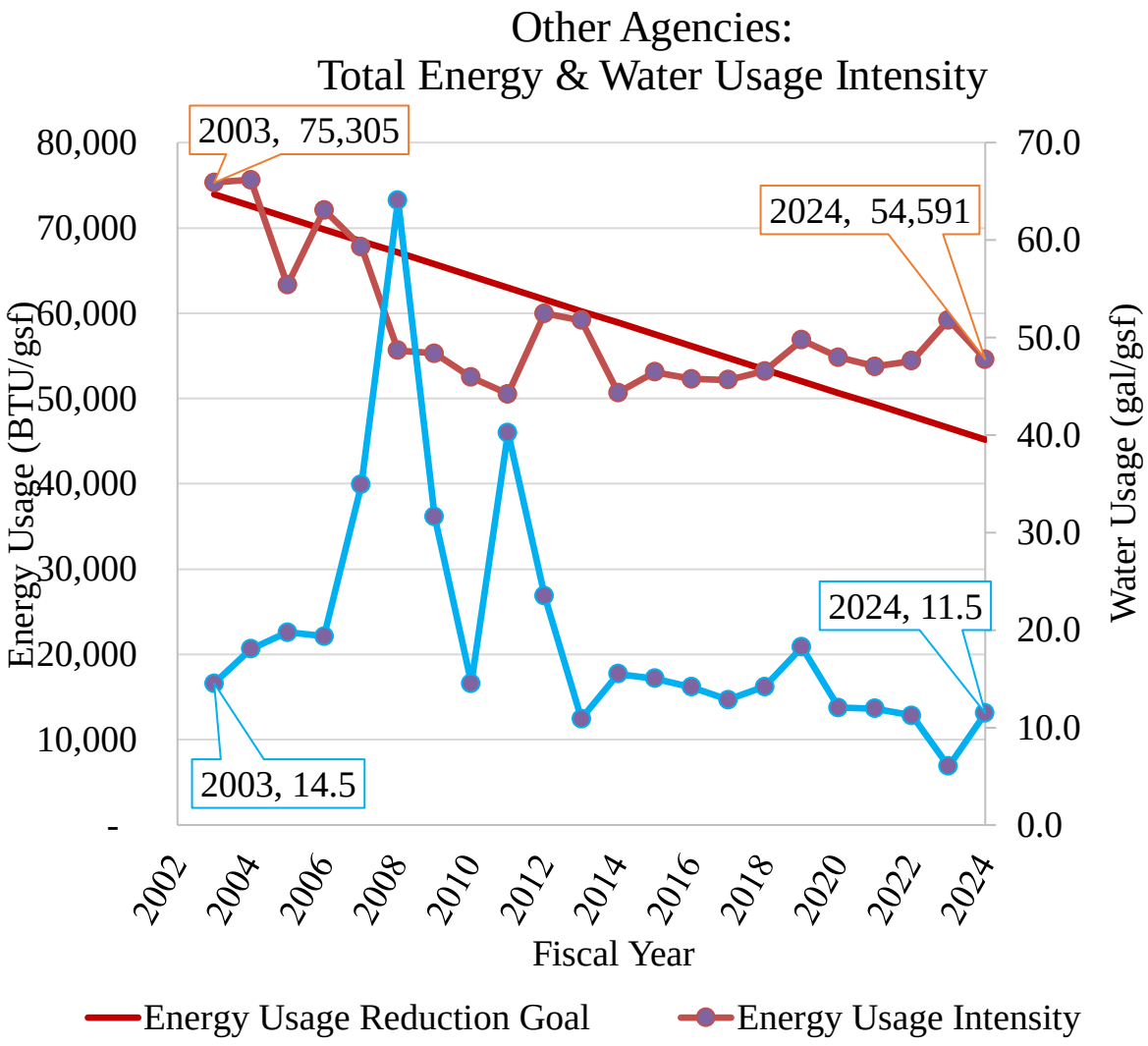


Figure 7: Other Agencies Utility Usage Over Time

Community Colleges

The USI team meets quarterly with community colleges to discuss program updates, including funding and educational/training opportunities, as well as coordinating guest speakers to present on best practices and case studies for successful energy efficiency projects or concepts in the higher education space. The USI team also performs site visits to community colleges as resources allow; these site visits are designed to build strong relationship and communication pathways between the community college and USI staff, provide assistance with data collection efforts, provide technical assistance and guidance with energy efficiency projects/goals around their campuses, performance contracting assistance, and generally provide support in community colleges reaching and exceeding their energy reduction goals. USI is involved in the North Carolina Association of Community College Business Officers (NCACCBO) and the North Carolina Association of Community College Facility Operations (NCACCFO); USI's involvement in these associations

allows for continuous improvement in communication and relationship building efforts and provide a mechanism for providing annual updates to target audiences in the community college system. Energy efficiency and renewable energy continue to be topics of growing interest and attention in these two associations, and USI looks forward to continuing to bring awareness to these important topics to association members. North Carolina community colleges have been submitting annual utility consumption reports to the SEO since 2007-2008 (the baseline), as compared to the 2002-2003 baseline for all other USI entities. USI received annual utility consumption reports from all 58 community colleges for FY2023-24.

Table 9 shows a summary of the community college sector's utility metrics as compared to the 2007-08 baseline. Square footage has increased by 45% while utility costs have also increased by 41%. The combined community college EUI is at -21%, a 5% improvement from FY2022-23. Water usage has decreased by 42% while water costs have increased by 126%. The error in water usage data from FY2022-23 has been corrected.

Table 8: Community Colleges Utility Statistics to Date

Metric	Fiscal Year		% Change
	2007-08	2023-24	
Total Gross Square Feet	22,795,156	33,067,452	+45%
Total Utility Cost	$37,189,830	$52,555,510	+41%
Energy Usage (Btu/gsf)	79,018	62,469	-21%
Energy Cost ($/MMBtu)	$19.18	$22.99	+20%
Water Usage (gal/gsf)	15	9	-42%
Water Cost ($/kgal)	$7.92	$17.87	+126%

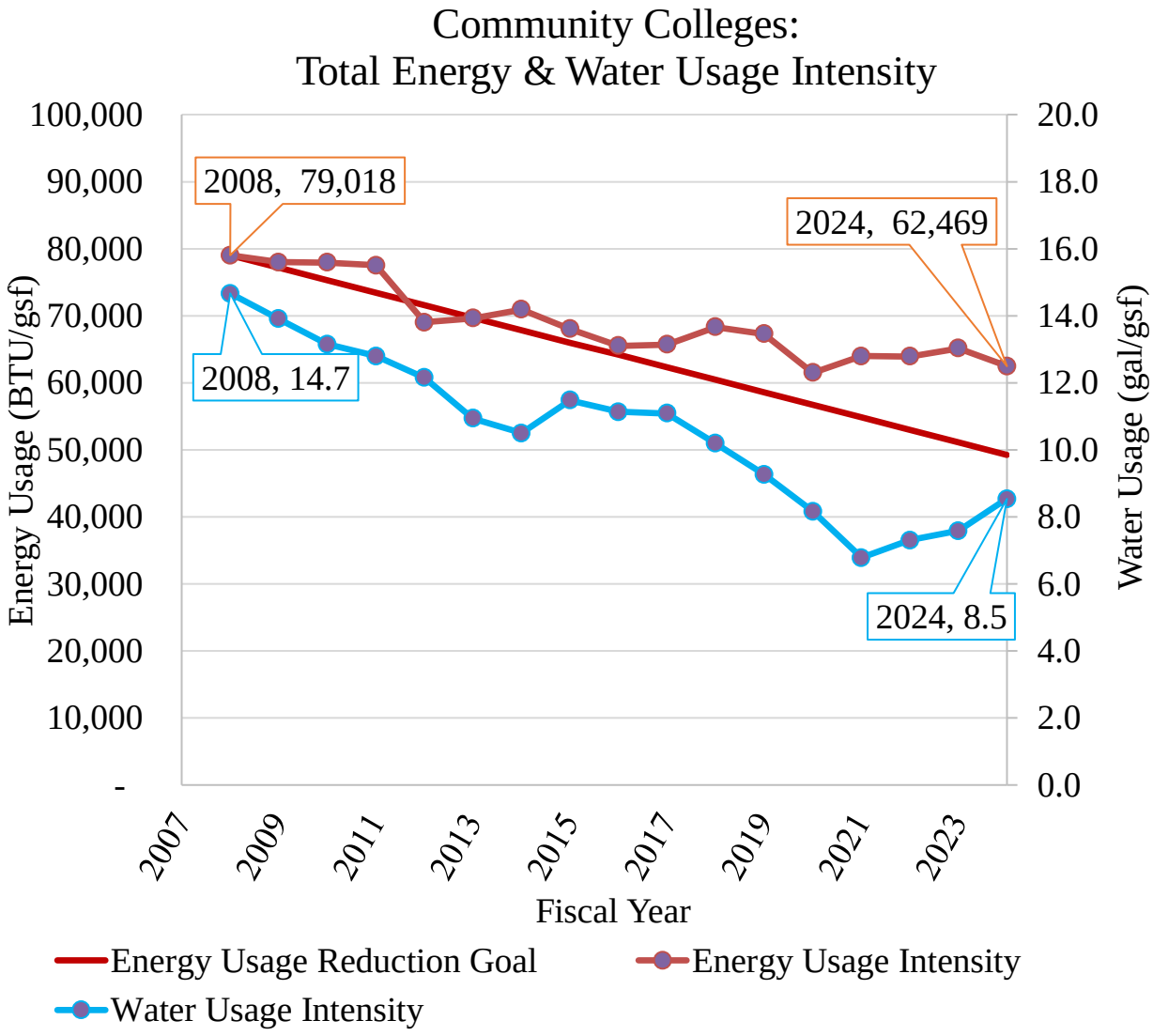


Figure 8: Community Colleges Utility Usage Over Time

4.3 Suggested Revisions to General Law

GS §143-64.12(j)(2): [The report shall contain:] *"Any new measures that could be taken by State agencies and State institutions of higher learning to achieve greater efficiency gains, including any changes in general law that might be needed."*

Appendix E of this report contains more detail regarding these suggested revisions to general law.

The USI program emphasizes the importance of transparency and accountability in fund allocations by recommending annual reports from governmental agencies and universities regarding the expenditure of funds for review by the OSBM. While energy management plans have traditionally been submitted biennially, aligning with utility usage reports in September, the introduction of the carry forward program (Session Law 2010-196) has led to the reporting of project details, costs, energy savings, and completion dates on an annual spreadsheet and project tracking log. To ensure the accuracy and integrity of quoted energy savings, USI suggests modifying the submission to an annual requirement, underscoring the program's dedication to thorough assessment and validation of reported metrics.

Reporting Intervals

In the past, the state governmental units were mandated to annually report their energy, water, and other utility usage to the USI program. This practice enabled USI's staff to efficiently identify anomalies, offer best practices, and recommend strategies to lower energy consumption and expenses. However, with the implementation of Session Law 2014-120, this reporting requirement was transitioned to a biennial schedule, posing challenges for USI's staff in obtaining comprehensive data to aid governmental units in energy management. Advocating for a return to the annual reporting requirement, the USI program emphasizes the importance of governmental units submitting detailed reports on their utility usage as outlined in GS 143-64.12(a). Furthermore, within the same provision, the program advocates for the clarification that utility reports must be submitted by state agencies, institutions of higher learning, and community colleges by September 1st annually. With the current conflict between GS 116-30.3B(c) and GS 143-64.12(a) directives regarding reporting schedules, the need for alignment and clarity in reporting obligations becomes paramount for efficient energy management and resource allocation.

Energy Reduction Goal

Due to insufficient support for energy initiatives, inflation, rising energy costs, and financial constraints, it is proposed that the EO80 objective of reducing Energy Use Intensity (EUI) by 40% from FY2002-03 levels by 2025 be revised. This revision is based on comparisons to on going performance contracts and energy projects that would bring in the energy and the guaranteed savings amount to meet this goal. This shift towards a more sustainable energy consumption model necessitates the development of comprehensive planning strategies, targeted investments, and a culture of innovation to optimize existing resources and drive down energy consumption and associated expenses.

Through a detailed analysis outlined in this report, it becomes evident that achieving the 2025 target demands a concerted effort toward embracing forward-thinking approaches. The USI program advocates for revising the due date for the 40% reduction goal, as this move promises

substantial environmental advantages and long-term energy cost savings for future generations. The known shortfalls of the EO80 goal primarily due to challenges related to funding constraints, inadequate representation of energy managers, cost overruns and lack of backing for energy efficiency initiatives. By addressing these hurdles and fostering a supportive environment for sustainable practices, we can propel state-owned buildings towards a more energy-efficient and financially prudent future.

5.0 Recommendations for State Governmental Units to Reduce Energy Consumption

In addition to achieving continued reductions in existing buildings' energy and water use, new buildings must be constructed to energy efficient standards. As new buildings are constructed, governmental units have greater ability to operate and to monitor building performance thereby ensuring energy efficiency goals are met. Sectors that have aging buildings and infrastructure continue to experience difficulties in optimizing building operations and with monitoring energy usage. Transitioning from old, out of date technology to new technology and more sophisticated systems better enables buildings to meet energy goals. These improvements will also improve building comfort and indoor air quality. USI continues to recognize achievements and promotes best practices through programmatic and legislative means.

5.1 Best Practices for Energy Management in State-Owned Buildings

The following concepts and principles are recommended as best practices in energy management for both leased and state-owned buildings:

Dedicated Energy Manager

Every successful energy program must have a champion. That is a person who is fully committed to and consistently works to further the program goals. An energy manager serves this role, and the importance cannot be overstated. A full-time, dedicated energy manager is an important asset and can recover energy savings and costs that exceed their salary multiple times. As such, USI has advocated for several years that every agency, university, and community college hire at least one full-time, dedicated energy manger. The UNC System has adopted this philosophy as evidenced by the fact that most UNC System universities currently employ at least one full-time energy manager, and several have whole dedicated energy management teams. As a result, the UNC System leads all public sectors in reducing their energy consumption from baseline levels. Governor Cooper also recognized the importance of energy managers and directed through EO80 that all cabinet agencies appoint energy managers. While energy managers are needed, most state agencies complied by appointing an existing employee who already had another full-time position. Energy management was added as an additional duty on top of the employee's existing workload. Without being able to dedicate full-time efforts, these employees are not able to be as effective nor achieve the energy efficiency results a full-time energy manager could. DAC is the only state agency who currently has a full-time, dedicated energy manager. We hope that agencies follow this leadership and will be able to find funding mechanisms for these positions. Senior management needs to perceive energy management as part of the organization's core business and overarching involvement in each facet of the business line, to realize success and sustainability.

Organizations with energy programs that achieve results have senior-level support, sufficient energy program staff, and management structures that empower staff to address energy efficiency issues directly. It is imperative that our State divisions enable and provide a management structure for their organizations to follow in developing a strategy for achieving sustained performance. Forming an energy team, led by an Energy Manager, is one of the first steps in this framework. The energy team is responsible for planning, implementing, benchmarking, monitoring, and evaluating the organizational energy management program. The team's duties also include delivering training, communicating results, and providing recognition. Management of energy is solid strategic business alignment because it strengthens the efficiency and stewardship of revenues and funding. In many sectors, well-run energy programs may reduce energy costs by 7 to 10 percent annually. By improving financial performance, superior energy practices can create a competitive edge.

Once a full-time energy manager is hired, other factors must also be considered in order to help this position succeed. First, leadership can assist by prioritizing the need for energy efficiency goals to be met within the organization. (see Effective Strategic Energy Planning section below) When upper management prioritizes and supports the importance of energy conservation, the rest of the organization will respond accordingly. This sets the tone and expectation for everyone to participate. Second, the energy manager must be positioned strategically within the organization. They are typically located within a facilities department but have close ties to the business office. That is because they need to know about the equipment and building projects being planned but also be aware of budgets and utility spending. Every project from a stand-alone HVAC package unit to new building construction should be reviewed by the energy manager. Third, they should have the authority to influence and direct these projects for the selection of energy efficient equipment and other energy conservation design considerations. This involvement helps to ensure that a complete life cycle cost is weighed against the upfront costs. Often equipment which might be the cheapest to purchase will cost more in operation over the long run. Fourth, the energy manager could have a dedicated source of funding to implement conservation measures. Ideally, documented savings from energy efficiency measures can be tracked and those funds returned so that additional measures can be implemented. In this manner, the overall savings begins to grow and cascades as an organization becomes more efficient. That is a key indicator of a successful energy management program.

Utility Data Collection

Once an energy manager is hired, utility data is an essential part of their energy management program. Utility data is the key to determining which buildings are the highest energy users, which utilities cost the most, where conservation efforts should be focused, have savings been achieved, and whether there are leaks and slippage occurring. Without data providing measurements of utility usage, an energy manager is working without guidance and cannot properly manage the energy usage of an organization. However, some organizations receive thousands of utility bills from a multitude of providers every month. Merely collecting and compiling all these bills into a usable format can be an arduous task that subtracts from the goal and active work of managing energy. That's why several organizations have turned to third party data collection services to manage and to provide data from all their utility bills. This third party collects, verifies, reconciles, and records all bills so that the energy manager can access the data with ease. Formatted reports are available with up-to-date information so that energy managers can track utility usage from month to month and analyze fluctuations which can signal potential issues. This type of regular

and consistent analysis is imperative to understanding and managing the utility consumption for an organization.

There is third party software available for any entity to use for utility consumption tracking as well as utility cost tracking. If interested in additional information about this service, the SEO can put you in touch with someone for more information.

HVAC Optimization

The HVAC system is the main energy consumer within a building, utilizing these systems leads to substantial monthly costs. Neglecting its maintenance can lead to reduced indoor comfort, higher energy consumption, increased repair costs, and the need for premature equipment replacements. Therefore, it is crucial to engage a reputable contractor for routine inspections and servicing HVAC systems. Ensuring the HVAC system is functioning correctly is crucial for creating a comfortable and healthy indoor environment for occupants. By implementing operations & maintenance (O&M) best practices, organizations have the potential to save 5-20% annually on energy bills, as estimated by the U.S. Department of Energy. In addition to regular maintenance, periodic commissioning is essential to maintain the HVAC system's ability to meet thermal and air quality management standards. Retrofitting components and updating control sequences can help enhance the performance of HVAC systems. When selecting a contractor, it is important to understand the range of maintenance plans available, which can vary from wide-ranging packages to basic inspection and filter change services. To effectively compare different contractors' offerings, it is essential to first identify the key components included in their maintenance plans.

Effective Strategic Energy Planning

Creating an effective strategic energy plan (SEP) is a critical element of effective energy management. SEPs provide a clear roadmap to achieving energy reduction goals that are important to a governmental unit and help support the goals of EO80, while also providing buy-in from multiple stakeholders, implementation support, and accountability by identifying responsible parties within an organization. Setting reasonable yet dynamic goals and targets for energy and water efficiency that reflect the governmental unit's priorities and vision for the future helps set the stage for the unit's approach to these important initiatives, while also providing support for implementation to reach these goals. SEPs provide a focused pathway and strategies to better manage utility costs and consumption over time.

