MERIDIAN
IDAHO

ENERGY STRATEGY PLAN
MARCH 2026

PREPARED FOR THE CITY OF MERIDIAN BY:

GARDNER ENERGY STRATEGIES, LLC

STRAVEN STRATEGY GROUP

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ENERGY STRATEGY PLAN
MARCH 2026

EXECUTIVE SUMMARY

PURPOSE OF THE PLAN

The City of Meridian developed this Energy Strategy Plan to establish a clear, data-driven framework for managing municipal energy use, costs, and long-term risk across facilities, utilities, fleet, and streetlighting. Funded through the U.S. Department of Energy's Energy Efficiency and Conservation Block Grant (EECBG) Program, the Plan follows a structured three-phase process (**Figure ES-1**): establishing baseline energy and greenhouse gas (GHG) conditions; identifying and prioritizing cost-effective energy conservation measures (ECMs); modeling long-term implementation pathways to inform capital planning and fiscal decision-making.

The Plan supports informed decision-making. It does not commit the City to specific expenditures but provides practical options, financial impacts, and implementation sequencing so leadership can evaluate actions based on feasibility, fiscal responsibility, and operational priorities.

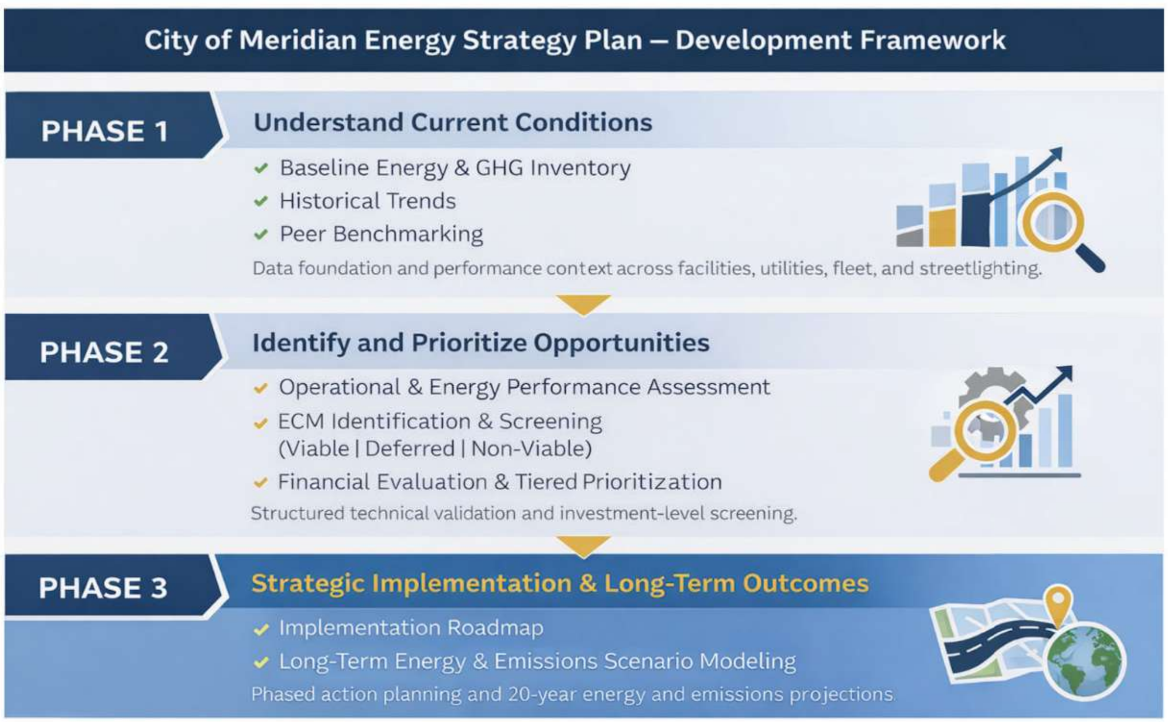


Figure ES-1. Three-Phase Energy Strategy Development Process

ENERGY MANAGEMENT PROGRESS TO DATE

The City is not starting from scratch. Over the past decade, Meridian has successfully implemented multiple energy efficiency initiatives that have reduced operating costs and improved infrastructure performance. Prior efforts include retro-commissioning of City facilities, wastewater treatment plant efficiency upgrades, including beneficial reuse of digester gas to heat the biosolids greenhouse, and continued conversion of streetlighting and facility lighting to modern light-emitting diode (LED) technology. These actions have contributed to improved per-capita energy performance, well over six figures in cumulative cost savings, and demonstrate that targeted investments produce measurable results. The Energy Strategy Plan builds on this foundation—scaling what has worked, refining where needed, and aligning future investments with the City's highest cost drivers.

2024 ENERGY PROFILE

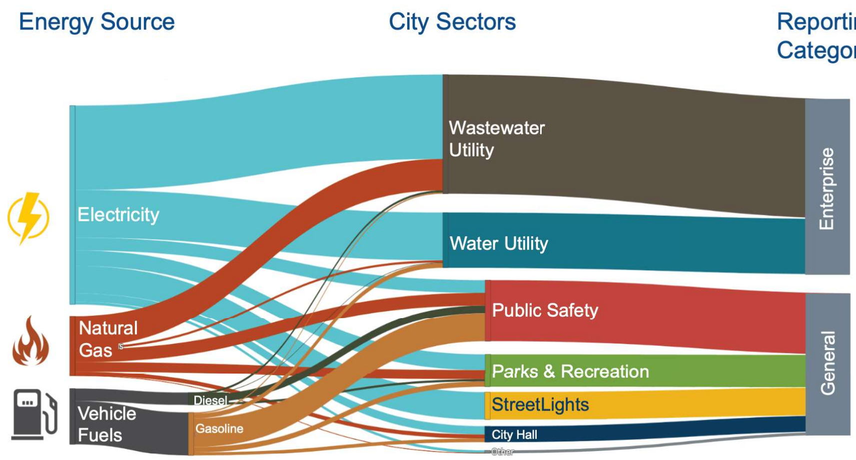
~20%
REDUCTION IN PER CAPITA ENERGY USE SINCE 2008 DESPITE RAPID GROWTH

Energy supports nearly every municipal function in Meridian—from water and wastewater operations to public safety facilities, parks, and streetlighting. As the City has grown, so have the systems required to serve residents.

In 2024, Meridian spent approximately $2.93 million on electricity, natural gas, gasoline, and diesel. While total energy use has increased alongside population and infrastructure expansion, per-capita energy use has declined nearly 20% since 2008, the earliest year with complete baseline data. This reflects improved operational efficiency even as service levels expanded.

Vehicle fuels and electricity now represent the City's largest energy cost and GHG emissions drivers. Non-transportation energy use is concentrated in the wastewater and water utility systems, which represent the City's highest energy-consuming operations.

Overall, Meridian's performance demonstrates disciplined growth management, with remaining opportunities focused in a small number of high-impact systems.



Public Safety facilities and fleet expansion sharply increase both electricity and fuel use—new fire stations and the police fleet are the primary contributors.

Vehicle fuel use is rising 4–7% annually, driven by population growth, increased service demand, and an aging fleet with lower fuel efficiency.