The following steps should be taken to begin the process of establishing a strategic energy plan[6]:

- Step 1: Establish and Charge a Leadership Team
- Step 2: Identify and Engage Stakeholders
- Step 3: Develop an Energy Vision
- Step 4: Assess the Current Energy Profile
- Step 5: Develop Energy Goals and Strategies
- Step 6: Identify and Prioritize Actions
- Step 7: Put Together a Funding and Financing Strategy

[6] https://www.energy.gov/sites/prod/files/2014/05/f15/cesp_guide.pdf

- Step 8: Develop a Blueprint for Implementation
- Step 9: Plan to Evaluate
- Step 10: Develop, Adopt, and Publicize the SEP

A strong and effective SEP should generally include, but is not limited to, the following elements:

- Include historical utility consumption and cost data and describe the organization's method for future data collection efforts;
- An organizational chart illustrating the makeup of the team, including specific names and titles, responsible for the SEP's success;
- Identify specific energy and water efficiency goals/mandates important to the organization using SMART goal metrics (**S**pecific, **M**easurable, **A**chievable, **R**elevant, and **T**ime-Bound);
- List specific projects and strategies that will be used to achieve these goals, including a discussion of the source of funding for these projects, as well as individuals or teams responsible for the success of each goal;
- Identify Key Performance Indicators (KPIs) that will be used to measure the progress and success of the goals/mandates identified;
- A training plan for staff to better understand and implement the goals within the SEP;
- Outline a specific plan for revisions and updates to the SEP; and
- Signature page that shows upper management acknowledgment and buy-in.

The USI team is prepared and able to provide guidance and technical assistance as state governmental units revise, or develop for the first time, their SEP. While SEPs were not due this fiscal year, pulling an example from DIT's SEP[7] last year helps demonstrate the importance of an SEP in stating goals, priorities, and leadership buy-in, and can help governmental units prepare for the SEPs that will be due next fiscal year:

- Description of existing facilities, equipment, and energy/water consumption histories
    - Eastern Data Center description, mechanical equipment within (i.e. air handlers, chillers, water heating, controls, etc), and utility data history
    - Western Data Center description, equipment within, and utility data history
- Description of roles and responsibilities of existing personnel/positions as they relate to energy management
    - Role of the Energy Manager (Tony Brackett)
    - Role of the Operations Director (Hank Kaylor)
    - Other roles such as DIT COO and DIT Facilities
- Energy efficiency projects recently completed or in progress
    - Western Data Center example: Replacing 400-watt pole lighting with 150-watt LED replacements as they go out, 5 of 18 completed.
    - Eastern Data Center example: Half of the lighting has been replaced with LEDs at the 3900 office building.
- Energy management goals / focus areas for 2023-2024 fiscal year
    - Eastern Data Center focus areas

[7] Pages C-1 through C-21 of Appendix C of the 2023 Comprehensive Program Report and EO80 Update

        - Building management system / controls improvements
        - Roof replacement
        - EV charger installations
    - Western Data Center focus areas
        - New high-efficiency chiller project with R&R funding
        - New high-efficiency UPS units (uninterruptible power supply), 15-20% more efficient than existing units
        - Computer power management for personal computers
- Leadership buy-in
    - Signatures from the Workplace Services Director, Operations Director, Chief Operating Offer, and Chief DSCIO
    - Demonstrates their commitment to the Plan and the goals / priorities within

State governmental units are encouraged to learn from their peers and use other SEP examples as a source of inspiration and ideas for their own SEPs; the USI team can and does facilitate these discussions to encourage peer exchange. Energy efficiency projects require planning, coordination, ownership, approvals, and funding. Acknowledgement and support of energy priorities must be documented and communicated to the entire organization. By incorporating all of the critical elements outlined above, the SEP has a higher likelihood of success in achieving the stated goals and objectives, bringing the organization closer to a strong foundation of, and commitment to, robust energy efficiency and energy management practices.

Energy Efficiency Assessments

Conducting a thorough energy efficiency assessment offers valuable insights into the strengths and weaknesses of a building, aiding in a deeper understanding of its performance. It evaluates both immediate and future chances to conserve energy and costs within buildings. Conducting a comprehensive energy assessment not only supports the energy reduction targets set by EO80 but also demonstrates a strong dedication to achieving the entity's energy goals. This assessment examines the yearly energy usage of the building and pinpoints any possible opportunities for enhancing operations and upgrading equipment. Assessments are advantageous for facilities of any scale and should be considered as a vital component of the strategic energy plan (SEP). To initiate an assessment, start with a plan. This plan should consist of reinforced recommendations stated in the SEP that include but are not limited to:

- Planned Activities: The actions to be carried out.
- Schedule: The timing for executing the activities.
- Essential Personnel: The key individuals involved in the project.
- Resource Needs: Financial and technical requirements.
- Risk Analysis: Identification of potential risks and strategies to manage them.
- Projected Outcomes: Expected results and deliverables.
- Reporting Procedures: Procedures for post-assessment reporting.
- Monitoring Timelines: Timelines for tracking progress, reviewing performance, and scheduling future assessments.

Understanding the essential details of energy-consuming machinery and its operation is crucial for the efficient functioning of a facility. Utilize assessment software tools that offer dependable, up-to-date, and precise data on facility energy flow. These tools are capable of gathering and assessing data on any system driven by motors including steam, pumps, compressed air, and process heating. Collecting new data usually starts with easily accessible high-level data. For instance, invoice data can provide insights into the types of energy used at various sites and processes, presented as a percentage of total energy consumption. Such details are commonly found in financial or greenhouse gas accounting systems. Verify that the measurement frequency and timeframe are appropriate to capture a representative operational period. It may be necessary to measure intraday, daily, monthly, or seasonal variations. Facilities with robust energy management programs currently established can potentially achieve additional savings of by implementing the best practices of conducting energy assessments.

Collaborating with stakeholders across all levels of the organization is essential. It is important to recognize that the required skill sets may already be present in various departments, highlighting the importance of utilizing both a team based and organization-wide strategy. Depending on the organization's size and resources, it may be beneficial to establish dedicated full-time roles for energy efficiency (Energy Manager) or assign staff to specialized assessment responsibilities. In certain cases, organizations may find it imperative to seek external technical assistance. Energy Services Companies (ESCO's) are able to assist with various aspects of an evaluation, such as data collection, opportunity identification, analysis, facilitation, and reporting.
Conducting a preliminary high-level analysis of the data at hand can help identify any missing data in critical high energy-consumption areas or processes that require further detailed scrutiny. By analyzing energy data, the entity can determine an energy baseline that will help establish the correlation between energy utilization and business operations. This baseline will link energy costs with business performance over a specific period. Sharing the findings of this analysis with a diverse group of individuals can lead to the generation of additional ideas and perspectives. Oftentimes, workshops are utilized to convene subject matter experts to review the data collected in the assessment and brainstorm potential opportunities. It is essential to document all identified opportunities in a register or similar document. This will serve as a persistent record to monitor ideas and results, and to reassess potential opportunities in case of changes in operating conditions or energy prices.

After receiving the findings from an energy efficiency assessment, determine the key areas that you will focus on and present them to predetermined decision makers identified in the SEP. Utilize the payback period or cost savings associated with each enhancement as a primary consideration. The business proposal should clearly outline the financial implications and advantages of each initiative, enabling decision-makers to make well-informed choices for the entity.

Building Envelope Improvements

Improving and maintaining the building envelope is crucial for enhancing energy efficiency, comfort, health and durability. An energy audit can help identify and prioritize specific areas for efficiency improvement. Additionally, consider the age, deferred maintenance, life cycle viability and uses for buildings that may be considered for obsolescence and/or replacement. Here are several key focus strategies:

Insulation Upgrades:

- **Add or Upgrade Insulation**: Improve the thermal resistance of walls, roofs, and floors. Consider spray foam insulation applications.
- **Use Insulated Panels**: Consider structural insulated panels (SIPs) or insulated concrete forms (ICFs) for better insulation.

Air Sealing:

- **Seal Gaps and Cracks**: Use caulking, weatherstripping, or foam sealants to reduce air leaks and infiltration.
- **Blower Door Testing**: Conduct tests to identify leaks and areas needing improvement.
- **'Smoke' testing:** Consider retaining specialty firms that provide simulated, non-toxic 'smoke' to identify envelope voids and pathways.

Windows and Doors:

- **Energy-Efficient Windows**: Install high performance double or triple-glazed windows with low-E coatings and other new technologies in fenestration.
- **Upgrade Doors**: Replace old doors with energy-efficient models that have good insulation properties and improved gaskets and sealing.

Efficient Roofing:

- **Cool Roofs**: Consider the use of reflective roofing materials to reduce heat absorption and improve indoor comfort.
- Restrict the use of dark heat absorbing roof coverings, in new or retro fit applications, to decrease solar gain. (warmer climates)
- **Built-up Roofing:** Consider additional rigid panel roof insulation, to enhance the thermal performance.

Exterior Walls:

- **Cladding**: Consider adding or upgrading cladding materials that provide insulation and weather resistance.
- **Moisture Barriers**: Ensure proper moisture barriers are in place to prevent water intrusion.
- **Drainage:** Ensure the effectiveness of and provisions to expel and transfer moisture and site water away from exterior.

Heat/ Cooling and Ventilation Improvements:

- **Dedicated Outside Air Systems (DOAS):** Implement mechanical ventilation systems that provide fresh air while minimizing energy loss and establish balanced ventilation with improved internal air quality.

- **Energy Recovery Ventilators (ERVs)**: These systems can improve indoor air quality while recovering energy from exhaust air, often to be utilized for alternate

purposes.

- **High Performance Systems:** consider upgrades for high-performing HVAC system composed of efficient equipment that is also right sized for the use and building type.

Smart Technology:

- **Building Management Systems / Building Automation Systems**: Utilize smart thermostats, sensors and advanced meters to optimize energy use based on occupancy and weather. These programs can be visualized and adjusted in real time, often reducing costly overrides, enhancing efficiency and improved maintenance, in addition to facilitating trend analysis.

Operations and Maintenance:

- **Inspect**: Conduct routine inspections, cleaning, and repairs to keep buildings operating properly. Regularly check for damage or wear in the building envelope and components to ensure efficiency performance.

- **Maintain**: The need and benefits of a robust maintenance program can not be overstated. Improve operations and maintenance practices by regularly checking and maintaining equipment to ensure that it's functioning efficiently.

Implementing these improvements can lead to significant energy savings, thus reducing EUI, contribute to enhanced comfort and health, and a reduced environmental footprint.

LED Lighting and Controls

Light Emitting Diodes (LED) are now the standard to which all lighting is compared. The market offers a wide range of white LED lighting products, with the selection continually expanding as new generations of devices are introduced. Although many of these products deliver impressive performance, their energy efficiency and color accuracy may vary. LED lighting products are well-known for their longevity compared to traditional lighting options. The useful life of an LED luminaire or lamp is commonly measured as the number of operating hours until it emits 70% of its initial light output. Premium white LED lighting products are projected to have a useful life ranging from 30,000 to 50,000 hours, surpassing many conventional lighting sources. This extended lifespan not only reduces the frequency of replacements but also offers significant energy savings and maintenance costs over time. Choosing high-quality LED lighting products can provide both efficiency and durability, making them a reliable and long-lasting investment for various applications. LED lighting products vary in price depending on several key factors related to lighting performance features. These differences in price often reflect varying levels of color quality, lifetime, optical performance, and other varying factors within the products. As consumers navigate the market for LED lighting, it is crucial to strike a balance between price and performance to ensure their needs are met effectively. The LED lighting platform offers a spectrum of performance levels at different price points, allowing consumers to choose products that align with both their budget and desired lighting capabilities. By understanding these distinctions and

making informed decisions, consumers can optimize their lighting solutions for both functionality and cost efficiency in professional settings.

Integrating lighting controls such as occupancy sensors, vacancy sensors, and daylight sensors in a project can significantly improve energy savings. These sensors can be connected to the fixture through hardwiring or operate wirelessly with battery power, allowing for greater flexibility during installation. In today's market, many LED manufacturers incorporate various controls into their products, simplifying the process for users. However, it is important to recognize that not all sensors may be compatible with every product. It is crucial for professionals to diligently assess compatibility to ensure the smooth integration of lighting controls and maximize energy efficiency in projects. Below are various types of controls that not only enhance efficiency and cut costs, but also enable maintenance staff to focus on other tasks:

- Occupancy sensors play a pivotal role in energy efficiency by automatically turning lights on and off based on occupancy levels to optimize energy usage;
- Vacancy sensors are ideal for small private spaces, offering manual activation and automatic shutoff to cater to areas consistently utilized throughout the day;
- Daylighting sensors are equally essential, ensuring electric lights are dimmed or switched off when natural light is sufficient;
- Multiple sensor strategies is a smart approach, although it's crucial to note that energy savings from various tactics are not simply cumulative;
- Dimming controls provide further energy efficiency by adjusting light intensity as per occupants' preferences, timers, or daylight levels. It is worth noting that not all LED products support dimming capabilities;
- Task tuning, characterized by dimming to tailor light output to occupants' needs, enhances both comfort and efficiency in lighting environments. This comprehensive approach to sensor deployment and control mechanisms underscores the importance of professional practices in creating sustainable and efficient lighting solutions.

Retrofit kits offer greater energy savings potential through lighting controls compared to tubular LEDs (TLEDs). The body of the retrofit kit allows for easy installation of sensors. They can be used for small projects with stand-alone wireless controls, or larger whole-building retrofits with more complex systems. Retrofit kits can be wired during installation of new lighting systems for maximum efficiency.

While all of the projects listed in Section 5.0 could help to achieve energy efficiency at state agencies, universities and community colleges, there are a few main barriers to implementation that impact all project types:

- A lack of staff time to review energy usage data and develop, implement and oversee energy efficiency projects;
- Training, staff time, and support for needed building commissioning and decommissioning, and regular building and systems maintenance;
- Education and training for new and existing staff on energy usage, tools for energy efficiency, and how to maximize existing building and system technology; and
- Funding for energy efficiency projects. Funding pathways are discussed further in the following section.

5.2 Funding Pathways

The following funding sources have been awarded to the SEO and could be a potential resource for your facilities in the upcoming calendar year. For any updates to what funding sources the SEO is awarded in the future, be sure to check our website at: The NC State Energy Office.

IRA & IIJA Funding Updates

A. **Inflation Reduction Act**

Section 60114 of the Inflation Reduction Act authorized the Climate Pollution Reduction Grants (CPRG) program under the EPA, providing $5 billion in grants to states, local governments, tribes, and territories to develop, strategize, and implement plans for reducing greenhouse gas emissions and other harmful sources of air pollution. North Carolina received a $3 million award this year for planning activities. North Carolina is in the process of developing a Comprehensive Climate Action Plan (CCAP). The CCAP, due July 5th, 2025, will update and expand upon North Carolina's existing climate strategies, ensuring that these documents align with the latest available science, modeling, and best practices. The Priority Climate Action Plan (PCAP) was developed after extensive stakeholder engagement. The PCAP identified the priority areas in NC for greenhouse gases, while ensuring equitable implementation. To view the PCAP, you can click on this website: PCAP.

The SEO was not awarded the implementation funding in 2024. However, the SEO does plan to reapply for the CPRG implementation grant in 2025. If awarded implementation funding, state-owned facilities in North Carolina may be eligible to receive funding for projects where greenhouse gas emissions can be substantially reduced, leading to further implementation of EO80 goals.

B. **Infrastructure Investments and Jobs Act**

The bipartisan Infrastructure Investments and Jobs Act (IIJA) was signed into law on November 15th 2021, allocating $1.2 trillion to create opportunities for states, tribes, and local governments to invest in infrastructure towards green energy, energy equity, and climate resiliency. Under Section 40552 of H.R. 3684, the Energy Efficiency and Conservation Block Grant (EECBG) program provides $550 million to improve transportation and building infrastructure. The SEO was awarded approximately $2.9 million in EECBG funding from the Department of Energy. It will allow North Carolina to implement energy efficiency measures and renewable energy system installations in their facilities, providing a direct funding pathway to help meet the EO80 goal of a 40% energy usage intensity reduction by 2030. This funding will include energy efficiency funding opportunities for State Agencies.

The SEO applied for and has been awarded the Preventing Outages and Enhancing the Resilience of the Electric Grid grant under the IIJA Grid Resilience Formula Grant Program Section 40101(d). The Grid Resilience grant provides approximately $9.2 million annually for the next five (5) years in funding support for the deployment of grid modernization technologies, diversification of distributed generation assets, and hardening and improving adaptivity of transmission infrastructure to strengthen the resiliency of the electric grid against disruptions from extreme

weather-related events and outages. Potential projects from eligible entities, including electric grid operators, distribution providers, and others, will be prioritized based on North Carolina's objectives of grid modernization, equitable access to resilient and reliable energy, and equitable workforce development initiatives. For the first two years of the grant, North Carolina received approximately $18.4 million and plans to administer funding to subawardees following a competitive proposal selection. Selected projects will reduce the likelihood and consequences of grid failure due to natural disasters.

Guaranteed Energy Savings Contracts (GESC)

Since 2002, GS §143-64.17 allows for governmental units to utilize the GESC process to implement and finance energy efficiency improvements which save energy and reduce utility expenditures. Under this law, the energy savings resulting from the performance of the contract must equal or exceed the total cost of the contract. Furthermore, the contracts are not to exceed a term of twenty (20) years from the date of installation and acceptance. Based on the rules in *Title 01 NCAC Subchapter 41B*, an Energy Service Company (ESCO), in collaboration with the affected governmental units, works to: (1) design and propose a package of energy conservation measures (ECMs); (2) install the selected ECMs; (3) provide measurement and verification of the annual savings for the duration of the contract; and (4) guarantee the energy savings through a third-party's review of the ESCO's M&V analysis. Utility budget savings realized by the implementation of the guaranteed ECMs provides repayment of the multi-year loan executed by the governmental unit to finance the upgrades. Governmental units are encouraged to utilize the GESC process to fund capital projects that will assist in meeting the EO80 goal. USI's program staff are equipped to provide technical assistance and guidance throughout the GESC process.

Three cabinet agencies, DOA, DOT, and DPS/DAC, have historically used this financing method for energy efficiency improvements. The Department of Adult Corrections (DAC) was recently approved for a performance contract in September 2023 with Schneider Electric for six of their 1,000 cell facilities (Maury, Alexander, Tabor, Scotland, Anson, and Bertie); this is a $38.7M performance contract that is guaranteed to save $60M+ over the life of the 20-year performance period. The project is currently under construction and slated to begin its first performance year in FY2025-26. USI oversees and reports on nineteen active performance contracts within state agencies and the UNC System that have an expected cumulative guaranteed savings of over $443 million through the life of the contracts. DAC recently released an RFP for a GESC at Central Prison in Raleigh; the Investment Grade Audit (IGA) and subsequent contract approval request will likely occur in mid/late 2025. The Department of Natural and Cultural Resources (DNCR) was working with Siemens to establish a performance contract at nine of their facilities across the state; DNCR decided not to pursue this contract in May 2024.