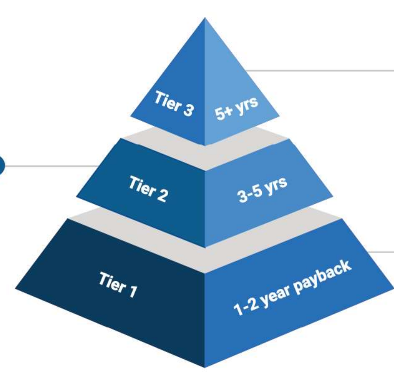
Figure ES-2. 2024 City Energy Flow by Source and Operational Sector

ENERGY CONSERVATION MEASURE (ECM) TIERED FRAMEWORK AND STRATEGY ROADMAP

The Energy Strategy Plan identifies a portfolio of ECMs organized into three implementation tiers, as shown in **Figure ES-2**. Measures were evaluated for financial performance, operational feasibility, and risk to ensure recommendations are practical, cost-effective, and aligned with City priorities. For General Government facilities, **Appendix E** provides a prioritized list of ECMs, including estimated capital cost, savings, payback, GHG reduction, and implementation considerations. For Enterprise Utilities, ECMs and their respective tier classifications are documented in the Wastewater and Water Utility audit reports provided in **Appendix D**.

Investment-Ready

Measures with strong returns and modest upfront costs, requiring limited planning or coordination; typical paybacks of 3–5 years.



Long-Term / Replace-as-You-Go

Capital-intensive measures best integrated into major equipment replacement cycles, facility master plans, or broader capital projects, with paybacks generally exceeding five years and benefits realized over the long term.

Immediate / Short-Payback

Low- or no-cost operational measures that can be implemented immediately, with simple paybacks of 1–2 years, to capture near-term savings.

Figure ES-3. ECM Tier Classification Framework

Tier 1 measures focus on operational improvements that can be implemented quickly with minimal capital investment. Tier 2 measures include targeted efficiency upgrades with moderate costs and typical paybacks of three to five years. Tier 3 measures represent larger capital investments that are best implemented as part of planned equipment replacement or facility upgrades. Investment ranges presented for ECMs reflect capital and implementation costs and do not include ongoing staff time or internal labor. Near-term operational energy management activities are supported separately by an estimated annual investment of approximately $40,000, allocated across part-time staff capacity, energy management software, and technical support.

Table ES-1 outlines a phased implementation timeline for these measures, including representative actions, estimated investment ranges, and potential annual savings across citywide operations, General Government facilities, and Enterprise Utilities. Years shown reflect approximate implementation timing. Implementation pace will ultimately depend on available funding. Lower funding levels emphasize operational improvements, while higher sustained investment enables larger capital projects aligned with equipment replacement cycles, reducing long-term operating costs through improved efficiency and system performance.

Table ES-1. Phased Implementation Timeline for Energy Strategy Measures

Tier Focus	Representative Actions	Investment Range	Annual Savings	Ongoing
2027 — Operational Optimization and Near-Term Efficiency				• Continue streetlight and building LED upgrades *(funded through existing capital program)* • Ongoing monitoring and verification • Annual fleet transition assessment and implementation (hybrid and EV adoption where appropriate) • Replace appliances with commercial-grade Energy Star® as needed
Implement Priority Tier 1- 2 Measures + Solar Feasibility Screening	Building automation system (BAS)/ direct digital control(DDC) optimization, energy dashboards, utility bill review, HVAC and pump scheduling, demand management, and operational best practices, with Tier 1-2 facility improvements; complete solar photovoltaic (PV) feasibility screening to support incentive timing	$60–$200k	$190k–$205k	
2028 — Complete Operational Measures				
Complete Tier 1-2 Measures + Conduct GSHP & Irrigation Feasibility Studies	Adopt project owner requirements and procurement policies; implement SCADA/EMS-based monitoring and control refinement, operator-driven optimization, and enhanced performance visibility; and conduct feasibility studies for ground source heat pumps (GSHPs) and smart irrigation.	$30–$160k+	$100k+	
2029+ — Implement Capital Improvements				
Implement Approved Tier 3 Capital Projects	Implement capital improvements aligned with feasibility study results and asset replacement cycles, including solar PV and GSHP deployment, smart irrigation and control upgrades, retro-commissioning and major HVAC improvements, and utility system optimization through equipment upgrades, load shifting, and expanded EMS integration.	Aligned with capital replacement cycles $200k+	$20k-600k+ (long-term)	

Note: Table ES-1 summarizes and bundles ECMs further described in the main report. Investment ranges and savings are planning-level estimates.

The recommended strategy prioritizes operational improvements that generate near-term savings while positioning the City to integrate larger efficiency and electrification upgrades through normal capital planning cycles. Detailed implementation roadmaps are provided in **Section VI, Tables 3-5**.

LONG-TERM ENERGY OUTCOMES

Three implementation scenarios were evaluated to understand how different investment levels affect long-term municipal energy demand: **Business-As-Usual, Achievable Efficiency** (Tier 1–2 implementation), and **Deep Efficiency** (Tier 1–3 implementation). **All scenarios incorporate projected population growth and associated increases in municipal service demand.**

Under a **Business-As-Usual** pathway, current operations continue without additional ECM implementation.

The **Achievable Efficiency** pathway stabilizes energy demand through operational improvements and investment-ready upgrades, while the **Deep Efficiency** pathway further reduces long-term demand through capital-cycle improvements and electrification strategies. Modeled results for the Achievable and Deep Efficiency pathways are directional and conservative, as several high-impact measures (e.g., solar photovoltaic (PV), ground source heat pumps (GSHPs), fleet electrification) were evaluated at a representative project scale and not extrapolated across all applicable assets. As a result, full Citywide energy savings and emissions reduction potential is materially higher.

General Government Outcomes

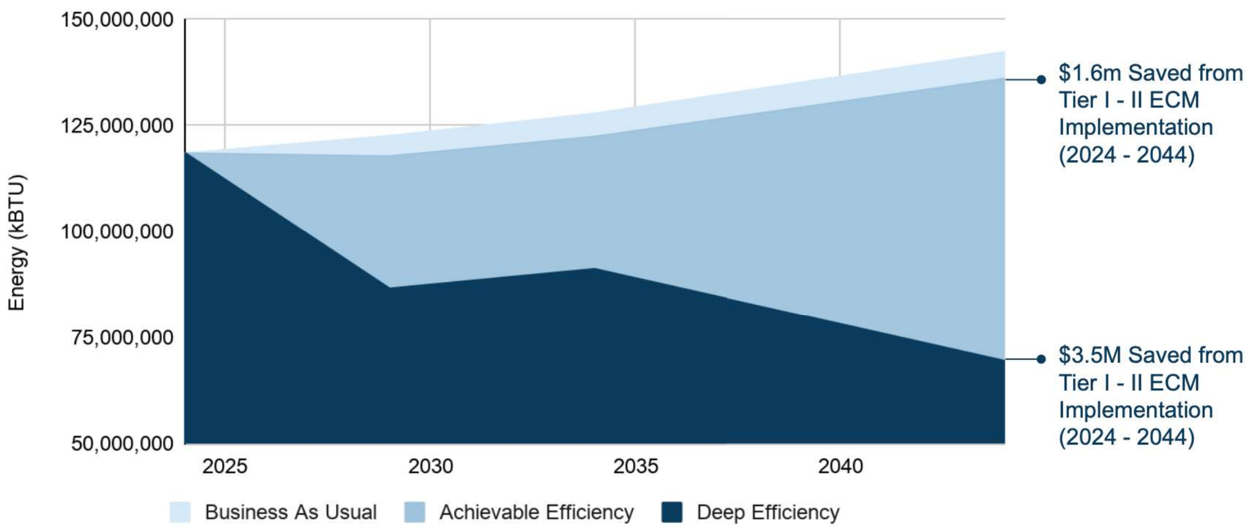


Figure ES-3. General Government Energy Demand by Implementation Scenario (2025–2044)

Figure ES-3 illustrates projected total municipal energy demand under each scenario through 2044. The results show that early operational optimization, combined with disciplined capital sequencing, can moderate long-term energy growth, and reduce costs for the City even as municipal operations expand.