Agencies, the UNC System, and local governments have proven that GESC works and works well for completing energy efficiency improvements across building portfolios. Strong communication and coordination among all parties involved, including the governmental entity, the ESCO, the State Energy Office, and the Council of State/Treasurer, is critical to the success of any GESC; this strong communication and coordination must exist before, during, and after the contract's execution. GESCs allow governmental entities to address issues associated with aging, inefficient buildings or equipment, high maintenance costs, and scarce budget resources through a unique funding mechanism that does not require any upfront capital and provides guaranteed savings

through a single vendor and a single contract. GESC continues to be a valuable and vetted method of analyzing, designing, and implementing energy efficiency improvements, and should be utilized to the maximum extent possible if EO80 goals are to be achieved.

Energy Efficiency Repair and Renovation Funds

Each agency makes annual requests for repair and renovation (R&R) budgets. These requests contain a variety of requests including capital projects, maintenance issues, aging equipment, and infrastructure necessary to maintain the current use of existing facilities. USI and OSBM have worked together to ensure that agencies target a portion of these funds for energy efficiency measures. For example, during FY2023-24, cabinet agencies collectively leveraged up to $25 million in much needed funding for energy projects that were pre-approved by USI's technical staff. In the most recent 2023-24 North Carolina budget, $140 million was approved for repairs and renovations for both state agencies and UNC System facilities. USI will continue to work with OSBM to ensure that agencies target a portion of these funds for energy efficiency improvements. Overall, this is a positive step towards achieving greater efficiency gains and providing stewardship of taxpayer funds.

Utility Program Offerings

Opt-In Utility Programs offer customers the choice to partake in demand side management (DSM) and energy efficiency (EE) initiatives. The key aim is to decrease energy consumption and enhance the efficiency of electrical appliances. Participants typically pay a slightly higher amount on their monthly bills but gain access to discounted high-efficiency equipment or lighting through rebates. By engaging in these programs, participants receive incentives that offset the added costs of energy-efficient installations and maintenance. On the other hand, customers who opt-out have the option to receive a bill credit, which they are encouraged to use for implementing their own efficiency measures. However, some customers may not utilize these savings for energy efficiency purposes as intended. If governmental entities opt-out, it is crucial that they redirect the funds they would have spent otherwise into consistent energy efficiency enhancements at their facilities. Tracking a monthly "would-be" spend amount within existing internal mechanisms for utility expenses can ensure these funds are earmarked for energy efficiency projects, promoting sustainable practices and accountability.

In North Carolina, there are utility programs offering financial assistance to eligible commercial customers with an average annual demand of 180 kilowatts or less for energy efficiency improvements. A dedicated contractor provides free energy assessments and makes recommendations for improvements in lighting, refrigeration, heating and cooling, and water efficiency. The process is streamlined, with the contractor calculating savings and payback, and handling installation. Participants receive upfront discounts from the energy provider to encourage the purchase and installation of high-efficiency equipment for their businesses.

Duke Energy offers in-home assessment programs that have been expanded to include new virtual, phone, and online options for customers. Customers can choose to have a virtual assessment conducted with energy advisors using their device's camera, a phone assessment with energy advisors, or a self-guided online assessment. Energy specialists will analyze customers' total home

energy usage and check the efficiency of their appliances and heating/cooling systems during the virtual and phone assessments. The online assessment generates customized savings recommendations based on customer responses. Customers will receive a customized report detailing steps they can take to increase efficiency and lower their energy bill, along with free energy-saving recommendations. Customers will also receive a free energy efficiency kit in the mail, containing bathroom aerators, weatherstripping, water heater insulation pipe wrap, and a furnace filter whistle. These items can be self-installed to provide immediate energy savings. The program aims to help customers reduce energy usage and lower their bills.

Carry Forward Funds

One barrier all state governmental units face is a lack of funding for energy efficiency improvement projects. In this regard, the UNC System and affiliates benefit from a statutory provision that was created under SL 2010-196, Sections 1 and 2 (NCGS 116-30.3B), also known as carry forward funds. This provision allows the UNC System and affiliates to retain funds annually left over in their utility accounts by measuring and receiving third-party verification on energy savings associated with utility saving projects completed during the same fiscal year. These funds are credited into the next fiscal year's budget with the requirement that at least 60% of those funds must be used for more energy related projects. This provides an incentive to install projects which generate energy savings because a portion of the funds are credited back and can then be used for more energy efficiency projects. Over time, projects become larger thereby resulting in greater savings. A more recent legislation, The Department of Adult Correction (DAC) submitted their first request for carry forward funds under § 143B-1445 during FY2023-24, totaling $3,631,974. Energy efficiency projects included Small Business Energy Savers (SBES) projects through Duke Energy, water leak repairs, interior and exterior LED lighting projects, opt-out credits through Duke Energy, and energy savings during construction of the Thousand Cell Performance Contract with Schneider Electric. If other cabinet agencies had a carry forward mechanism like DAC has under § 143B-1445, they too could utilize this funding pathway to fund additional energy efficiency projects across their portfolios, furthering the energy reduction goal of EO80.

During FY 2023-24, eleven UNC System schools asked to carry forward nearly $23 million in utility savings and reported spending an additional $11.4 million for new energy efficiency projects. Figure 9 represents the previous fiscal year's estimated avoided energy costs of the top agencies that totaled more than $38 million. If these agencies had a more permanent, clear, and reliable mechanism like NCGS 116-30.3B (i.e., outside the dedicated energy efficiency R&R funds), some of these avoided costs could have been utilized to self-fund additional energy efficiency projects similar to the UNC System and its affiliates. USI recommends cabinet agencies have access to similar self-funding energy efficiency improvement funds as the UNC System has under NCGS 116-30.3B and as DAC has under NCGS 143B-1445; these funds would be significant and would provide a clear pathway to increased implementation of valuable energy efficiency projects.

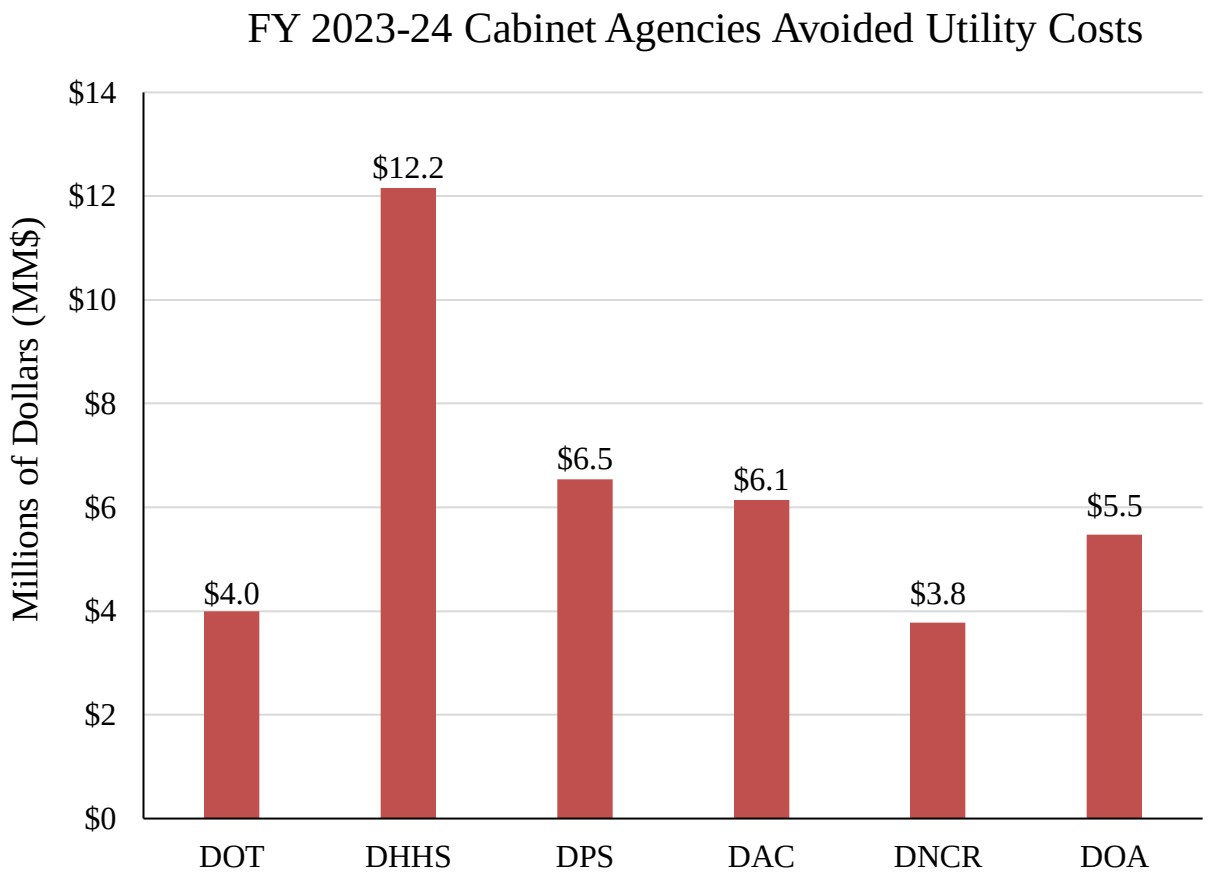


Figure 9: Cabinet Agencies Avoided Utility Costs

6.0 Conclusion

This report emphasizes the need for significant energy conservation measures and resources by all governmental units to achieve the EO80 40% EUI reduction goal by 2025. If substantial measures and resources are not implemented in FY2024-25, the EO80 40% EUI goal will likely not be achieved.

Hiring full-time dedicated energy managers with decision-making authority and access to specific funding for energy improvements would help substantially in this effort. Management can empower these energy managers and fully support EUI reduction initiatives both by communicating energy efficiency goals, providing staff time to address them, and by providing leadership in making sure the goals are achieved. Energy managers and contacts within governmental units must engage and communicate with the USI team at the SEO consistently, who are there to provide technical assistance and guidance in all EUI reduction initiatives.

Improved data collection efforts are underway within several state agencies, but all governmental units would benefit from a more sophisticated and centralized utility data collection system; this would reduce the risk of human error in data collection efforts, thereby increasing the accuracy and effectiveness of the data and allowing energy managers to more easily identify facilities that would benefit the most from energy efficiency efforts.

Similarly, all governmental units need to consider alternative financing mechanisms for energy efficiency projects such as GESPCs. A comprehensive and thoughtful utility management plan is also necessary for all governmental units to provide a long-term vision and structure for incorporating energy efficiency practices and principles into business decisions.

Additionally, directives should be implemented to prevent purchasing non-LED lamps or fixtures throughout all government sectors, unless an exception is required for specialty circumstances or situations.

As the data shows, the EUI has decreased and the State is further from its 40% energy reduction goal as compared to FY2022-23. The State Energy Office (SEO) recommends the following overall improvements and capital investment as it relates to energy efficiency for state-owned buildings:

- Invest in more sophisticated, state-of-the-art data collection tools and/or mechanisms to streamline and standardize utility data collection and increase the accuracy of the SEO's data collection efforts;
- Appoint a full-time energy manager, particularly for the top five largest agencies, where energy management is their sole responsibility;
- Buy-in from executive management and additional funding for energy manager positions in state cabinet agencies;
- Maintain consistent and frequent communication with the SEO so we can better understand and support USI entities' struggles and successes;
- Participate in energy efficiency assessments for state-owned facilities at least once every 3-5 years in order to identify and prioritize energy efficiency projects, and communicate these findings to the SEO;
- Explore and be creative with the various funding pathways for energy efficiency projects as outlined in Section 5.2, particularly with Guaranteed Energy Savings Performance Contracts;
- Implement a directive against purchasing new non-LED bulbs and/or fixtures, unless an exception is required for specialty circumstances or situations;
- The North Carolina General Assembly should consider establishing carry-forward funds for cabinet agencies as they have with UNC System institutions as a means of increasing funding, implementing energy efficiency projects, and achieving savings.

Overall, cabinet agencies, other agencies, and the UNC System spent over $357MM on utilities in FY 2023-24. Proper stewardship of these funds requires robust energy conservation measures and an intentional focus on energy efficiency. This message should come directly from leadership and filter through all levels of governmental sectors. Due to the plethora of upcoming stimulus and grant funding opportunities, state agencies and UNC System institutions have monetary opportunities for financial reinforcements that are necessary to move toward and reach the collective 40% EUI reduction goal by 2025. Now more than ever, an investment in energy efficiency is necessary for North Carolina to continue to lead-by-example both within our state and nationally. The USI team at the State Energy Office is prepared to support and assist with all energy efficiency efforts and to drive future energy savings across the state. We must continue to work together to conserve our valuable resources for the benefit of all North Carolinians.

Appendix A

Agency Summaries, Data, and Graphs

Department of Administration (DOA)

The Department of Administration acts as the business manager for North Carolina State government. The Department oversees Government Operations, which includes the maintenance of state-owned buildings and grounds. The DOA Division of Facility Management has been tracking electrical and natural gas consumption data for buildings owned and maintained by DOA monthly since 1998. The Division is also responsible for operating and maintaining DOA buildings, including paying the water, electric, and natural gas utility bills. DOA operates a central steam heating plant, two chilled water plants, and chilled water storage tanks. Most large DOA buildings are in the Downtown Government Complex with the majority being offices, but also includes the steam and chilled water plant. The buildings are mostly occupied by agencies other than DOA with DOA serving as landlord. DOA deducts the Legislative Building and Legislative Office Building chilled water and steam usage from their totals because DOA does not report on these buildings. Due to technical glitches, DOA did not have the data needed from the building automation system for this fiscal year, resulting in estimated values using last year's numbers for the Legislative Building and Legislative Office Building. Brittany Quinn and Ralph Taylor work together to improve the energy efficiency and sustainability of DOA facilities. DOA accounts for 12% of overall cabinet agencies' energy consumption impact; DOA has seen a 36% reduction in EUI (BTUs per square foot) since the baseline year of 2002-03.

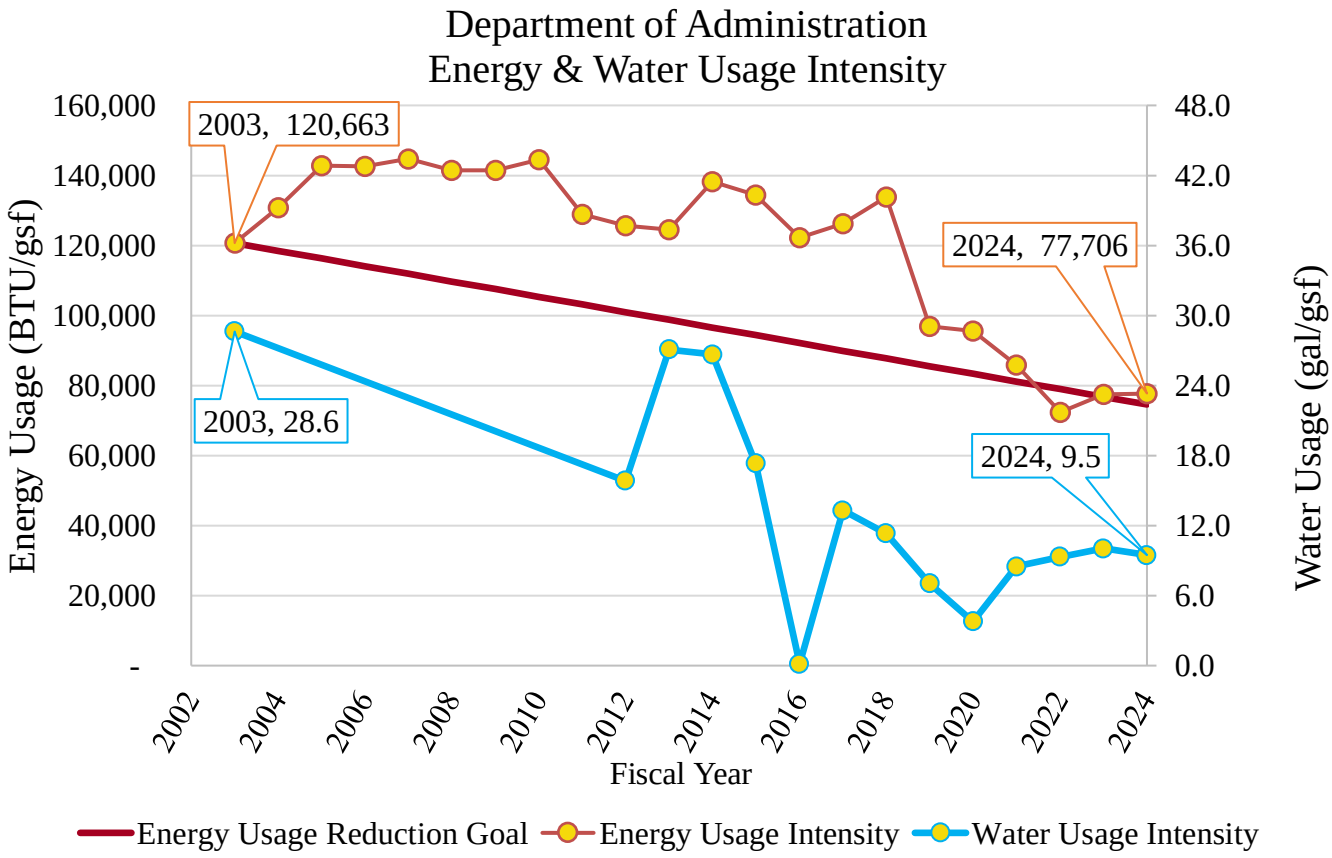


Figure A.1: DOA Utility Usage Over Time

Table A.1: DOA Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	4,798,719	5,374,594	+12%
Total Utility Cost	$7,491,785	$8,286,604	+11%
Energy Usage (Btu/gsf)	120,663	77,706	-36%
Energy Cost ($/MMBtu)	$12.41	$18.38	+48%
Water Usage (gal/gsf)	29	9	-67%
Water Cost ($/kgal)	$2.23	$12.00	+439%

Department of Commerce (DOC)

The DOC's mission is to *"work closely with local, regional, national, and international organizations to propel economic, community, and workforce development in the State."* To accomplish this task, the DOC is comprised of several divisions and programs that assist businesses with siting and workforce requirements, connecting the community with funding opportunities to attract new businesses, and publishing analytical reports for those interested in investing in North Carolina's economy. Except for the Division of Employment Security's (DES) Central Office, all business operations are housed in properties that are owned or leased by the Department of Administration (DOA). Therefore, the DES is the only entity that is required to report utility consumption through the DOC in accordance with GS §143-64.12 and EO80, Section 8. Joe Katzberg is the Support Services Director, and is designated as the agency's energy manager. DOC accounts for less than 1% of overall cabinet agencies' energy consumption impact; DOC has seen a 15% reduction in EUI (BTUs per square foot) since the baseline year of 2002-03. Water consumption (in kgals) were not reported until FY2006-07, therefore there is no baseline water data available for DOC.

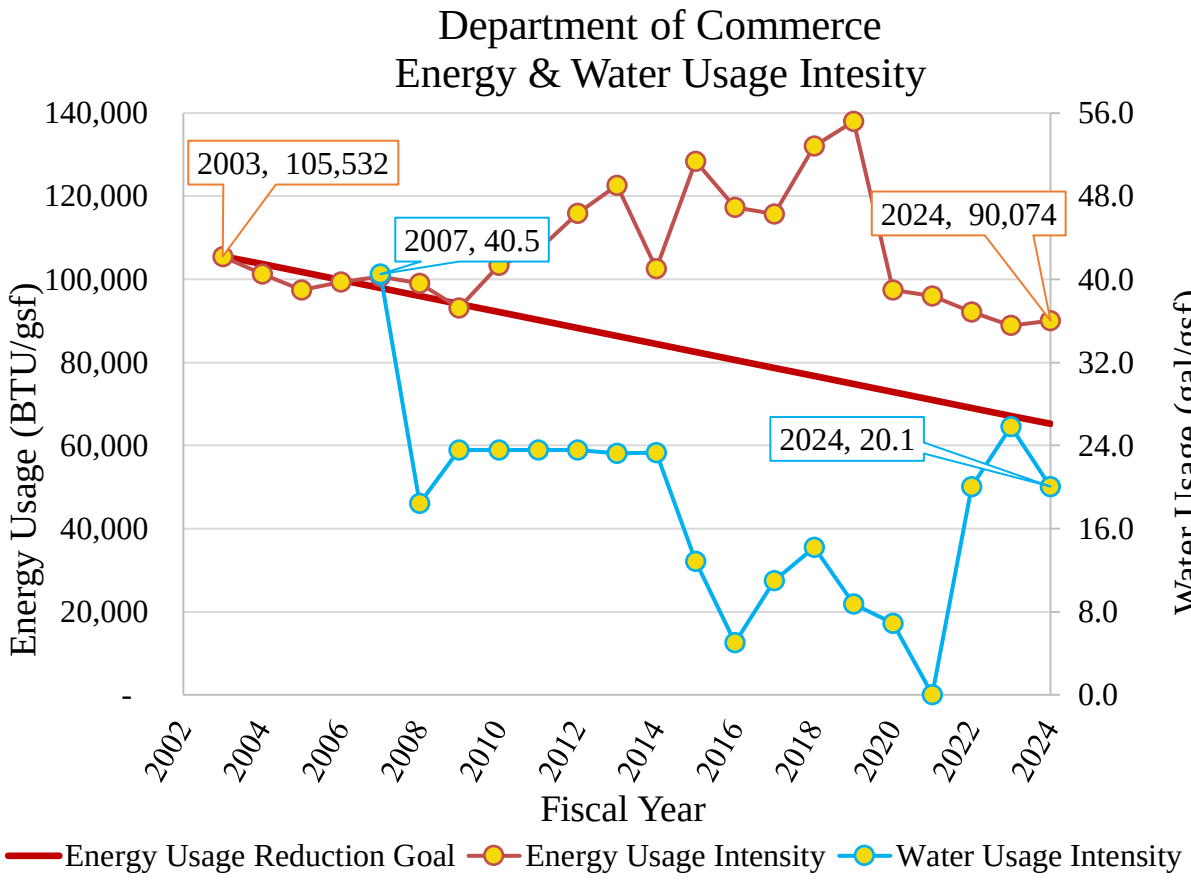


Figure A.2: DOC Utility Usage Over Time

Table A.2: DOC Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	261,091	261,091	0%
Total Utility Cost	$398,568	$429,738	+8%
Energy Usage (Btu/gsf)	105,532	90,074	-15%
Energy Cost ($/MMBtu)	$17.02	$24.76	+45%
Water Usage (gal/gsf)	0	20	
Water Cost ($/kgal)		$5.19	

Department of Environmental Quality (DEQ)

The DEQ is the lead stewardship agency for the protection of North Carolina's environmental resources and has offices from the mountains to the coast. Chief responsibilities include administering regulatory programs designed to protect air quality, water quality, and the public's health along with advancing energy efficiency. The majority of DEQ employees work in buildings owned by the DOA or in leased buildings which are not included in the utility data of this report. Only the state-owned facilities currently managed by DEQ are measured and tracked for the DEQ utility data, which include the Reedy Creek complex located in Raleigh primarily occupied by the Division of Air Quality, and Water Resources along with the Division of Marine Fisheries (DMF) located in Morehead City. Eric Turon is the Division Director for DEQ's Division of Facilities Health & Safety. 2002-03 baseline data was estimated for DEQ to track EO80 progress, but this exercise could not be done for every year between 2002-03 and 2010-11 due to data availability limitations. DEQ accounts for less than 1% of overall cabinet agencies' energy consumption impact; DEQ has seen a 36% reduction in EUI (BTUs per square foot) since the baseline year of 2002-03.

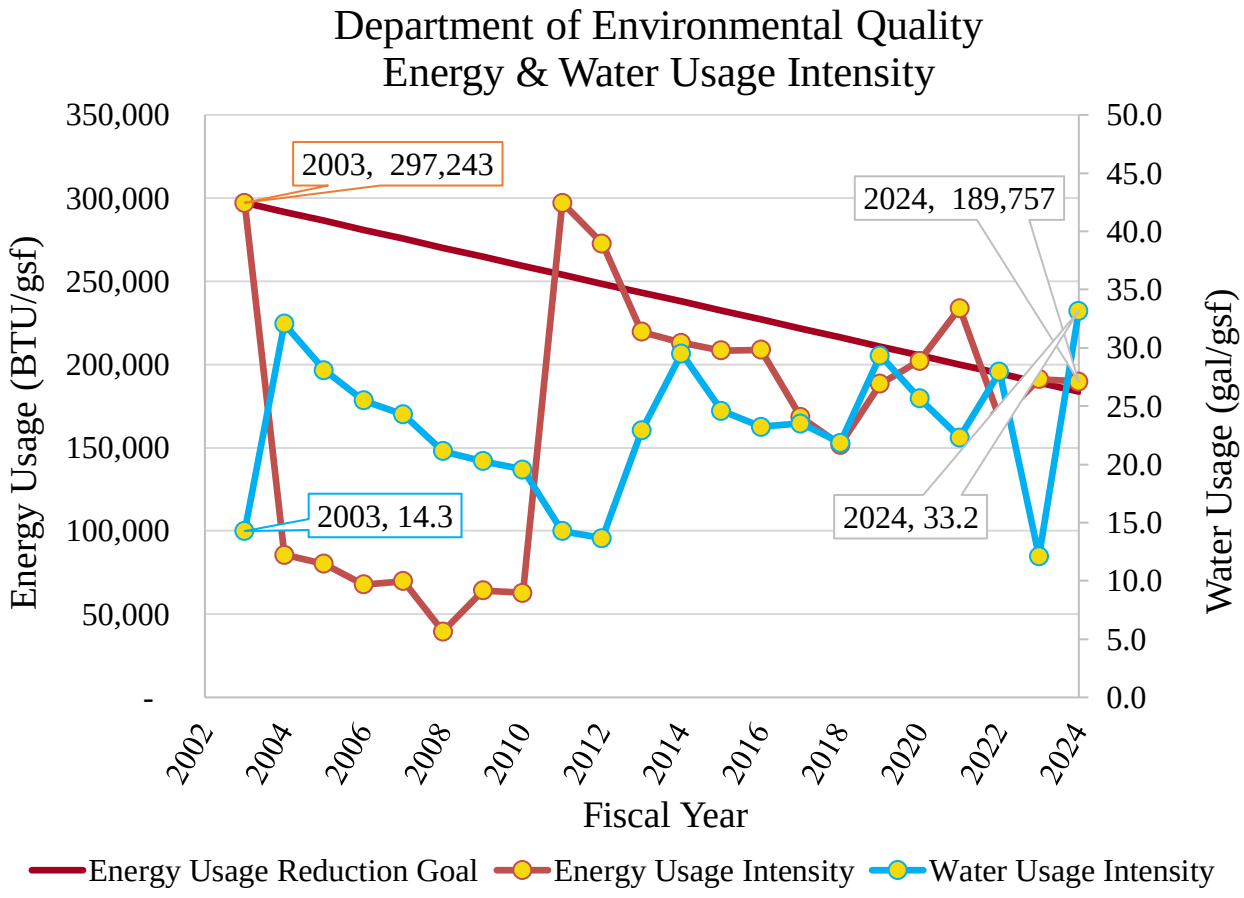


Figure A.3: DEQ Utility Usage Over Time

Table A.3: DEQ Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	105,527	95,182	-10%
Total Utility Cost	$572,246	$543,523	-5%
Energy Usage (Btu/gsf)	297,243	189,757	-36%
Energy Cost ($/MMBtu)	$17.56	$27.94	+59%
Water Usage (gal/gsf)	14	33	+132%
Water Cost ($/kgal)	$14.21	$12.34	-13%

Department of Health and Human Services (DHHS)

The DHHS manages the delivery of health and human-related services for all North Carolinians, especially our most vulnerable citizens; children, elderly, disabled and low-income families. The Department works closely with health care professionals, community leaders and advocacy groups; local, State, and federal entities; and many other stakeholders to make this happen. The Department is divided into 30 divisions and offices. DHHS divisions and offices fall under four broad service areas: (1) health; (2) human services; (3) administrative; and (4) support functions. DHHS has approximately 635 buildings at 14 different institutions across the State encompassing roughly 7.8 million square feet of space. These institutions include psychiatric hospitals, neuro-medical treatment centers, alcohol and drug abuse treatment centers, developmental centers, and vocational rehabilitation centers. The Energy Managers for DHHS are Greg Johnson, Luke Hoff, and Bill Stevens within the Division of Property and Construction. DHHS accounts for 22% of overall cabinet agencies' energy consumption impact; DHHS has seen a 37% reduction in EUI (BTUs per square foot) since the baseline year of 2002-03.

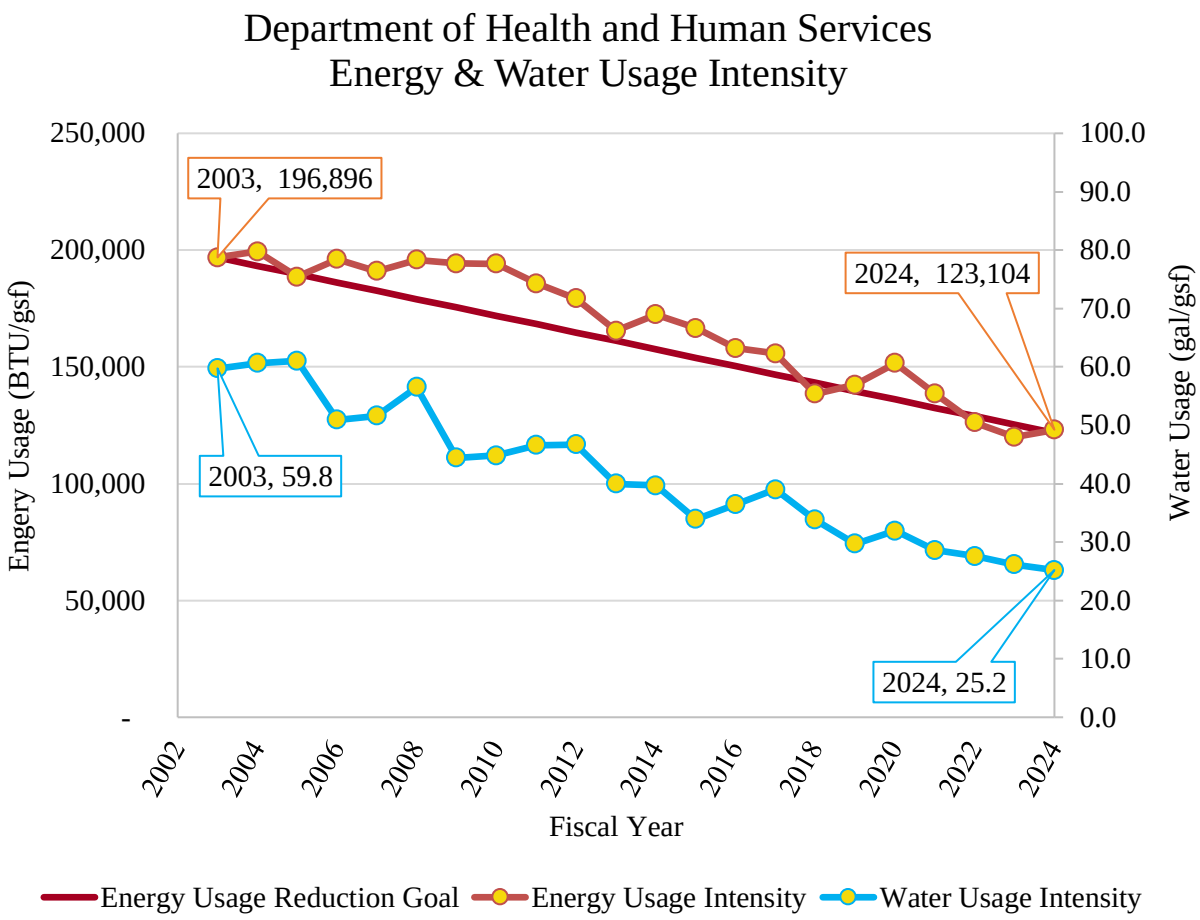


Figure A.4: DHHS Utility Usage Over Time

Table A.4: DHHS Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	6,381,007	7,882,511	+24%
Total Utility Cost	$12,834,405	$17,365,819	+35%
Energy Usage (Btu/gsf)	196,896	123,104	-37%
Energy Cost ($/MMBtu)	$9.23	$15.56	+69%
Water Usage (gal/gsf)	60	25	-58%
Water Cost ($/kgal)	$3.25	$11.43	252%

Department of Information Technology (DIT)

DIT has two data centers totaling approximately 164,000 square feet. The Eastern Data Center (EDC) located at 3700 Wake Forest Road in Raleigh has operated for roughly 36 years. The Western Data Center (WDC) located in Forest City has been in operation for approximately 15 years. The nature of DIT's Data center facilities differs from most State buildings since their energy consumption is constantly variable depending on the number of servers, network, and other types of IT equipment in use at any given time. DIT offers numerous IT services supported by the Data centers to other state agencies. Floor hosted options are also offered to the agencies where they can utilize a spot on the Data floor with a DIT supplied rack, power, and cooling. As state agency's IT requirements change over time, there is a general upward trend in the power consumption needed. The Energy Manager for DIT is Tony Brackett, Workplace Services Director. DIT accounts for less than 1% of overall cabinet agencies' energy consumption impact; for the reasons explained above, DIT has seen a 25% increase in EUI (BTUs per square foot) since the baseline year of 2002-03.

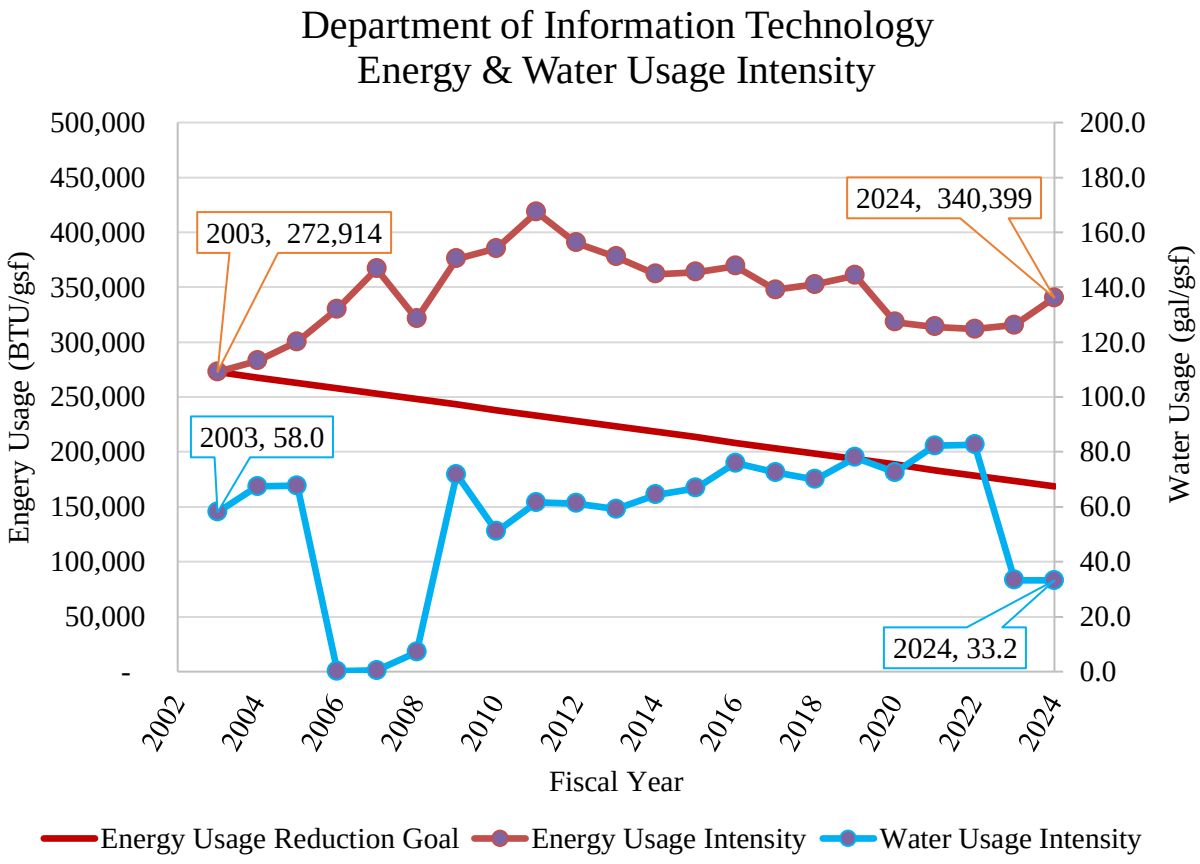


Figure A.5: DIT Utility Usage Over Time

Table A.5: DIT Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	94,343	163,866	+74%
Total Utility Cost	$362,255	$1,371,082	+278%
Energy Usage (Btu/gsf)	272,914	340,399	+25%
Energy Cost ($/MMBtu)	$13.67	$23.23	+70%
Water Usage (gal/gsf)	58	33	-43%
Water Cost ($/kgal)	$1.90	$13.81	+627%

Department of Military and Veteran's Affairs (DMVA)

The DMVA is the newest of the State agencies dedicated to helping veterans and active-duty men and women access the programs, benefits, and resources that they have earned. DMVA staff are committed to providing the highest level of service, responsiveness, and integrity in keeping the principles and values of this State and nation that military personnel and their families deserve. DMVA assists with the management of four military Skilled Care Nursing Homes housing almost 450 veterans and is in the construction phase of a 120-bed home with plans to build a sixth home. NC has one of the largest military footprints of any State, representing three out of the four branches. Military and defense industries are the second largest employers in our State and the military has an economic impact of over $66 billion annually. The current designated energy managers are Joy John, Accounting Technician III, and Brian Pierce, Chief Deputy Secretary.