Enterprise Utilities Outlook

Water and wastewater utilities were evaluated separately due to the process-driven nature of their energy use. These systems are dominated by pumps, aeration systems, and treatment processes that require facility-specific engineering analysis, so detailed capital cost and financial modeling was not included. High level estimates of forecasted energy consumption and emissions values can be found in **Section VII,** under "Enterprise Utilities Energy and Emissions Outlook."

Preliminary analysis indicates that operational optimization of pumping systems and wastewater treatment processes could reduce energy intensity by approximately 5–8% in the near term, with additional reductions possible through equipment upgrades and control improvements.

Assuming the same rate of population and energy demand increases as the General Government energy forecasts above, Enterprise Utilities could potentially expect to see approximately a 7% reduction in energy use in the **Achievable Efficiency** pathway, and a 31% reduction if following the **Deep Efficiency** pathway.

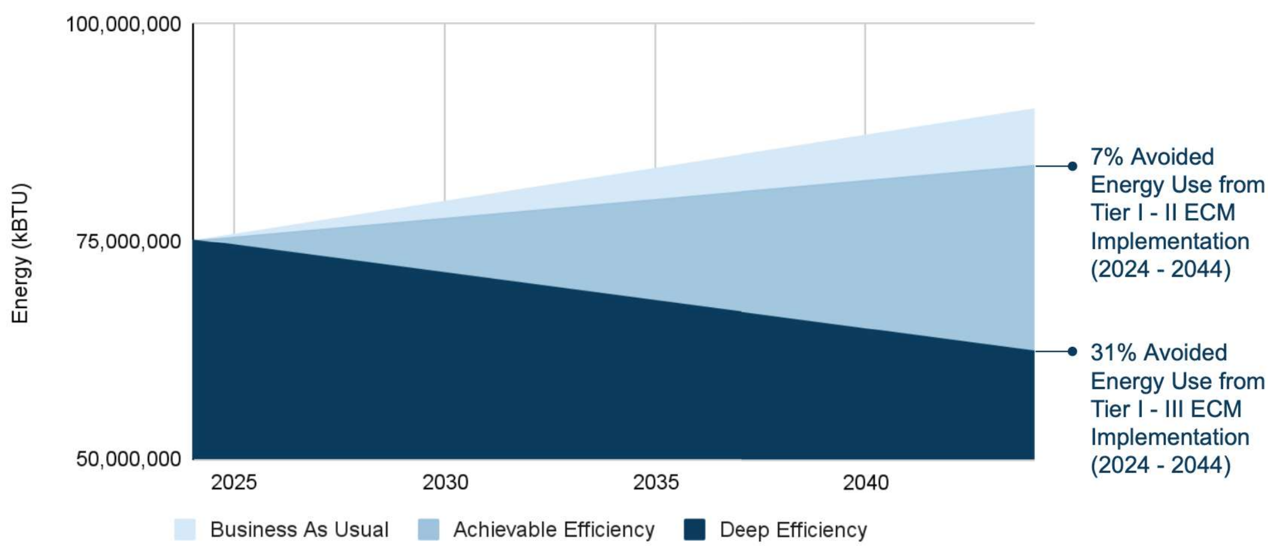


Figure ES-4. Projected Enterprise Utilities Energy Demand by Implementation Scenario (2025–2044)
Note: Enterprise Utilities ECM savings were not calculated because capital costs are not yet known.

Figure ES-4 illustrates projected energy demand across Enterprise Utilities under each scenario through 2044, highlighting the role of continued operational optimization and capital-cycle improvements in improving long-term system efficiency.

CONCLUSION

This Energy Strategy Plan provides a practical, fiscally disciplined framework for managing municipal energy demand, operating costs, and long-term infrastructure risk. The recommended next step is implementation of Tier 1 and Tier 2 measures through existing budget and capital planning processes while strengthening operational performance and energy management practices across City facilities. These actions position the City to capture near-term cost savings, improve operational reliability, and integrate larger efficiency and electrification opportunities as facilities are upgraded through normal capital replacement cycles.

Meridian has already demonstrated that targeted investments deliver measurable results. This Plan builds on that foundation—**optimizing first, investing second, and integrating efficiency into long-term capital planning** to protect taxpayers and strengthen operational resilience. The phased approach allows the City to capture near-term savings while maintaining flexibility to adapt as technologies, utility costs, and operational priorities evolve.

MERIDIAN IDAHO

Energy Strategy Plan

Main Report

Project Team & Acknowledgements

The development of this Energy Strategy Plan benefited from the expertise and collaboration of a multidisciplinary team of engineers, analysts, and advisors.

Technical engineering analysis and peer review were provided by **Dr. John Gardner, P.E., Ph.D., of Gardner Energy Strategies**, whose experience in energy systems modeling and infrastructure planning helped shape the evaluation of energy conservation measures and long-term system performance. Additional technical guidance was provided by **Dr. Damon Woods, P.E., Ph.D., of Woods Energy Solutions and Director of the Integrated Design Lab at the University of Idaho**, whose work in high-performance buildings and applied energy research informed the technical framework used throughout this analysis.

Brad Acker, P.E., of Acker Engineering, provided valuable support during **facility and utility site visits**, contributing practical insights related to building systems operations and maintenance. **Zach Bell** supported energy data analysis, the City's emissions profile, and data visualization. Research and project support were provided by **Garrett Eppich**, a sophomore at Vanderbilt University, who contributed to background research and supporting materials. Overall project strategy, analysis and consultant team coordination, and report development were led by **Deb LaSalle, J.D. of STRAVEN Strategy Group.**

The project team also gratefully acknowledges the collaboration and leadership of the **City of Meridian Public Works Department**, including **Public Works Director Laurelei McVey** and **Environmental Programs Coordinator, Jason Korn**, whose guidance and coordination were instrumental to the completion of this work.

Finally, the team recognizes the **City of Meridian's leadership and commitment to responsible energy management**, which made the development of this strategy possible.