Previous reports indicated that DMVA utilities are paid through federal funds and therefore they did not have utility graphs/tables to report; however, the SEO was informed in late June 2023 that DMVA nursing homes and cemeteries *are* paid with state funds and therefore should be included in reporting efforts. DMVA accounts for roughly 1% of overall cabinet agencies' energy consumption impact. SEO received incomplete energy consumption data from DMVA in FY2022-23; we were able to successfully collect FY2022-23 and FY2023-24 data this year, however there is no baseline data available for DMVA. Below is a summary of DMVA's utility consumption data for FY2022-23 and FY2023-24:

Table A.6: DMVA Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	404,969	516,269	+27%
Total Utility Cost	$971,174	$1,109,537	+14%
Energy Usage (Btu/gsf)	93,902	79,570	-15%
Energy Cost ($/MMBtu)	$20.76	$22.31	+7%
Water Usage (gal/gsf)	190	312	+64%
Water Cost ($/kgal)	$2.36	$1.20	-49%

Department of Natural and Cultural Resources (DNCR)

The NC Department of Natural and Cultural Resources oversees the State's resources for the arts, history, libraries and nature. This includes 27 historic sites, seven history museums, two art museums, two science museums, three aquariums, 39 State parks and recreation areas, the NC Zoo, the NC Symphony, the State Library, the State Archives, the NC Arts Council, State Preservation Office, Office of State Archaeology, the African American Heritage Commission, and the Office of Land and Water Stewardship. This comprises approximately 1,825 buildings across the State which account for over 3.6 million gross square feet. The Energy Managers for DNCR are Tony Romaine, Erin Lawrence, and Shannon Riley. 2002-03 baseline data was estimated for DNCR to track EO80 progress, but this exercise could not be done for every year between 2002-03 and 2010-11 due to data availability limitations. DNCR accounts for 7% of overall cabinet agencies' energy consumption impact; DNCR has seen a 38% reduction in EUI (BTUs per square foot) since the baseline year of 2002-03, which is the highest EUI reduction among all state agencies.

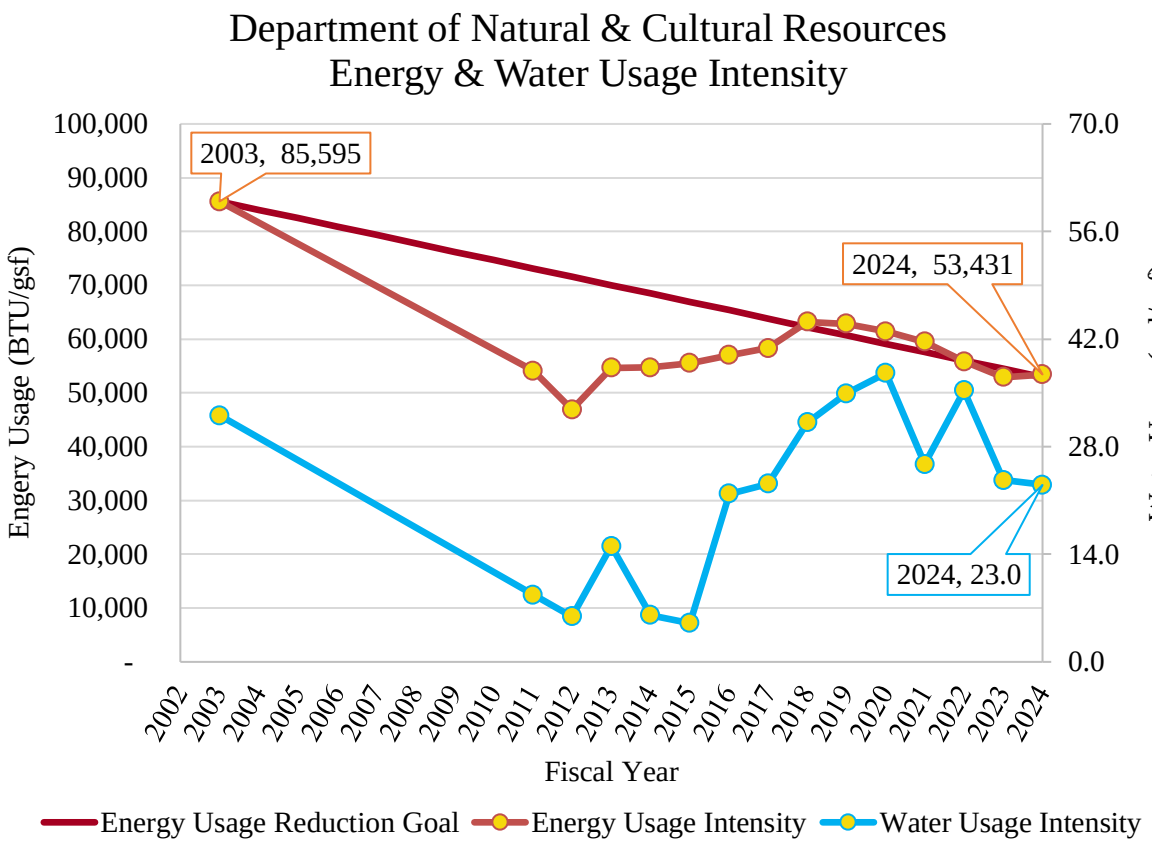


Figure A.7: DNCR Utility Usage Over Time

Table A.7: DNCR Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	2,291,088	3,641,596	+59%
Total Utility Cost	$3,808,442	$6,688,076	+76%
Energy Usage (Btu/gsf)	85,595	53,431	-38%
Energy Cost ($/MMBtu)	$17.08	$28.36	+66%
Water Usage (gal/gsf)	32	23	-28%
Water Cost ($/kgal)	$6.25	$13.96	+123%

Department of Transportation (DOT)

The NC Department of Transportation is responsible for all modes of transportation in North Carolina. This includes highways, rail, aviation, ferries, public transit, and bicycle and pedestrian transportation. The department also oversees the State's Division of Motor Vehicles and the Governor's Highway Safety Program, which promotes safety awareness to reduce highway crashes and fatalities. Additionally, DOT helps expand economic growth opportunities through oversight of the NC State Port Authority (NCSPA), NC Global TransPark and NC Turnpike Authority. DOT combined with the NCSPA occupies a total of 2,382 buildings which amount to more than 9.5 million gross square feet spread throughout the State. The energy manager for DOT is Eric Frazier whose primary job title is Energy Management Engineer for the Facilities Management Unit. DOT accounts for 16% of overall cabinet agencies' energy consumption impact.

The SEO did not receive any utility data from DOT for FY2022-23 or FY2023-24. Energy and water consumption data was duplicated from FY2021-22 to carry forward their approximate usage in order to make reasonable assumptions based on their contribution to agency totals.

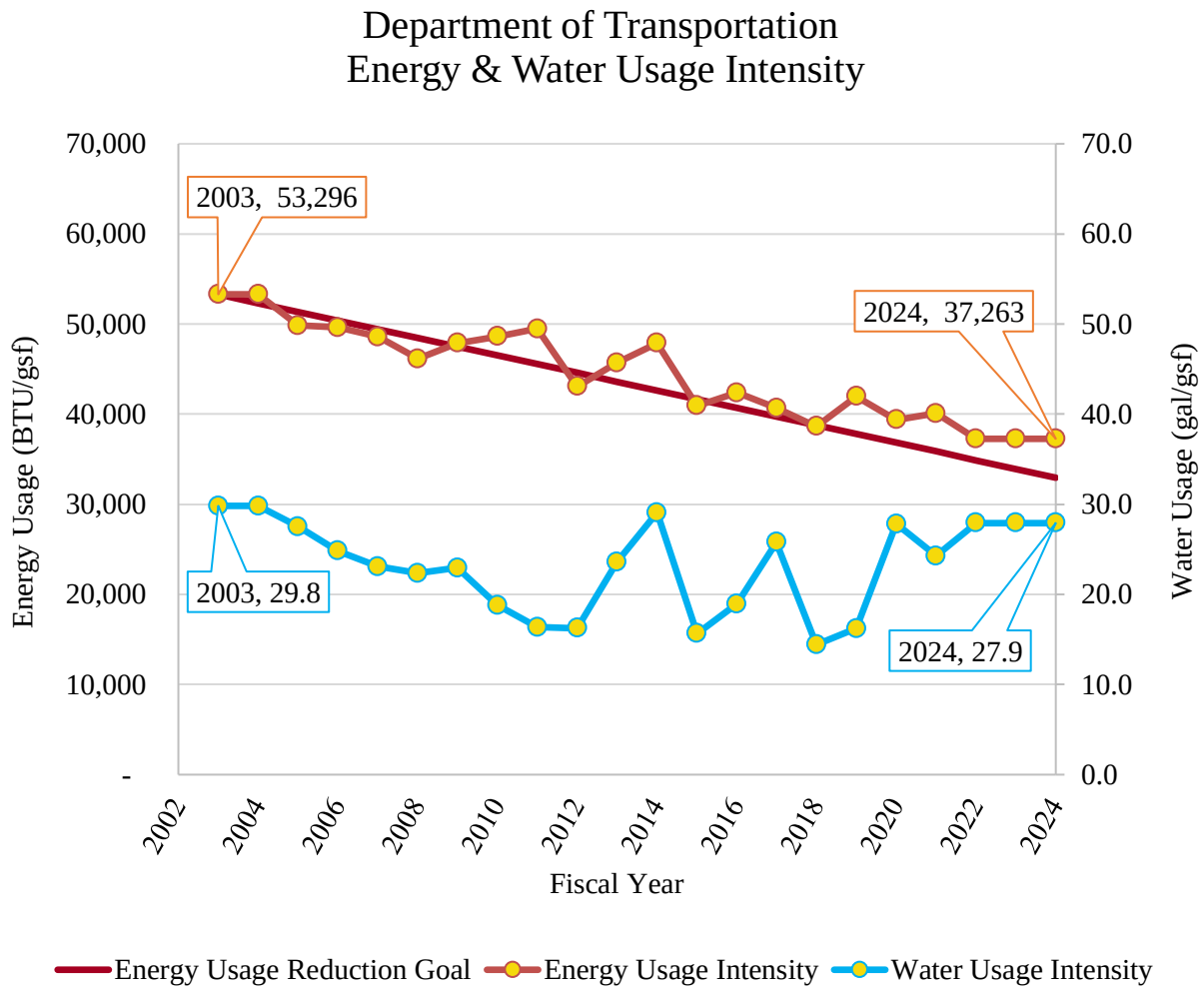


Figure A.8: DOT Utility Usage Over Time

Table A.8: DOT Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	8,784,848	9,628,207	+10%
Total Utility Cost	$9,341,426	$11,411,289	+22%
Energy Usage (Btu/gsf)	53,296	37,263	-30%
Energy Cost ($/MMBtu)	$17.02	$24.76	+45%
Water Usage (gal/gsf)	30	28	-6%
Water Cost ($/kgal)	$5.24	$9.40	+79%

Department of Revenue (DOR)

The DOR is tasked with administering tax laws and collecting tax revenue to fund public services for the citizens of North Carolina. The tax-funded public services include items such as schools, universities, roads, and public safety. To fulfill these tasks, the Department's vision is to protect customer information, maintain an expert workforce, achieve a high-level of understanding and compliance, respond with accurate information through innovative services, and to treat taxpayers fairly. The main DOR office building is located at 501 North Wilmington Street in Raleigh. This building is currently owned by the DOA, and utilities are reported through that agency. The DOR also occupies thirteen remote offices across the State that are housed in leased spaces so those utilities are not included in this report. Matthew King is designated as the energy manager for DOR, his primary role serving as Business Operations Facilities Manager.

No agency-specific utility graphs/tables are included below since the DOR reports utilities through the DOA.

Department of Public Safety (DPS)

The Department of Public Safety (DPS) manages facilities across the State that include juvenile detention centers, law enforcement support services, emergency management headquarters, and motor vehicle division sites. Also housed within DPS are the departments of Homeland Security and the National Guard. The designated energy manager for DPS is Robert Gron, Regional Engineer with Central Engineering. DPS accounts for about 6% of overall cabinet agencies' energy consumption impact, a large reduction from the 43% it previously accounted for when DPS and DAC were joined as DPS; prior to this split, DPS was the largest user of utilities among all state agencies. DPS has seen an approximate 24% reduction in EUI (BTUs per square foot) since the baseline year of 2002-03, however the following items should be noted[8]:

- DPS data has been updated back to 2021. Prior years of data were obtained from DAC Engineering. The accuracy of the pre-2021 data cannot be verified due to incomplete/missing information and numerous organization changes both before and after the creation of DPS in 2011;

[8] *These items were mentioned in a memo from NCDPS dated 8/28/2024 to the State Energy Office.*

- This data does not contain information for the North Carolina National Guard, as they report separately;
- This data does contain information for the State Bureau of Investigation (SBI). Beginning next fiscal year, the SBI will report separately. DPS will partner with SBI to assist in their initial independent report;
- This data does contain information for the State Highway Patrol / State Bureau of Investigation Campus in Raleigh, which is maintained by DOA.
- Energy and water reduction initiatives have slowed tremendously since the separation of DAC from DPS. DAC retained the entirety of Energy Management staff, leaving DPS without dedicated professional staff. To address this challenge, DPS has requested additional permanent staff to address both utility management and utility reduction project implementation. Despite requests and inclusion into the Governor's Budget, staffing resources have not been authorized by the legislature.

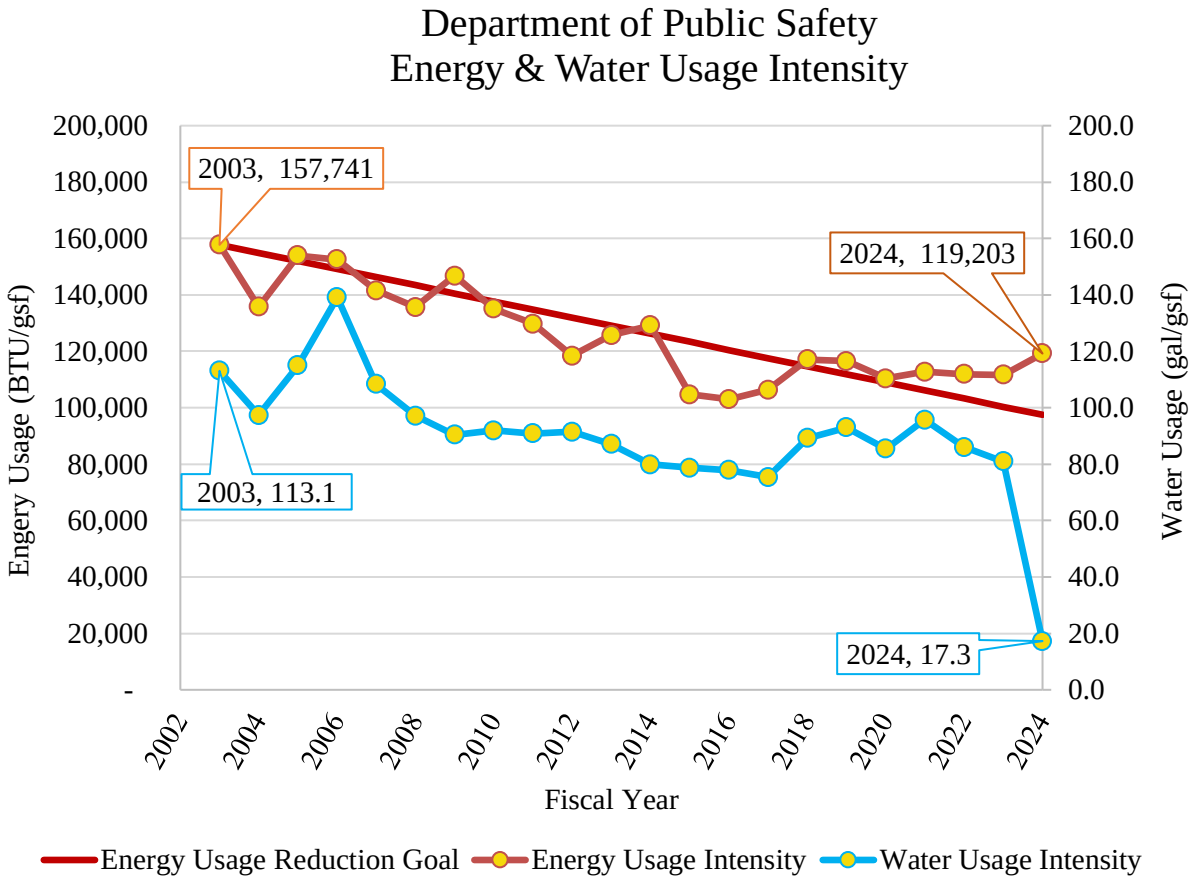


Figure A.9: DPS Utility Usage Over Time

Table A.9: DPS Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	11,581,135	2,315,854	-80%
Total Utility Cost	$32,284,715	$7,481,237	-77%
Energy Usage (Btu/gsf)	157,741	119,203	-24%
Energy Cost ($/MMBtu)	$12.43	$24.24	+95%
Water Usage (gal/gsf)	113	17	-85%
Water Cost ($/kgal)	$7.31	$19.72	+170%

Department of Adult Correction (DAC)

The Department of Adult Correction (DAC) was launched as a standalone Cabinet agency on January 1, 2023; prior to this date, DAC was a division within the Department of Public Safety (DPS). DAC oversees the operation of 54 prison facilities in three custody levels (minimum, medium, and close) as well as three Confinement in Response to Violation centers and two substance use disorder treatment facilities. DAC also manages Community Supervision Judicial District offices in all 100 North Carolina counties. DAC's operational divisions and sections include Institutions, Community Supervision, Comprehensive Health Services, Education Services, Rehabilitation and Reentry, Special Operations and Intelligence Unit, and Correction Enterprises. All divisions work collaboratively to create a safer North Carolina[9]. DAC's designated energy manager is Paul Braese; Mr. Braese is the Sustainability, Efficiency & Resilience Services Manager within the Division of Engineering, Construction and Maintenance. DPS is the only agency that has a dedicated department and staff focused exclusively on energy management. DAC is the largest user of utilities among all the state agencies and accounts for 35% of overall cabinet agencies' energy consumption impact; DAC has seen a 28% reduction in EUI (BTUs per square foot) since the baseline year of 2002-03.

[9] https://public.powerdms.com/NCDAC/documents/2732328

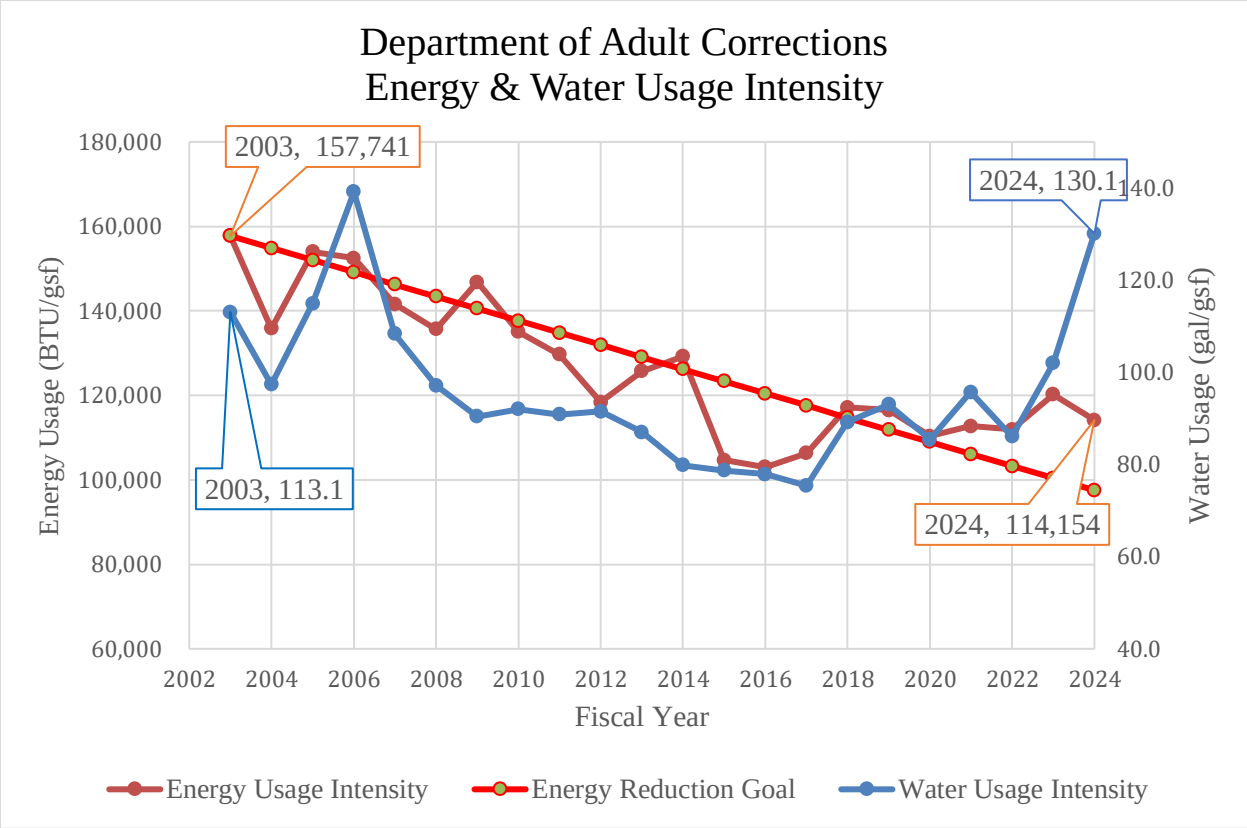


Figure A.10: DAC Utility Usage Over Time

Table A.10: DAC Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	11,581,135	13,175,178	+14%
Total Utility Cost	$32,284,715	$47,408,942	+47%
Energy Usage (Btu/gsf)	157,741	114,154	-28%
Energy Cost ($/MMBtu)	$12.43	$16.02	+29%
Water Usage (gal/gsf)	113	130	+15%
Water Cost ($/kgal)	$7.31	$13.60	86%

Voluntary EUI Reduction Progress for Other State Agencies

Per EO80, the State of North Carolina strives to reduce energy consumption per square foot in state-owned buildings by at least 40% from fiscal year 2002-2003 levels. While the executive order applies directly to cabinet agencies, other state agencies are strongly encouraged to adopt the same goal. These other state agencies are the Department of Agriculture and Consumer Services (DA&CS), the Department of Justice (DOJ), the Department of Public Instruction (DPI), and the Wildlife Resources Commission (WRC). Also, these agencies were not required under EO80 to appoint an energy manager.

Department of Agriculture and Consumer Services (DA&CS)

The North Carolina Department of Agriculture and Consumer Services provides services that promote and improve agriculture, agribusiness and forests; protect consumers and businesses; and conserve farmland and natural resources for the prosperity of all North Carolinians. DA&CS has facilities across the State that include offices, storage, animal housing, chiller plants, food service, shops, housing, arenas, laboratories, greenhouses, and museums. In 2011, the department underwent major restructuring along with the Department of Natural Resources. The designated energy manager for DA&CS is Wendy Dudka, whose title is Real Property Agent. DA&CS has seen a 14% reduction in EUI (BTUs per square foot) since the baseline year of 2002-03.

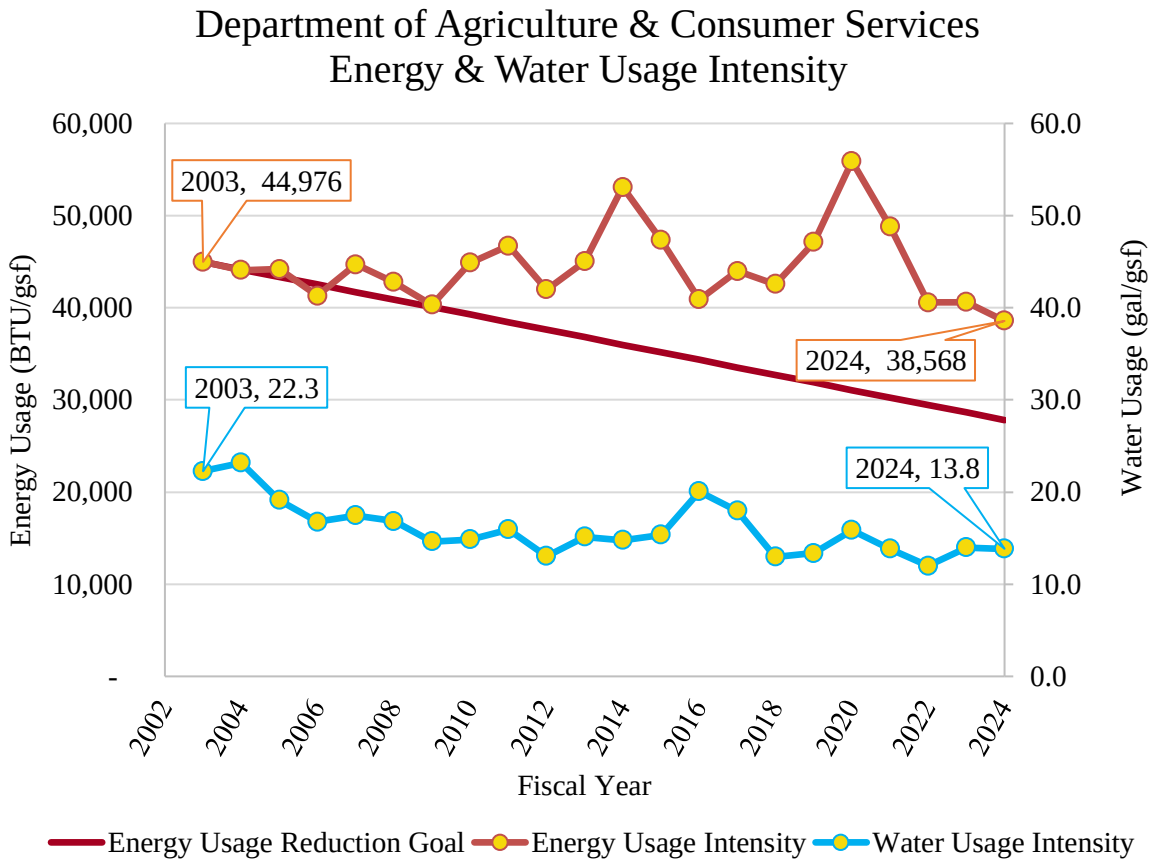


Figure A.11: NCDA&CS Utility Usage Over Time

Table A.11: DA&CS Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	2,995,262	4,414,290	+47%
Total Utility Cost	$2,374,024	$5,837,302	+146%
Energy Usage (Btu/gsf)	44,976	38,568	-14%
Energy Cost ($/MMBtu)	$15.41	$24.90	+62%
Water Usage (gal/gsf)	22	14	-38%
Water Cost ($/kgal)	$4.47	$26.14	+485%

Department of Justice (DOJ)

The DOJ has two training academies that provide training for law enforcement personnel. The NC Justice Academies (NCJA) are in Salemburg and Edneyville totaling almost 300,000 square feet. These academies provide basic, intermediate, and advanced training for law enforcement officers (LEOs) on topics including anti-terrorism, community-oriented policing, criminal investigation, traffic crash investigation, firearms, self-defense, and management and supervision. The Western Crime Lab is also located at the Edneyville campus. The designated energy manager for DOJ is Greg Raynor; Mr. Raynor's title is Operations Manager. DOJ has seen a 23% reduction in EUI (BTUs per square foot) since the baseline year of 2002-03.

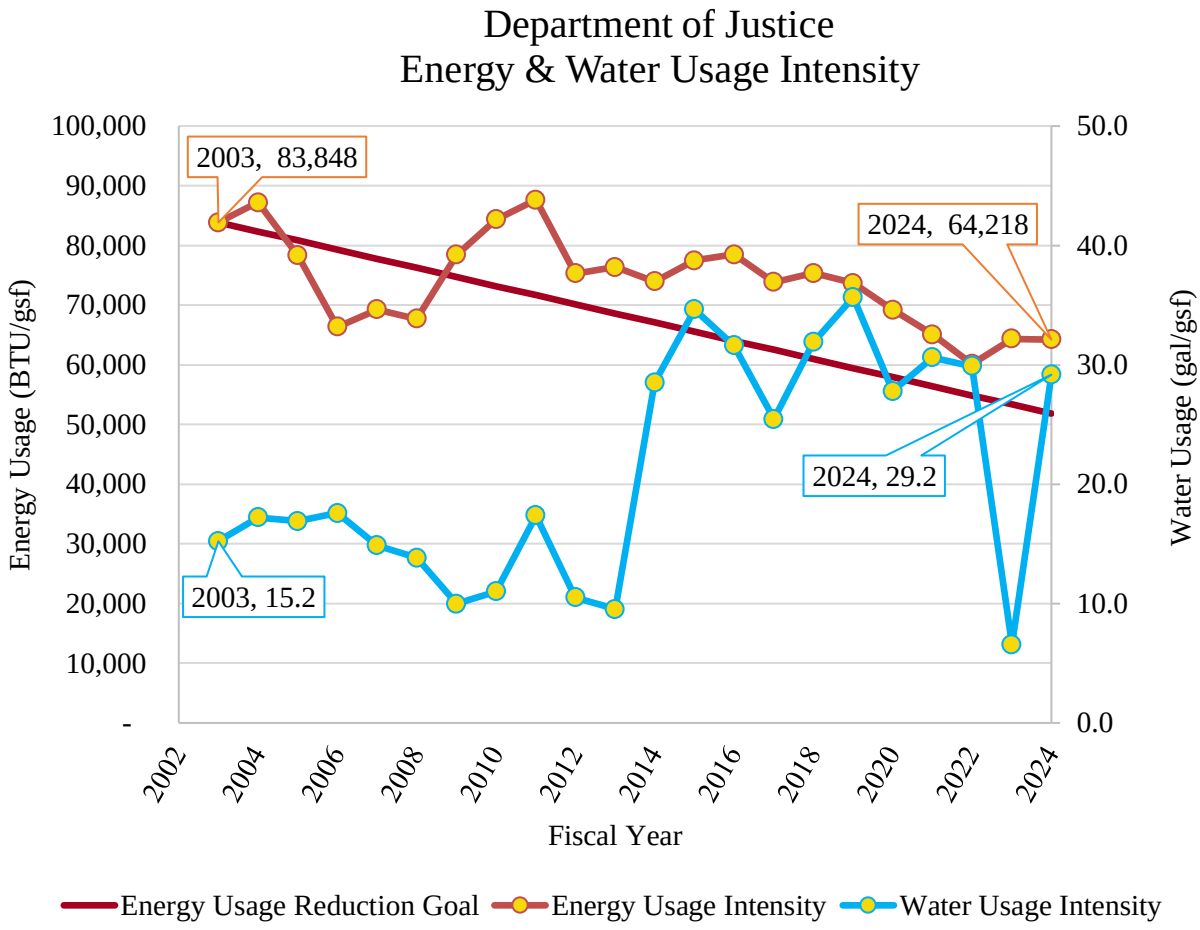


Figure A.12: DOJ Utility Usage Over Time

Table A.12: DOJ Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	204,206	298,220	+46%
Total Utility Cost	$269,833	$618,397	+129%
Energy Usage (Btu/gsf)	83,848	64,218	-23%
Energy Cost ($/MMBtu)	$15.09	$28.11	+86%
Water Usage (gal/gsf)	15	29	+92%
Water Cost ($/kgal)	$3.71	$9.21	+148%

Department of Public Instruction (DPI)

The DPI administers educational funding, oversees the licensure of teachers and administrators, provides curriculum support, and evaluates student success for public schools. North Carolina's public school system encompasses approximately 2,500 district schools and 180 charter schools that prepare students for the modern workforce and further education. Currently, the department's administrative staff are housed in the Central Office in Raleigh as well as four regional licensing centers in Catawba, Concord, Elm City, and Fayetteville. A fundamental component of DPI is management of the Western School of the Deaf in Cullowhee, Morehead Governor's School in Raleigh, and the Eastern School of the Deaf in Wilson. All three facilities are designed to be residential or day learning institutions for visually or hearing-impaired children. Furthermore, the department leads two North Carolina Centers for the Advancement of Teaching (NCCAT) in Cullowhee and Ocracoke Island that are designed to professionally-develop and improve the classroom effectiveness of teachers. William Putnam is the designated energy manager for the NCCAT locations; Tammy Ward is the designated energy manager for the Eastern NC School for the Deaf; Nathan Maune, Frankie Sykes, and Jon Long are the designated energy managers for other campuses / School Facilities. DPI has seen a 28% reduction in EUI (BTUs per square foot) since the baseline year of 2002-03.

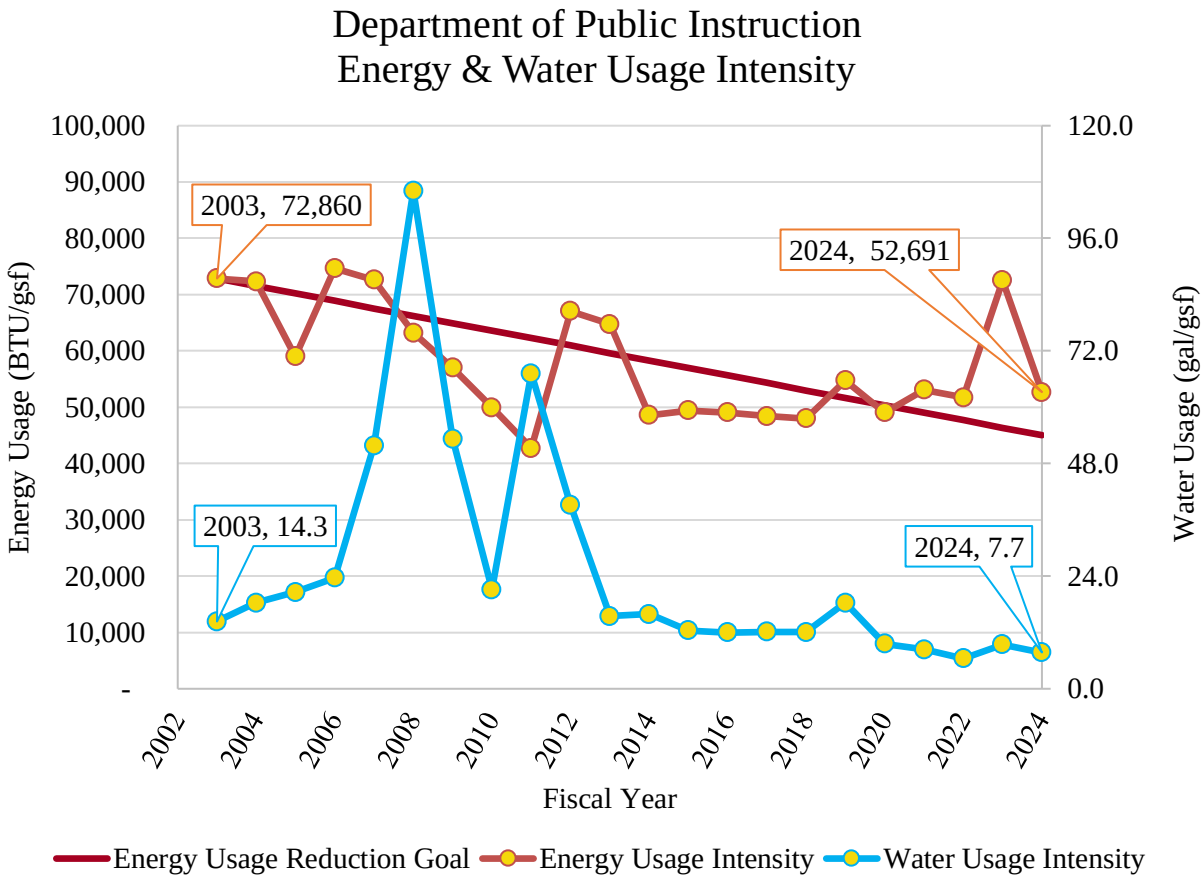


Figure A.13: DPI Utility Usage Over Time

Table A.13: DPI Utility Statistics to Date

Metric	Fiscal Year		% Change
	2002-03	2023-24	
Total Gross Square Feet	713,347	663,259	-7%
Total Utility Cost	$747,574	$865,444	+16%
Energy Usage (Btu/gsf)	72,860	52,691	-28%
Energy Cost ($/MMBtu)	$12.91	$23.49	+82%
Water Usage (gal/gsf)	14	8	-46%
Water Cost ($/kgal)	$7.47	$8.68	+16%

Wildlife Resources Commission (WRC)

The NC Wildlife Resources Commission conserves and sustains the State's fish and wildlife resources through research, scientific management, wise use, and public input. The Commission is the regulatory agency responsible for the enforcement of fishing, hunting, trapping, and boating laws. Commission buildings are located across the State and include offices, pole barns, equipment storage, workshops, garages, residences, barns, animal housing, and laboratories. The designated energy manager for WRC is Brandon Davis, whose title is Facility Maintenance Supervisor. WRC has seen a 27% reduction in EUI (BTUs per square foot) since the baseline year of 2005-06.

Data is only available for WRC dating back to the 2005-06 fiscal year.