ACRONYM LIST

ACRONYM	DEFINITION
BAS	BUILDING AUTOMATION SYSTEM
CAPEX	CAPITAL EXPENDITURES
CBECS	COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY
DDC	DIRECT DIGITAL CONTROL
ECM	ENERGY CONSERVATION MEASURE
EECBG	ENERGY EFFICIENCY AND CONSERVATION BLOCK GRANT
EMS	ENERGY MANAGEMENT SYSTEM
EPA	U.S. ENVIRONMENTAL PROTECTION AGENCY
EUI	ENERGY USE INTENSITY
EV	ELECTRIC VEHICLE
GHG	GREENHOUSE GAS
GSHP	GROUND SOURCE HEAT PUMP
HVAC	HEATING, VENTILATION, AND AIR CONDITIONING
HVLS	HIGH-VOLUME, LOW-SPEED (FANS)
ISO	INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
LED	LIGHT-EMITTING DIODE
NREL	NATIONAL RENEWABLE ENERGY LABORATORY
PD HQ	POLICE DEPARTMENT HEADQUARTERS
PSTC	POLICE SAFETY AND TRAINING CENTER
PV	PHOTOVOLTAIC
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SLOPE	STATE AND LOCAL PLANNING FOR ENERGY (NREL MODELING PLATFORM)
SOP	STANDARD OPERATING PROCEDURE
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
WRRF	WATER RESOURCE RECOVERY FACILITY

I. OVERVIEW

PURPOSE AND CONTEXT

The City of Meridian's Energy Strategy Plan establishes a data-driven framework to guide management of energy use, costs, and related investments across municipal facilities, infrastructure, and operations. As shown in **Figure ES-1**, the Plan follows a structured three-phase process, beginning with baseline analysis and concluding with modeling of long-term energy conservation measures (ECMs). The objective is to improve operational efficiency, reduce avoidable costs, and lower associated environmental impacts through more effective energy management.

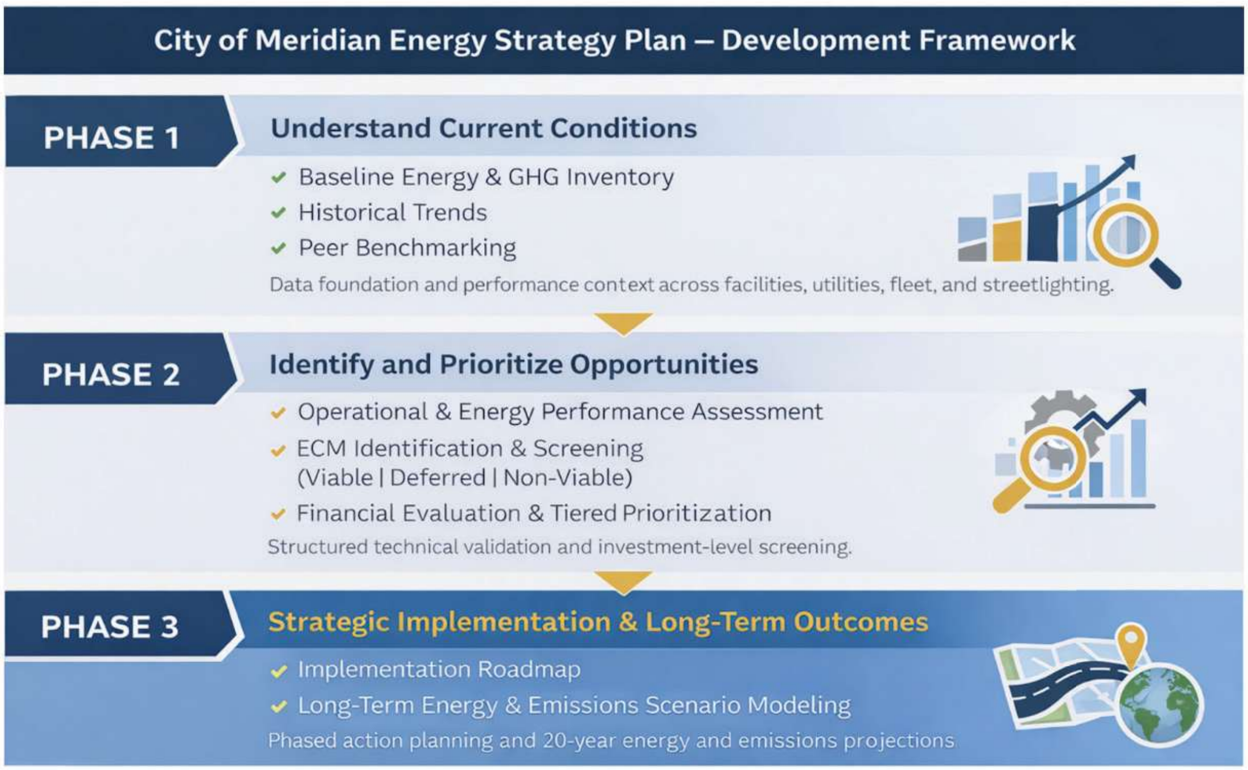


Figure ES-1. Three-Phase Energy Strategy Development Process

This effort was initiated through Meridian's participation in the U.S. Department of Energy's Energy Efficiency and Conservation Block Grant (EECBG) Program, funded by the Bipartisan Infrastructure Law. In 2023, the City received a one-time formula allocation to support energy planning and long-term municipal energy management.

The City determined that development of a comprehensive Energy Strategy Plan represented the most effective use of these funds. The Plan establishes current energy and cost baselines, evaluates practical operational, capital, policy, and utility-related opportunities, and provides a structured framework for prioritizing future actions and investments.

The Plan supports informed decision-making and does not commit the City to specific projects or expenditures. Rather, it presents options, estimated costs and benefits, and implementation considerations so City leadership can evaluate actions based on feasibility, fiscal responsibility, and alignment with operational priorities.

ALIGNMENT WITH EXISTING PLANS AND PRIOR ENERGY STRATEGY

Policy Alignment

The City of Meridian's Energy Strategy Plan is aligned with the City's adopted Comprehensive Plan (2019), 2021–2025 Strategic Plan, and the City Council's 2020 Clean Energy Resolution. Together, these documents establish a consistent policy framework emphasizing fiscally responsible growth, efficient use of resources, and long-term operational sustainability.

The Comprehensive Plan defines sustainability as balancing environmental protection, economic vitality, and community livability. The Strategic Plan reinforces this direction through its Vibrant and Sustainable Community focus area, while Resolution No. 20-2226 affirms the City's commitment to integrating energy efficiency and clean energy practices where economically and operationally viable. The EECBG-funded Energy Strategy Plan builds upon this foundation by providing the data, analysis, and implementation framework to support fiscally responsible, long-term energy stewardship and future decision-making.

Prior Energy Strategy

In 2010, the City of Meridian developed an Energy Efficiency & Conservation Strategy (EECS) with support from the DOE's EECBG program. That plan integrated energy efficiency into City operations and supported implementation of multiple successful projects that reduced energy use, operating costs, and emissions.

Notable outcomes included retro-commissioning of City facilities, modern light-emitting diode (LED) technology, streetlight conversions, wastewater treatment plant efficiency upgrades, and operational improvements in Public Safety facilities, resulting in well over six figures in cumulative cost savings.

Building on this foundation, the present Energy Strategy Plan evaluates current performance, identifies remaining opportunities, and outlines a practical roadmap for continued fiscal and operational stewardship.

ORGANIZATION OF THE REPORT

This report progresses from understanding current conditions to identifying priority actions and, finally, evaluating long-term energy and emissions outcomes based on the pathway the City chooses to pursue.

- **Section II** establishes the City's energy, cost, and greenhouse gas (GHG) emissions baseline.
- **Section III** benchmarks performance against peer municipalities and national datasets.
- **Section IV** describes the methodology used to identify, evaluate, and prioritize ECMs.
- **Section V** presents prioritized actions organized by investment level and expected payback.
- **Section VI** outlines an ECM implementation roadmap and near-term next steps.
- **Section VII** models long-term energy, cost, and emissions outcomes under three pathways: Business-As-Usual, Achievable Efficiency, and Deep Efficiency.
- **Section VIII** summarizes key findings and strategic recommendations.
- **Appendices** provide detailed technical documentation, including baseline data, historical trends, GHG inventory methodology, peer benchmarking, facility site assessment findings, the ECM investment and payback matrix, ECM technical analysis, and long-term energy and emissions modeling.

II. CITYWIDE ENERGY BASELINE AND KEY DRIVERS

Section II establishes the City's current energy baseline. It summarizes how energy is consumed across municipal operations, how that consumption has changed over time, and where operational and financial exposure are concentrated. Detailed data sources, calculation methods, and supporting analysis are provided in **Appendix A**. *City of Meridian Overall Energy Analysis*.

2024 ENERGY FLOW AND SECTOR ORGANIZATION BY REPORTING CATEGORY

The City of Meridian consumes electricity, natural gas, gasoline, and diesel across municipal operations. For analytical consistency, facilities and utility meters were grouped into operational sectors grouped under two financial reporting categories:

Enterprise Utilities – Wastewater Resource Recovery Facility (WRRF) and the Water Utility
General Government – City Hall, Public Safety, Parks & Recreation, Street Lights, and Other

Figure 1 illustrates the 2024 flow of energy from primary sources to these operational sectors. Total City energy expenditures across all sources amounted to $2.93 million in 2024.

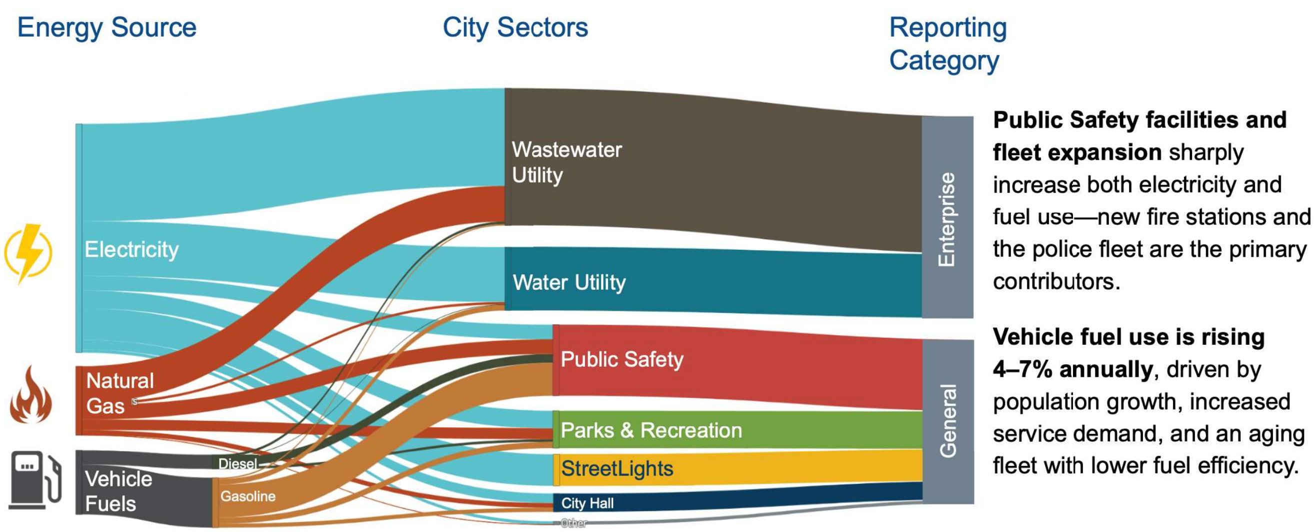
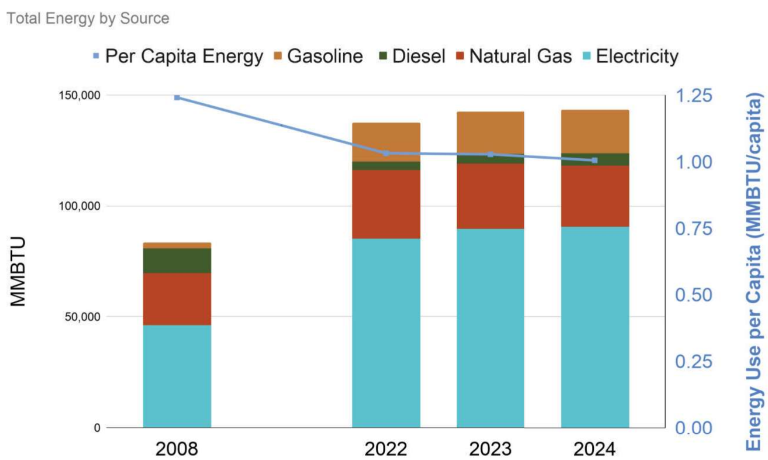


Figure 1: 2024 City Energy Flow by Source and Operational Sector

2008–2024 ENERGY TRENDS

Since 2008, total City energy consumption has nearly doubled, reflecting sustained population growth, expanded public safety operations, and increased infrastructure assets required to serve a growing community. Despite this expansion, as shown in **Figure 2**, the City has improved its energy performance on a per capita basis. When normalized for population, overall energy use declined from 1.24 MMBtu (a standard unit used to compare different fuel types) per resident in 2008 to 1.00 MMBtu in 2024 — a nearly 20 percent improvement in energy intensity relative to growth.

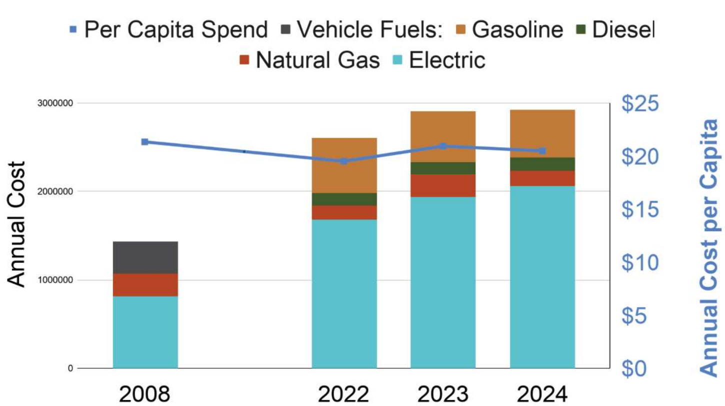
This trend indicates that Meridian has successfully absorbed substantial service expansion while improving operational efficiency and moderating energy demand per resident.



~20%
REDUCTION IN PER CAPITA ENERGY USE SINCE 2008 DESPITE RAPID GROWTH

Figure 2: Total and Per Capita Energy Consumption by Source (2008-2024).

A similar pattern is observed in energy expenditures. While total energy costs have increased alongside system growth, per capita energy spending has remained essentially flat. As shown in **Figure 3**, per capita energy cost decreased slightly from approximately $21 per person in 2008 to $20.60 per person in 2024. Efficiency improvements and historically stable energy pricing moderated the fiscal impact of growth.



1.9%
DECREASE IN PER CAPITA ENERGY COSTS FROM $21 (2008) TO $20.60 (2024)

Figure 3: Total and Per Capita Energy Expenditures (2008–2024).
Note: In 2008, diesel and gasoline consumption were reported in aggregate.

Looking ahead, continued population growth and service expansion are expected to increase total energy demand. Sustaining efficiency gains will therefore be critical to maintaining Meridian's strong per capita performance while managing long-term financial risk.