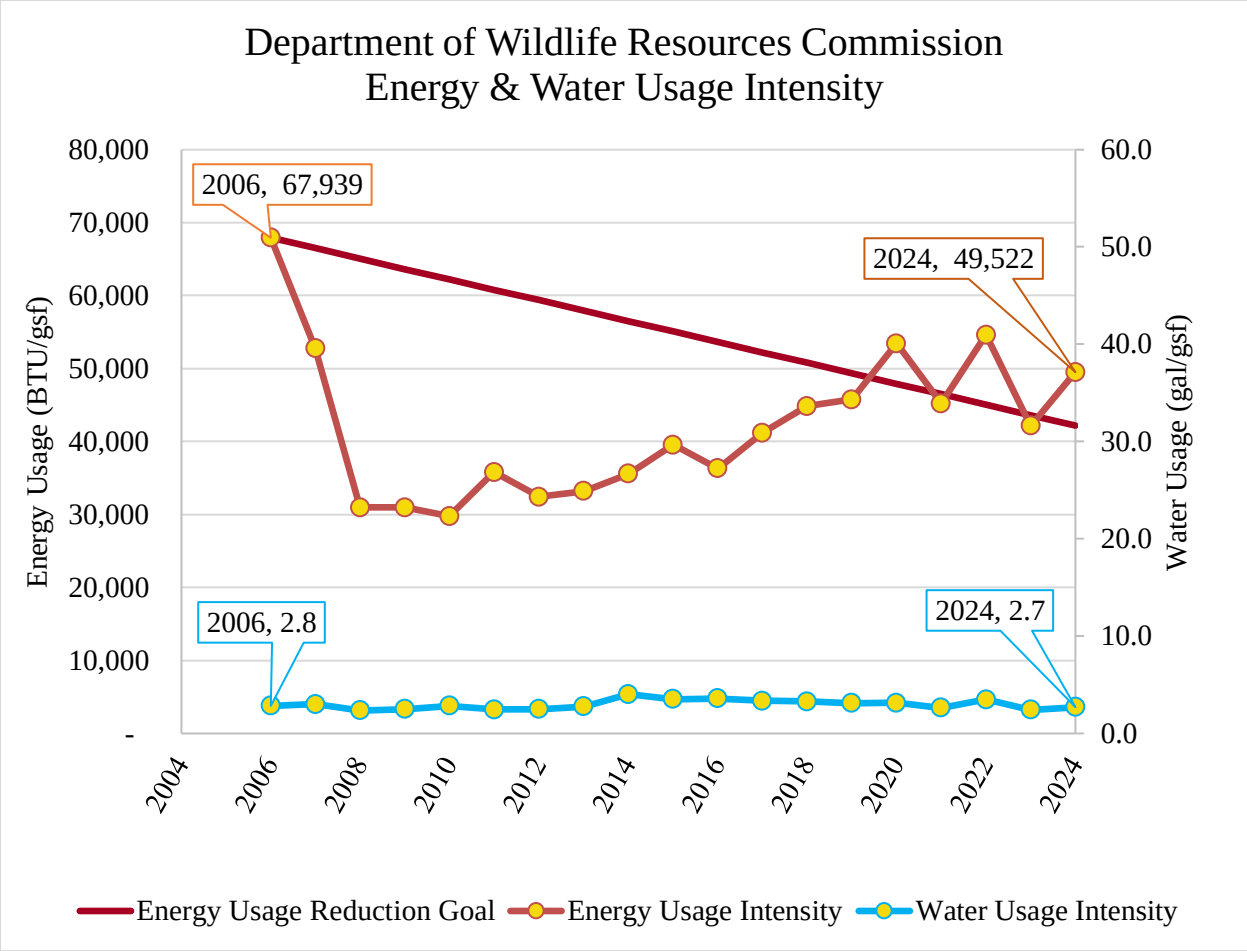


Figure A.14: WRC Utility Usage Over Time

Table A.14: WRC Utility Statistics to Date

Metric	Fiscal Year		% Change
	2005-06	2023-24	
Total Gross Square Feet	161,093	317,633	+97%
Total Utility Cost	$222,601	$441,896	+99%
Energy Usage (Btu/gsf)	67,939	49,522	-27%
Energy Cost ($/MMBtu)	$20.00	$26.67	+33%
Water Usage (gal/gsf)	2.84	2.71	-5%
Water Cost ($/kgal)	$8.18	$25.99	218%

Appendix B

Sources and Assumptions Used to Calculate Greenhouse Gas Offsets

Sources and Assumptions Used to Calculate Avoided Greenhouse Gas Emissions

Introduction and Scope

This appendix documents the process to revise the avoided greenhouse gas emissions contained in the December 1, 2024, version of the report titled *"Comprehensive Program to Manage Energy, Water, and Other Utility Use for State Agencies and State Institutions of Higher Learning"*. The emissions were revised by utilizing the latest emission factors presented in the *"State Inventory and Projection Tool"*[10] (SIT) and the *"Emissions & Generation Resource Integrated Database"*[11] (eGRID) developed by the United States Environmental Protection Agency (USEPA). Additionally, equivalency results to translate emissions measurements into relatable terms were calculated by utilizing the *"Greenhouse Gas Equivalencies Calculator"*[12] developed by the USEPA.

Please note that prior to the December 1, 2021 report, the USI program historically applied one constant kilowatt-hour (kWh) emission factor for all fiscal years based on the most recent *"Emissions & Generation Resource Integrated Database"* (eGRID) data. However, it was later determined that this methodology was incorrect since the average generation mix changes over time for fossil fuel-fired electricity generating units. As such, the old methodology in addition to omitted chilled water and steam efficiency factors for the UNC System *(in previous reports)* significantly underestimated greenhouse gas emissions reductions.

Quality Assurance Measures

Staff from the Utility Savings Initiative (USI) program applied quality assurance measures to ensure that the data meets indicator goals and objectives. For example, all raw utility consumption data utilized to calculate avoided emissions were checked for reasonableness against historical data from the same data category and geographic area (i.e., county, city, or state). In addition, all automated calculations and data processing operations performed by spreadsheet macros and database queries were validated by comparing to hand-calculated results.

Methodology to Calculate Avoided Greenhouse Gas Emissions

To generate the emission calculation conversion factors Table 1, the USI program utilized the following methodology:

1) **Kilowatt hours (kWh):** Prior to last year's report, the USI program historically applied one constant kWh emission factor for all fiscal years based on eGRID data. However, it was later determined that this methodology was incorrect since the average generation mix changes over time for fossil fuel-fired electricity generating units. As such, the old methodology significantly underestimated greenhouse gas emissions reductions from the electricity sector.

   Based on these findings, the USI program utilized the following general formula to develop updated emission factors in for the electricity sector for each fiscal year:

   $MTCO_{2e}$ per kWh by Year = (eGRID Emission Rate by Year (lb CO2e/kWh)) / (2204.62 lb/metric ton)

[10] https://www.epa.gov/statelocalenergy/download-state-inventory-and-projection-tool
[11] https://www.epa.gov/egrid/download-data
[12] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Please note: 2005, 2007, 2009, 2010, 2012, 2014, 2016, 2018, 2019, 2020, 2021, and 2022 emission rate values *(lb/kWh)* were taken from eGRID data files released by the USEPA *(which is typically updated every two years).* Based on these values, emission factors are interpolated for intermediate years *(i.e., (base + future year) / 2))* and held constant for the beginning and end of the time series *(i.e., 2002 through 2004; and 2021 through 2022).*

2) **Therms:** The USI program utilized the SIT tool *(see Table 2)* and the following general formula to create the emission factors for the *"residential/commercial"* sector for natural gas:

> **Total CO_{2e} Emission Factor for Therms** = *(((SIT Tool's $MTCO_{2e}$/Btu * 1.00E-05 therm/Btu conversion factor)) + (((SIT Tool's $MTCH_4$/BBtu) / (1,000,000,000 Btu/BBtu conversion factor) / (1.00E-05 therm/Btu conversion factor)) * (25 global warming potential factor for CH_4)) + (((SIT Tool's MTN_2O/BBtu) / (1,000,000,000 Btu/BBtu conversion factor) / (1.00E-05 therm/Btu conversion factor)) * (298 global warming potential factor for N_2O)))*
>
> *-Or Simply-*
>
> **Total CO_{2e} Emission Factor for Therms** = *($MTCO_{2e}$/therm for CO_2) + ($MTCO_{2e}$/therm for CH_4) + ($MTCO_{2e}$/therm for N_2O)*

Please note: The same emission factor for therms was applied to all fiscal years since emissions from natural gas were assumed to remain relatively constant over time.

3) **Number 2 Distillate Oil:** The USI program utilized the SIT tool *(see Table 2)* and the following general formula to create the emission factors for the *"residential/commercial"* sector for distillate oil:

> **Total CO_{2e} Emission Factor for Number 2 Distillate Oil** = *(((SIT Tool's $MTCO_{2e}$/Btu * 138,690 Btu/gal conversion factor)) + (((SIT Tool's $MTCH_4$/BBtu) * (25 global warming potential factor for CH_4) * (138,690 Btu/gal conversion factor)) / (1,000,000,000 Btu/BBtu conversion factor)) + (((SIT Tool's MTN_2O/BBtu) * (298 global warming potential factor for N_2O) * (138,690 Btu/gal conversion factor)) / (1,000,000,000 Btu/BBtu conversion factor)))*
>
> *-Or Simply-*
>
> **Total CO_{2e} Emission Factor for Number 2 Distillate Oil** = *($MTCO_{2e}$/gal distillate oil for CO_2) + ($MTCO_{2e}$/gal distillate oil for CH_4) + ($MTCO_{2e}$/gal distillate oil for N_2O)*

Please note: The same emission factor for fuel oil was applied to all fiscal years since emissions were assumed to remain relatively constant over time.

4) **Number 6 Residual Oil:** The USI program utilized the SIT tool *(see Table 2)* and the following general formula to create the emission factors for the *"residential/commercial"* sector for residual oil:

Total CO_{2e} Emission Factor for Number 6 Residual Oil = *(((SIT Tool's $MTCO_{2e}$/Btu * 149,690 Btu/gal conversion factor)) + (((SIT Tool's $MTCH_4$/BBtu) * (25 global warming potential factor for CH_4) * (149,690 Btu/gal conversion factor)) / (1,000,000,000 Btu/BBtu conversion factor)) + (((SIT Tool's MTN_2O/BBtu) * (298 global warming potential factor for N_2O) * (149,690 Btu/gal conversion factor)) / (1,000,000,000 Btu/BBtu conversion factor)))*

-Or Simply-

Total CO_{2e} Emission Factor for Number 6 Residual Oil = *($MTCO_{2e}$/gal residual oil for CO_2) + ($MTCO_{2e}$/gal residual oil for CH_4) + ($MTCO_{2e}$/gal residual oil for N_2O)*

Please note: The same emission factor for residual oil was applied to all fiscal years since emissions were assumed to remain relatively constant over time.

5) **Propane:** The USI program utilized the SIT tool *(see Table 2)* and the following general formula to create the emission factors for propane:

Total CO_{2e} Emission Factor for Propane = *(((SIT Tool's $MTCO_{2e}$/Btu * 91,648 Btu/gal conversion factor)) + (((SIT Tool's $MTCH_4$/BBtu) * (25 global warming potential factor for CH_4) * (91,648 Btu/gal conversion factor)) / (1,000,000,000 Btu/BBtu conversion factor)) + (((SIT Tool's MTN_2O/BBtu) * (298 global warming potential factor for N_2O) * (91,648 Btu/gal conversion factor)) / (1,000,000,000 Btu/BBtu conversion factor)))*

-Or Simply-

Total CO_{2e} Emission Factor for Propane = *($MTCO_{2e}$/gal propane for CO_2) + ($MTCO_{2e}$/gal propane for CH_4) + ($MTCO_{2e}$/gal propane for N_2O)*

Please note: The same emission factor for propane was applied to all fiscal years since emissions were assumed to remain relatively constant over time.

Table B.1: Emission Calculation Conversion Factors

Fiscal Year	$MTCO_{2e}$/kWh	$MTCO_{2e}$/Therm	$MTCO_{2e}$/Gal 2 Oil	$MTCO_{2e}$/Gal 6 Oil	$MTCO_{2e}$/Gal Propane
2002-03	0.000555763	0.005318772	0.010317173	0.011304793	0.005706251

Fiscal Year	$MTCO_{2e}$/kWh	$MTCO_{2e}$/Therm	$MTCO_{2e}$/Gal 2 Oil	$MTCO_{2e}$/Gal 6 Oil	$MTCO_{2e}$/Gal Propane
2003-04	0.000555763	0.005318772	0.010317173	0.011304793	0.005706251
2004-05	0.000555763	0.005318772	0.010317173	0.011304793	0.005706251
2005-06	0.00055765	0.005318772	0.010317173	0.011304793	0.005706251
2006-07	0.000561424	0.005318772	0.010317173	0.011304793	0.005706251
2007-08	0.000554367	0.005318772	0.010317173	0.011304793	0.005706251
2008-09	0.000536479	0.005318772	0.010317173	0.011304793	0.005706251
2009-10	0.000533099	0.005318772	0.010317173	0.011304793	0.005706251
2010-11	0.000524392	0.005318772	0.010317173	0.011304793	0.005706251
2011-12	0.000495851	0.005318772	0.010317173	0.011304793	0.005706251
2012-13	0.000473062	0.005318772	0.010317173	0.011304793	0.005706251
2013-14	0.000456026	0.005318772	0.010317173	0.011304793	0.005706251
2014-15	0.000434589	0.005318772	0.010317173	0.011304793	0.005706251
2015-16	0.000408751	0.005318772	0.010317173	0.011304793	0.005706251
2016-17	0.000387544	0.005318772	0.010317173	0.011304793	0.005706251
2017-18	0.000370968	0.005318772	0.010317173	0.011304793	0.005706251
2018-19	0.000358137	0.005318772	0.010317173	0.011304793	0.005706251
2019-20	0.000324215	0.005318772	0.010317173	0.011304793	0.005706251
2020-21	0.000299371	0.005318772	0.010317173	0.011304793	0.005706251
2021-22	0.000303907	0.005318772	0.010317173	0.011304793	0.005706251
2022-23	0.000303907	0.005318772	0.010317173	0.011304793	0.005706251
2023-24	0.000303907	0.005318772	0.010317173	0.011304793	0.005706251

Table B.2: State Inventory and Projection Tool Emission Factors[13]

Fuel Type	Carbon Dioxide		Methane		Nitrous Oxide	
Natural Gas (Res/Comm)	5.30549E-08	MTCO2e/ Btu	0.00475	MTCH4/ BBtu	0.00009	MTN2O/ BBtu
Natural Gas (Res/Comm)	5.30E-03	MTCO2e/therm	1.19E-05	MTCO2e/therm	2.68E-06	MTCO2e /therm
No. 2 Fuel Oil (Res/comm)	7.39609E-08	MTCO2e/ Btu	0.01002	MTCH4/ BBtu	0.0006	MTN2O/ BBtu
No. 2 Fuel Oil (Res/comm)	0.010257634	MTCO2e/gal	3.47418E-05	MTCO2e/ gal	2.47978E-05	MTCO2e /gal
No. 6 Dist Oil (Res/comm)	7.50918E-08	MTCO2e/ Btu	0.01002	MTCH4/ BBtu	0.0006	MTN2O/ BBtu
No. 6 Dist Oil (Res/comm)	0.011240531	MTCO2e/gal	3.74975E-05	MTCO2e/ gal	2.67647E-05	MTCO2e /gal
Propane	6.18334E-08	MTCO2e/ Btu	0.01002	MTCH4/ BBtu	0.0006	MTN2O/ BBtu
Propane	0.005666907	MTCO2e/gal	2.29578E-05	MTCO2e/ gal	1.63867E-05	MTCO2e /gal

Collective Avoided Greenhouse Gas Emissions

By utilizing the methodology described in the previous section, Table 3 and Table 4 represent the avoided greenhouse gas emissions for state agencies and the UNC System (i.e., state-owned buildings). Table B.3 provides avoided greenhouse gas emissions since the FY2002-03 baseline.

[13] https://www.epa.gov/statelocalenergy/state-inventory-and-projection-tool

In addition, Table B.4 provides a snapshot of avoided greenhouse gas emissions data to show the program's effectiveness during the most recent fiscal year (FY2023-24).

Table B.3: FY2002-03 to FY2023-24 Avoided Greenhouse Gas Totals

Fuel Source Usage	Cabinet Agencies (MTCO2e)	Other Agencies (MTCO2e)	UNC System (MTCO2e)	All State Government Units (MTCO2e)
Electricity	3,698,520	24,047	6,637,382	**10,359,950**
Nat Gas	-47,958	30,146	-398,931	**-416,742**
Fuel Oil	957,598	-3,344	1,612,746	**2,567,000**
Propane	161,262	-593	5,780	**166,449**
Total	**4,769,422**	**50,257**	**7,856,978**	**12,676,657**

Table B.4: FY2023-24 Avoided Greenhouse Gas Totals

Fuel Source Usage	Cabinet Agencies (MTCO2e)	Other Agencies (MTCO2e)	UNC System (MTCO2e)	All State Government Units (MTCO2e)
Electricity	244,683	2,458	670,410	**917,552**
Nat Gas	12,124	1,917	-41,930	**-27,890**
Fuel Oil	49,869	-216	96,852	**146,505**
Propane	21,241	-66	821	**21,997**
Total	**327,917**	**4,094**	**726,153**	**1,058,164**

Greenhouse Gas Equivalencies

Figure 1 contains a screenshot of the USEPA's greenhouse gas equivalencies calculator[14] based on total avoided emissions since the 2002-03 baseline for state-owned buildings. As shown, the figure provides relatable terms for the program's environmental success.

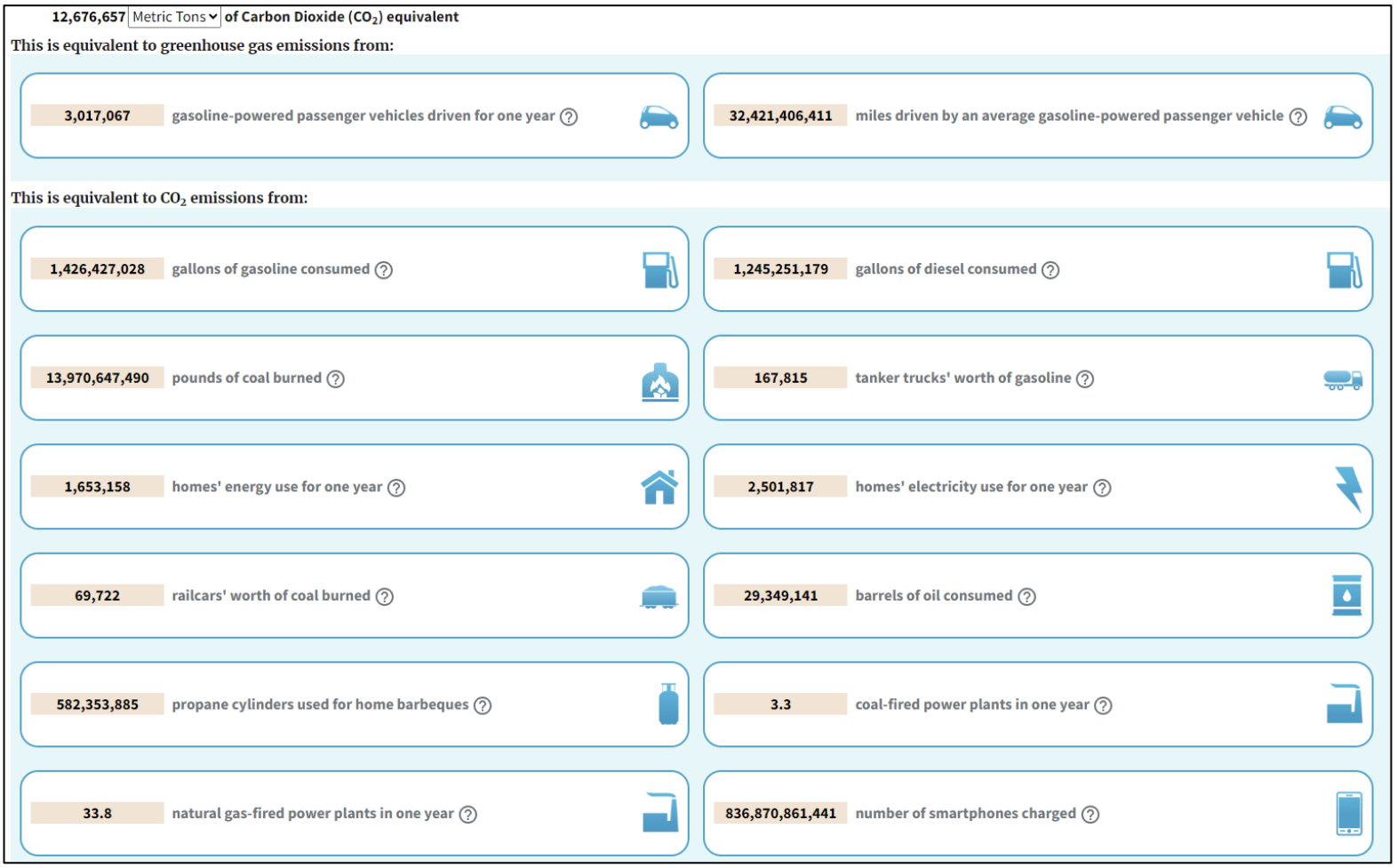


Figure B.1: EPA Greenhouse Gas Equivalencies Calculator

[14] *EPA Greenhouse Gas Equivalencies Calculator;* https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

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Appendix C

Executive Order No. 80

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State of North Carolina

ROY COOPER
GOVERNOR

October 29, 2018

EXECUTIVE ORDER NO. 80

NORTH CAROLINA'S COMMITMENT TO ADDRESS CLIMATE CHANGE AND TRANSITION TO A CLEAN ENERGY ECONOMY

WHEREAS, North Carolina residents deserve to be better educated, healthier, and more financially secure so that they may live purposeful and abundant lives; and

WHEREAS, N.C. Const. art. XIV, § 5 requires the conservation, protection, and preservation of state lands and waters in public trust; and

WHEREAS, North Carolina is well positioned to take advantage of its technology and research and development sectors, along with its skilled workforce, to promote clean energy technology solutions and a modernized electric grid; and

WHEREAS, public-private partnerships in North Carolina foster market innovations and develop clean energy technology solutions that grow the state's economy; and

WHEREAS, the effects of more frequent and intense hurricanes, flooding, extreme temperatures, droughts, saltwater intrusion, and beach erosion have already impacted and will continue to impact North Carolina's economy; and

WHEREAS, climate-related environmental disruptions pose significant health risks to North Carolinians, including waterborne disease outbreaks, compromised drinking water, increases in disease-spreading organisms, and exposure to air pollution, among other issues; and

WHEREAS, to maintain economic growth and development and to provide responsible environmental stewardship, we must build resilient communities and develop strategies to mitigate and prepare for climate-related impacts in North Carolina.