2024 ENERGY USE BY OPERATIONAL SECTOR

Enterprise Utilities (wastewater and water) account for approximately 65% of total City energy use, while the Public Safety, Parks and Recreation and Streetlight sectors account for nearly one-third. Together, these sectors represent roughly 95% of total municipal energy consumption in 2024 (**Figure 4 - left**).

This concentration of energy use is important for budget planning. Financial leverage and emissions reduction potential are not evenly distributed across City operations; they are concentrated in a small number of high-load systems.

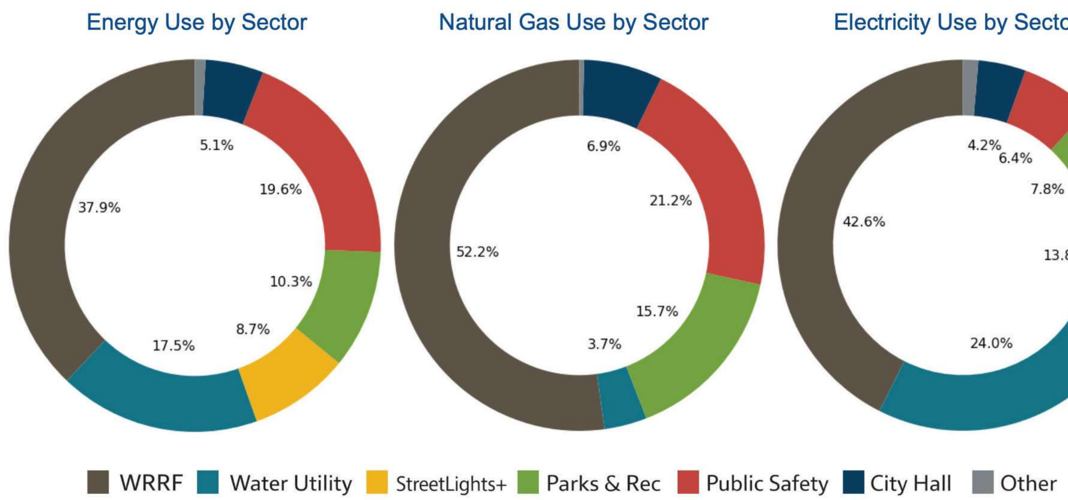


Figure 4: 2024 Percentage of Energy Consumption by Sector

~50%

OF NATURAL GAS USE SUPPORTS THE WASTEWATER SECTOR

Natural Gas Profile

The WRRF accounts for roughly half of the City's natural gas use, supporting both building heating and process-related thermal loads, such as digester or boiler systems. Public Safety and Parks & Recreation represent an additional 21% and 16%, respectively, primarily for space heating (**Figure 4 - middle**).

Figure 5 shows natural gas consumption declining about 5.5% annually between 2022 and 2024, influenced in part by warmer-than-average winter conditions.

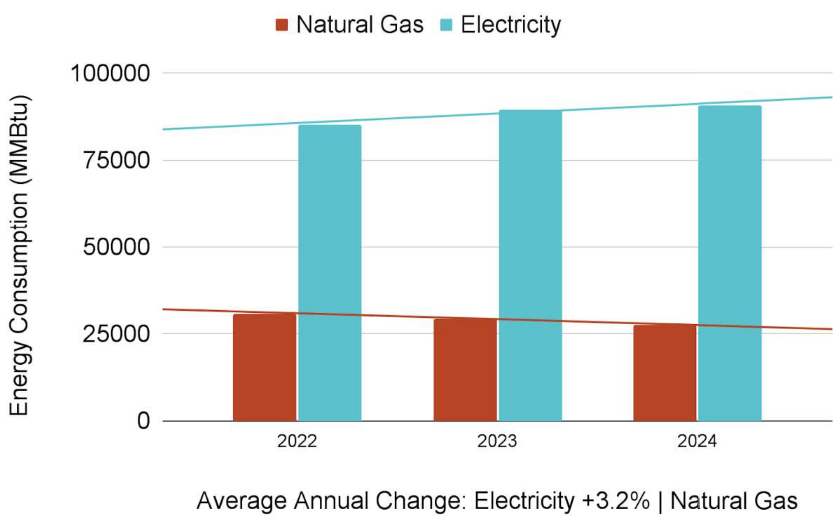


Figure 5: Electricity and Natural Gas Consumption and Electricity Share (2022–2024)

Reductions occurred across all sectors except Public Safety, which added new facilities during this period. City Hall accounted for the largest share of reductions. Additional sector-level trend detail and cost analysis are provided in **Appendix A.**

While recent declines are encouraging, weather-related reductions should not be interpreted as structural efficiency improvements. Long-term natural gas exposure remains concentrated within process-intensive wastewater operations and heated public facilities.

Electricity Profile

The Water Utility and WRRF together account for approximately two-thirds of total electricity consumption. Streetlighting and Parks & Recreation represent additional meaningful loads (**Figure 4 - right**).

~2/3
OF ELECTRICITY USE SUPPORTS THE
WATER & WASTEWATER SECTORS

Electricity is the City's largest energy source and fastest-growing cost driver. Between 2022 and 2024, total electricity consumption increased approximately 3.2% annually (**Figure 5**), while electricity costs increased by more than 10% annually. Most sectors experienced flat or population-proportional growth, while Streetlights and Parks & Recreation increased faster than population growth. Public Safety growth reflects the addition of new facilities. Detailed trend analysis is provided in **Appendix A**.

Because electricity represents the majority of total energy use and emissions, future rate structures and grid conditions will significantly influence City operating costs and long-term capital decisions.

Vehicle Fuels: Gasoline and Diesel

Gasoline and diesel consumption generally track population growth and service expansion (**Figure 6**). Public Safety accounts for the largest share of vehicle fuel use across City operations. Additional detailed sector-level cost and trend analysis is provided in **Appendix A**.

Fuel expenditures have increased approximately 5% annually since 2019, with notable year-to-year volatility driven by market price fluctuations. Unlike electricity and natural gas, gasoline and diesel costs are exposed to broader global energy market dynamics.

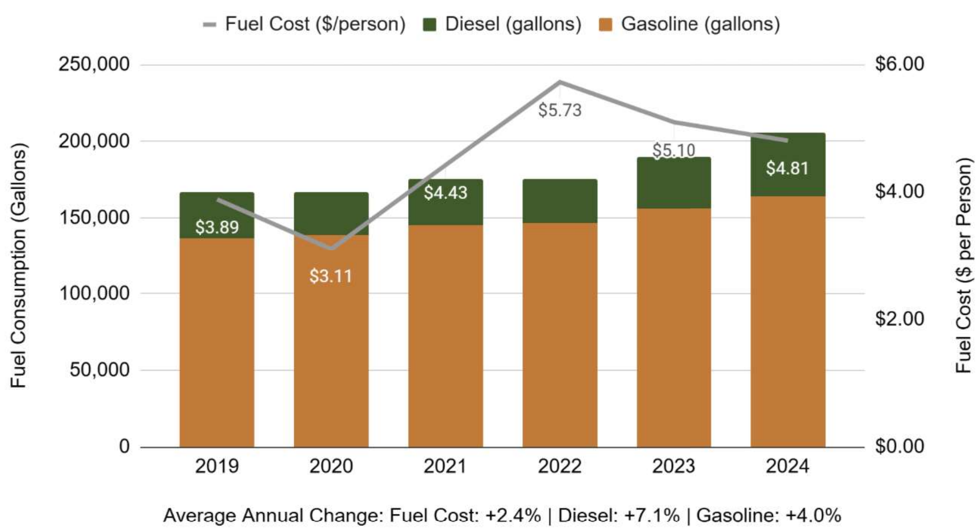


Figure 6. Vehicle Fuel Consumption and Per Capita Fuel Cost (2019–2024)

Energy Use Summary

4-7%
ANNUAL INCREASE IN VEHICLE FUEL USE – TRACKING POPULATION GROWTH, SERVICE EXPANSION, AND FLEET FUEL PERFORMANCE

Electricity represents the City's largest and fastest-growing operating cost driver. Regional load growth—including electrification, industrial expansion, and data-intensive facilities—may influence future rate structures and system capacity investments. Managing municipal load profiles and peak demand exposure will therefore remain an important cost-control strategy.