NOW, THEREFORE, by the authority vested in me as Governor by the Constitution and the laws of the State of North Carolina, **IT IS ORDERED**:

1. The State of North Carolina will support the 2015 Paris Agreement goals and honor the state's commitments to the United States Climate Alliance.

   The State of North Carolina will strive to accomplish the following by 2025:

   a. Reduce statewide greenhouse gas emissions to 40% below 2005 levels;
   b. Increase the number of registered, zero-emission vehicles ("ZEVs"; individually, "ZEV") to at least 80,000;
   c. Reduce energy consumption per square foot in state-owned buildings by at least 40% from fiscal year 2002-2003 levels.

2. Cabinet agencies shall evaluate the impacts of climate change on their programs and operations and integrate climate change mitigation and adaptation practices into their programs and operations. Council of State members, higher education institutions, local governments, private businesses, and other North Carolina entities are encouraged to address climate change and provide input on climate change mitigation and adaptation measures developed through the implementation of this Executive Order. Consistent with applicable law, cabinet agencies shall actively support such actions.

3. The Secretary or designee of each cabinet agency and a representative from the Governor's Office shall serve on the North Carolina Climate Change Interagency Council ("Council"), which is hereby established. The Secretary of the North Carolina Department of Environmental Quality, or the Secretary's designee, shall serve as the Council Chair. The North Carolina Department of Environmental Quality shall lead the Council by providing strategic direction, scheduling and planning Council meetings, determining the prioritization of activities, facilitating stakeholder engagement, and assisting in the implementation of pathways to achieve the goals provided in Section 1 of this Executive Order.

   The duties of the Council shall include the following:

   a. Recommend new and updated goals and actions to meaningfully address climate change;
   b. Develop, implement, and evaluate programs and activities that support statewide climate mitigation and adaptation practices;
   c. Establish workgroups, as appropriate, to assist the Council in its duties;
   d. Consider stakeholder input when developing recommendations, programs, and other actions and activities;
   e. Schedule, monitor, and provide input on the preparation and development of the plans and assessments required by this Executive Order;
   f. Review and submit to the Governor the plans and assessments required by this Executive Order.

4. The North Carolina Department of Environmental Quality ("DEQ") shall develop a North Carolina Clean Energy Plan ("Clean Energy Plan") that fosters and encourages the utilization of clean energy resources, including energy efficiency, solar, wind, energy storage, and other innovative technologies in the public and private sectors, and the integration of those resources to facilitate the development of a modern and resilient electric grid. DEQ shall collaborate with businesses, industries, power providers, technology developers, North Carolina residents, local governments, and other interested stakeholders to increase the utilization of clean energy technologies, energy efficiency measures, and clean transportation solutions. DEQ shall complete the Clean Energy Plan for the Council to submit to the Governor by October 1, 2019.

5. The North Carolina Department of Transportation ("DOT"), in coordination with DEQ, shall develop a North Carolina ZEV Plan ("ZEV Plan") designed to increase the number of registered ZEVs in the state to at least 80,000 by 2025. The ZEV Plan shall help establish interstate and intrastate ZEV corridors, coordinate and increase the installation of ZEV infrastructure, and incorporate, where appropriate, additional best practices for increasing ZEV adoption. DOT shall complete the ZEV Plan for the Council to submit to the Governor by October 1, 2019.

6. The North Carolina Department of Commerce ("DOC") and other cabinet agencies shall take actions supporting the expansion of clean energy businesses and service providers, clean technology investment, and companies with a commitment to procuring renewable energy. In addition, DOC shall develop clean energy and clean transportation workforce assessments for the Council to submit to the Governor by October 1, 2019. These assessments shall evaluate the current and projected workforce demands in North Carolina's clean energy and clean transportation sectors, assess the skills and education required for employment in those sectors, and recommend actions to help North Carolinians develop such skills and education.

7. Cabinet agencies shall prioritize ZEVs in the purchase or lease of new vehicles and shall use ZEVs for agency business travel when feasible. When ZEV use is not feasible, cabinet agencies shall prioritize cost-effective, low-emission alternatives. To support implementation of this directive, the North Carolina Department of Administration ("DOA") shall develop a North

Carolina Motor Fleet ZEV Plan ("Motor Fleet ZEV Plan") that identifies the types of trips for which a ZEV is feasible, recommends infrastructure necessary to support ZEV use, develops procurement options and strategies to increase the purchase and utilization of ZEVs, and addresses other key topics. DOA shall complete the Motor Fleet ZEV Plan and provide an accounting of each agency's ZEVs and miles driven by vehicle type for the Council to submit to the Governor by October 1, 2019, and annually thereafter.

8. Building on the energy, water, and utility use conservation measures taken pursuant to N.C. Gen. Stat. § 143-64.12(a), DEQ shall update and amend, where applicable, a Comprehensive Energy, Water, and Utility Use Conservation Program ("Comprehensive Program") by February 1, 2019, and biennially beginning December 1, 2019, to further reduce energy consumption per gross square foot in state buildings consistent with Section 1 of this Executive Order. The Comprehensive Program shall include best practices for state government building energy efficiency, training for agency staff, cost estimation methodologies, financing options, and reporting requirements for cabinet agencies. DEQ and cabinet agencies shall encourage and assist, as requested, higher education institutions, K-12 schools, and local governments in reducing energy consumption. To achieve the required energy consumption reductions:

    a. By January 15, 2019, each cabinet agency shall designate an Agency Energy Manager, who shall serve as the agency point of contact.
    b. Each cabinet agency shall develop and submit an Agency Utility Management Plan to DEQ by March 1, 2019, and biennially thereafter, and implement strategies to support the energy consumption reduction goal set forth in Section 1 of this Executive Order. DEQ shall assess the adequacy of these plans and their compliance with this Executive Order.
    c. By September 1, 2019, and annually thereafter, each cabinet agency shall submit to DEQ an Agency Utility Report detailing its utility consumption, utility costs, and progress in reducing energy consumption.
    d. DEQ shall develop an annual report that describes the Comprehensive Program and summarizes each cabinet agency's utility consumption, utility costs, and achieved reductions in energy consumption. DEQ shall complete this report for publication on its website and for the Council to submit to the Governor by February 1, 2019, and annually thereafter beginning December 1, 2019.

9. Cabinet agencies shall integrate climate adaptation and resiliency planning into their policies, programs, and operations (i) to support communities and sectors of the economy that are vulnerable to the effects of climate change and (ii) to enhance the agencies' ability to protect human life and health, property, natural and built infrastructure, cultural resources, and other public and private assets of value to North Carolinians.

    a. DEQ, with the support of cabinet agencies and informed by stakeholder engagement, shall prepare a North Carolina Climate Risk Assessment and Resiliency Plan for the Council to submit to the Governor by March 1, 2020.
    b. The Council shall support communities that are interested in assessing risks and vulnerabilities to natural and built infrastructure and in developing community-level adaptation and resiliency plans.

10. DEQ shall prepare and manage a publicly accessible Web-based portal detailing the Council's actions and the steps taken to address climate-related impacts in North Carolina. Cabinet agencies shall submit data, information, and status reports as specified by the Council to be published on the portal. In addition, DEQ shall develop, publish on the portal, and periodically update an inventory of the state's greenhouse gas emissions that, among other things, tracks emissions trends statewide by sector and identifies opportunities for additional emissions reductions.

11. By October 15, 2019, and annually thereafter, the Council shall provide to the Governor a status report on the implementation of this Executive Order.

12. This Executive Order is consistent with and does not otherwise abrogate existing state law.

13. This Order is effective October 29, 2018 and shall remain in effect until rescinded or superseded by another applicable Executive Order.

IN WITNESS WHEREOF, I have hereunto signed my name and affixed the Great Seal of the State of North Carolina at the Capitol in the City of Raleigh, this the 29th day of October, in the year of our Lord two thousand eighteen.

Roy Cooper
Governor

ATTEST:

Rodney S. Maddox
Chief Deputy Secretary of State

Appendix D

General Statute Chapter 143-64.12, *Authority and Duties of the Department; State Agencies and State Institutions of Higher Learning*

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§ 143-64.12. Authority and duties of the Department; State agencies and State institutions of higher learning.

(a) The Department of Environmental Quality through the State Energy Office shall develop a comprehensive program to manage energy, water, and other utility use for State agencies and State institutions of higher learning and shall update this program annually. Each State agency and State institution of higher learning shall develop and implement a management plan that is consistent with the State's comprehensive program under this subsection to manage energy, water, and other utility use, and that addresses any findings or recommendations resulting from the energy audit required by subsection (b1) of this section. The energy consumption per gross square foot for all State buildings in total shall be reduced by twenty percent (20%) by 2010 and thirty percent (30%) by 2015 based on energy consumption for the 2002-2003 fiscal year. Each State agency and State institution of higher learning shall update its management plan biennially and include strategies for supporting the energy consumption reduction requirements under this subsection. Each community college shall submit to the State Energy Office a biennial written report of utility consumption and costs. Management plans submitted biennially by State institutions of higher learning shall include all of the following:

(1) Estimates of all costs associated with implementing energy conservation measures, including pre-installation and post-installation costs.
(2) The cost of analyzing the projected energy savings.
(3) Design costs, engineering costs, pre-installation costs, post-installation costs, debt service, and any costs for converting to an alternative energy source.
(4) An analysis that identifies projected annual energy savings and estimated payback periods.

(a1) State agencies and State institutions of higher learning shall carry out the construction and renovation of facilities in such a manner as to further the policy set forth under this section and to ensure the use of life-cycle cost analyses and practices to conserve energy, water, and other utilities.

(b) The Department of Administration shall develop and implement policies, procedures, and standards to ensure that State purchasing practices improve efficiency regarding energy, water, and other utility use and take the cost of the product over the economic life of the product into consideration. The Department of Administration shall adopt and implement Building Energy Design Guidelines. These guidelines shall include energy-use goals and standards, economic assumptions for life-cycle cost analysis, and other criteria on building systems and technologies. The Department of Administration shall modify the design criteria for construction and renovation of facilities of State buildings and State institutions of higher learning buildings to require that a life-cycle cost analysis be conducted pursuant to G.S. 143-64.15.

(b1) The Department of Administration, as part of the Facilities Condition and Assessment Program, shall identify and recommend energy conservation maintenance and operating procedures that are designed to reduce energy consumption within the facility of a State agency or a State institution of higher learning and that require no significant expenditure of funds. Every State agency or State institution of higher learning shall implement these recommendations. Where energy management equipment is proposed for any facility of a State agency or of a State institution of higher learning, the maximum interchangeability and compatibility of equipment components shall be required. As part of the Facilities Condition and Assessment Program under this section, the Department of Administration, in consultation with the State Energy Office, shall develop an energy audit and a procedure for conducting energy audits. Every five years the Department shall conduct an energy audit for each State agency or State institution of higher learning, and the energy audits conducted shall serve as a

preliminary energy survey. The State Energy Office shall be responsible for system-level detailed surveys.

(b2) The Department of Administration shall submit a report of the energy audit required by subsection (b1) of this section to the affected State agency or State institution of higher learning and to the State Energy Office. The State Energy Office shall review each audit and, in consultation with the affected State agency or State institution of higher learning, incorporate the audit findings and recommendations into the management plan required by subsection (a) of this section.

(c) through (g) Repealed by Session Laws 1993, c. 334, s. 4.

(h) When conducting a facilities condition and assessment under this section, the Department of Administration shall identify and recommend to the State Energy Office any facility of a State agency or State institution of higher learning as suitable for building commissioning to reduce energy consumption within the facility or as suitable for installing an energy savings measure pursuant to a guaranteed energy savings contract under Part 2 of this Article.

(i) Consistent with G.S. 150B-2(8a)h., the Department of Administration may adopt architectural and engineering standards to implement this section.

(j) The State Energy Office shall submit a report by December 1 of every odd-numbered year to the Joint Legislative Energy Policy Commission, the Joint Legislative Oversight Committee on Agriculture and Natural and Economic Resources, and the Fiscal Research Division describing the comprehensive program to manage energy, water, and other utility use for State agencies and State institutions of higher learning required by subsection (a) of this section. The report shall also contain the following:

(1) A comprehensive overview of how State agencies and State institutions of higher learning are managing energy, water, and other utility use and achieving efficiency gains.

(2) Any new measures that could be taken by State agencies and State institutions of higher learning to achieve greater efficiency gains, including any changes in general law that might be needed.

(3) A summary of the State agency and State institutions of higher learning management plans required by subsection (a) of this section and the energy audits required by subsection (b1) of this section.

(4) A list of the State agencies and State institutions of higher learning that did and did not submit management plans required by subsection (a) of this section and a list of the State agencies and State institutions of higher learning that received an energy audit.

(5) Any recommendations on how management plans can be better managed and implemented. (1975, c. 434, s. 3; 1993, c. 334, s. 4; 2000-140, s. 76(f); 2001-415, s. 3; 2006-190, s. 12; 2007-546, s. 3.1(a); 2008-198, s. 11.1; 2009-446, s. 1(e); 2010-31, s. 14.3; 2010-196, s. 2; 2013-360, s. 15.22(p); 2014-120, s. 55; 2015-241, s. 14.30(u); 2017-57, s. 14.1(f).)

Appendix E

Suggested Revisions to General Law

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PART I. SAVE NORTH CAROLINA TAXPAYER DOLLARS BY REQUIRING REDUCTIONS IN ENERGY AND WATER CONSUMPTION IN PUBLIC BUILDINGS BY 2025.

Section 1. G.S. 143-64.12(a) reads as rewritten:

"§ 143-64.12. Authority and duties of the Department; State agencies and State institutions of higher learning.

(a) The Department of Environmental Quality through the State Energy Office shall develop a comprehensive program to manage energy, water, and other utility use for State agencies and State institutions of higher learning and shall update this program annually. Each State agency and State institution of higher learning shall develop and implement a management plan that is consistent with the State's comprehensive program under this subsection to manage energy, water, and other utility use, and that addresses any findings or recommendations resulting from the energy audit required by subsection (b1) of this section. The energy consumption per gross square foot for all State buildings in total shall be reduced by twenty percent (20%) by ~~2010~~ 2010, and thirty percent (30%) by ~~2015~~ 2015, and forty percent (40%) by 2025 based on energy consumption for the 2002-2003 fiscal year. Each State agency and State institution of higher learning shall update its management plan biennially by September 1st of odd-numbered years and include strategies for supporting the energy consumption reduction requirements under this subsection. Each State agency, State institution of higher learning, and community college shall submit to the State Energy Office ~~a biennial~~ an annual written report of utility consumption and ~~costs.~~ costs by September 1st. Management plans submitted biennially by State agencies and State institutions of higher learning shall ~~include all of the following:~~ contain:

~~(1) Estimates of all costs associated with implementing energy conservation measures, including pre-installation and post-installation costs.~~

~~(2) The cost of analyzing the projected energy savings.~~

~~(3) Design costs, engineering costs, pre-installation costs, post-installation costs, debt service, and any costs for converting to an alternative energy source.~~

~~(4) An analysis that identifies projected annual energy savings and estimated payback periods.~~

(1) Total utility consumption, costs, and efficiency gains.

(2) Findings or recommendations resulting from an energy audit to determine potential energy conservation measures.

(3) An analysis of energy conservation measures that may be implemented to reduce energy, water, and other utility use, including but not limited to:

a. Total design costs, engineering costs, pre-installation costs, post-installation costs, debt service, and any costs for converting to an alternative energy source;

b. Projected annual energy savings and estimated payback periods;

c. Finance options; and

d. Defined roles, responsibilities, and training needs for staff that manage energy, water, or other utility use.

(4) A signature from senior leadership, or an appropriate designee, of a State agency or State institution of higher learning.

PART II. EFFECTIVE DATE

Section 2. Except as otherwise provided, Section 1 of this act is effective when it becomes law.

§ 116-30.3B. Energy conservation savings.

(a) In addition to the funds carried forward under G.S. 116-30.3, the General Fund current operations appropriations credit balance remaining at the end of each fiscal year for utilities of a constituent institution that is energy savings realized from implementing an energy conservation measure shall be carried forward by the institution to the next fiscal year. Sixty percent (60%) of the energy savings realized shall be utilized for energy conservation measures by that institution. The use of funds under this section shall be limited to onetime capital and operating expenditures that will not impose additional financial obligations on the State. The Director of the Budget, under the authority set forth in G.S. 143C-6-2, shall establish the General Fund current operations credit balance remaining in each budget code of each institution.

(b) It is the intent of the General Assembly that appropriations to the Board of Governors on behalf of a constituent institution not be reduced as a result of the institution's realization of energy savings. Instead, the General Assembly intends that the amount of appropriations be determined as if no energy savings had been realized. The Director of the Budget shall not decrease the recommended base budget requirements for utilities for constituent institutions by the amount of energy savings realized from implementing energy conservation measures, including savings achieved through a guaranteed energy savings contract.

(c) Constituent institutions shall submit ~~biennial~~ annual documentation reports on the use of funds authorized pursuant to this section ~~as required under G.S. 143-64.12~~.

(d) As used in this section, "energy savings," "guaranteed energy savings contract," and "energy conservation measure" have the same meaning as in G.S. 143-64.17. (2010-196, s. 1; 2011-145, s. 9.6D(c); 2014-100, s. 6.4(e).)