In addition to financial exposure, the fuels relied upon by the City drive associated GHG emissions. While emissions do not directly affect current operating budgets, they signal long-term exposure to fuel price volatility, infrastructure replacement decisions, evolving utility rate structures, and changing regional conditions that influence energy demand. The inventory below quantifies where that exposure is concentrated.

GHG INVENTORY

GHG emissions associated with City energy use were calculated using emissions factors from the U.S. Environmental Protection Agency (EPA) and Idaho Power, consistent with the GHG Protocol and ISO 14064-1. Detailed methodology and calculation procedures are documented in ***Appendix B*** *GHG Inventory Documentation.*

Emissions generally follow energy use (**Figure 7**); though electricity-related emissions depend on how electricity is generated. As Idaho Power transitions away from coal and increases cleaner generation resources, the emissions associated with each unit of electricity are expected to decline over time.

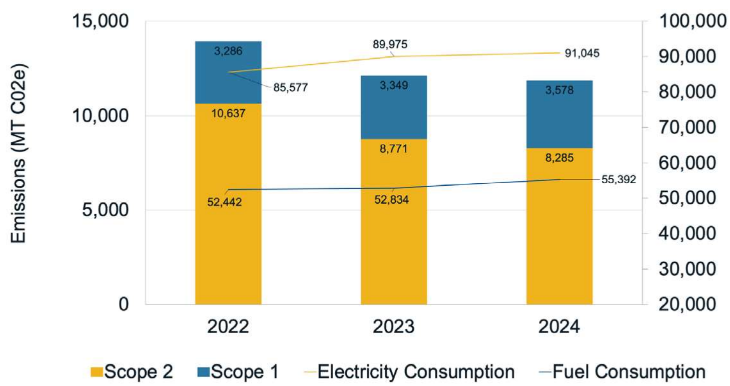


Figure 7: City Energy Consumption and Associated GHG Emissions by GHG Protocol Scope, 2022–2024

~70% **OF CITY GHG EMISSIONS ARE FROM THE WATER & WASTEWATER SECTORS**

~30% **OF GHG EMISSIONS ARE FROM FLEET & HEATING FUELS**

Although electricity consumption increased between 2022 and 2024, electricity-related emissions declined due to improvements in Idaho Power's generation mix. In contrast, direct fuel emissions have increased alongside city service expansion, particularly within fleet operations.

Approximately 30% of total emissions stem from fuels the City directly controls—fleet vehicles, equipment, and building heating (Scope 1)—while about 70% are associated with purchased electricity (Scope 2). The top four emissions sources (**Figure 8**) are electricity use at the WRRF (30% of total emissions), electricity at the Water Utility (17%), gasoline use in fleet operations (13%), and natural gas use for heating and process loads (12%).

Gasoline emissions are concentrated in Public Safety fleet operations, while natural gas emissions are primarily associated with building heating and wastewater process-related thermal loads.

Understanding where emissions are concentrated supports prudent long-term planning. As boilers, fleet vehicles, and wastewater process equipment reach end-of-life, replacement decisions will intersect with fuel cost trends, technology shifts, and infrastructure standards.

To further contextualize performance, the following section benchmarks Meridian's facilities and utilities against regional and national peers.

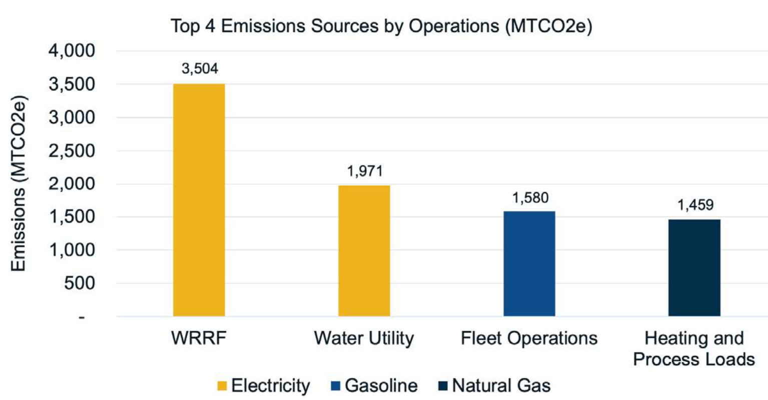


Figure 8: Top Four (4) Emissions Sources

III. PEER BENCHMARKING

GENERAL GOVERNMENT

The City's larger office buildings were benchmarked against regional and national data from the U.S. Energy Information Administration's (EIA) Commercial Buildings Energy Consumption Survey (CBECS). As shown in **Table 1**, City Hall has a lower energy intensity than both comparable Mountain-region office buildings (CBECS Mtn) as well as Mountain-region buildings over 100,000 square feet. City Hall's strong performance reflects its relatively modern construction (2008), efficient envelope, variable air volume (VAV) system with underfloor air distribution, and digital controls. While City Hall performs favorably relative to regional benchmarks, incremental efficiency opportunities remain, including lighting modernization and continued optimization of building systems.

Table 1. General Government EUI Comparison – CBECS Mountain Region (>100,000 sf)

Energy Intensity Metric	City Hall	CBECS Mtn (> 100k sf)	CBECS Mtn (Office)
Electricity (kWh/sf)	10.0	14.6	12.2
Natural Gas (cf/sf)	17.1	28.4	19.0
Combined Energy Use Intensity (EUI or kBtu/sf)	51.3	78.2	60.6

Compared to CBECS Mountain Region energy intensity benchmarks for office buildings and for buildings of similar size, the Police Safety and Training Center (PSTC) has a lower energy use intensity (EUI), while the Police Department Headquarters (PD HQ) has a higher EUI (**Table 2**). The higher energy intensity at PD HQ likely reflects its operational profile, including 24/7 functions, evidence storage with freezer loads, and continuous ventilation and cooling requirements—conditions not typical of standard office buildings. In contrast, the PSTC operates primarily during weekday business hours with more variable occupancy and fewer continuous loads, contributing to its comparatively low energy intensity.

Detailed calculations and benchmarking methodology are provided in ***Appendix C***. *General Government: Peer Benchmark Performance.*

Table 2. General Government EUI Comparison – CBECS Mountain Region (Office Buildings)

Energy Intensity Metric	PSTC (12k sf)	CBECS Mtn (10-25k sf)	PD HQ (33k sf)	CBECS Mtn (25-50k sf)	CBECS Mtn (Office)
Electricity (kWh/sf)	2.6	9.1	20.8	12.4	12.2
Natural Gas (cf/sf)	22.8	34.8	39.6	37.0	19.0
Combined EUI (kBtu/sf)	32.0	65.9	92	79.3	60.6

ENTERPRISE UTILITIES (WATER AND WASTEWATER)

The City's Water Utility and the WRRF represent the largest continuous energy loads within municipal operations and were evaluated separately using industry benchmarking datasets and facility-level energy intensity metrics. Supporting benchmarking data are provided in **Appendix C**.

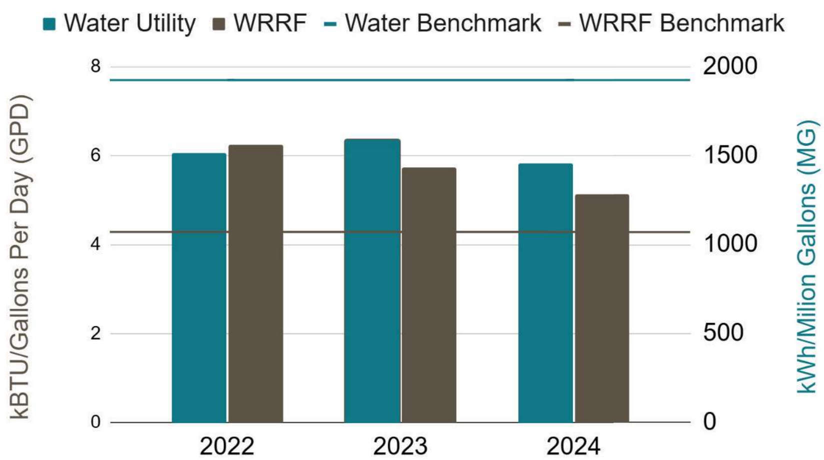


Figure 9: Annual Energy Intensity Comparison: Water Utility and WRRF (2022–2024) Relative to Industry Benchmarks

WRRF

A recent study by the EPA as part of the Portfolio Manager Program looked at the energy intensity of 1,377 municipal wastewater treatment facilities across the country. Details of the study, including a representative profile of the facilities included in the study, can be found in **Appendix C**. The median energy intensity of the facilities in the study was 4.28 kBTU/GDP, which could serve as a target for goal-setting keeping in mind that efficiencies are influenced by unique operational circumstances related to climate and effluent treatment standards (**Figure 9**). While the energy intensity at the WRRF has declined over the past three years, indicating improving operational efficiency, the benchmark comparison suggests additional performance gains remain achievable relative to median peer facilities. This supports continued emphasis on operational optimization and controls refinement.

Water Utility

The Water Utility operates below the national and regional median energy intensity benchmarks for comparable groundwater-based systems, reflecting strong baseline performance (**Figure 9**). However, observed year-to-year variability indicates that operating practices and production conditions materially influence energy use, underscoring the importance of consistent operational management to sustain peak performance.

These findings establish the technical context for targeted ECM identification in Section IV, with emphasis on operational control, cost drivers, and savings persistence rather than wholesale infrastructure replacement. Targeted infrastructure improvements, such as the proposed water storage tank to support pump operations, may also improve system efficiency, operational flexibility, and operational resilience during power outages.

IV. IDENTIFICATION AND VALIDATION OF ECMS

Section IV describes the process used to identify and validate ECMs across City operations. Through structured data analysis, site visits, and staff engagement, the City developed a prioritized portfolio of cost-effective, implementable actions. The focus is on operational optimization, demand cost management, and disciplined capital planning.

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FACILITIES & OPERATIONS EVALUATED

DATA + SITE VALIDATION + STAFF REVIEW

ANALYTICAL SCREENING PROCESS

ECMs were identified through a structured, data-driven process combining portfolio benchmarking, interval data analysis, site visits, and staff validation.

Seventeen facilities were screened using:

- **EUI benchmarking** (measures a building's total annual energy consumption divided by its gross floor area, allowing comparison of energy performance across facilities of different sizes)
- **Inverse modeling of energy use relative to weather** (evaluates energy use as a function of outdoor air temperature, helping distinguish weather-driven loads from operational inefficiencies)
- **Heat maps** (**Figure 10**) (three years of hourly electricity interval data to identify load patterns, peak demand drivers, and scheduling anomalies)
- **Site visits** (on-site equipment and controls reviews), with findings documented in audit summaries

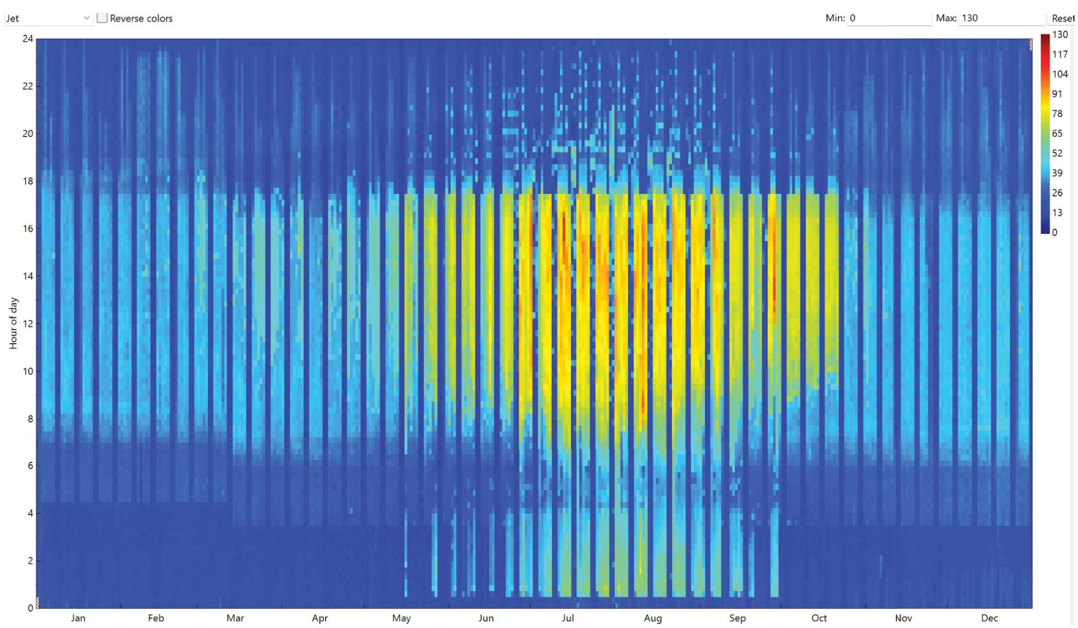


Figure 10. Meridian City Hall electricity heat map.

This process identified high-consumption facilities, abnormal load patterns, scheduling inefficiencies, and demand-related cost drivers. Detailed audit summaries and heat maps are provided in ***Appendix D***. *Facilities Audit Summaries and Heat Maps.*

Facilities not fully screened include those where representative comparison to similar buildings was sufficient (e.g., well pump stations), newer facilities with modern systems, smaller or seasonal facilities with limited energy impact, or buildings not identified as areas of concern based on preliminary review. Energy strategy efforts were directed toward year-round, higher-load facilities with greater potential for recurring operational and financial impact.

ECM EVALUATION FRAMEWORK

ECMs were evaluated using standardized criteria where sufficient data was available to support consistent comparison, including:

- **Estimated capital cost**
- **Annual utility cost savings**
- **Simple payback (based on current utility rates)**
- **GHG reduction potential**
- **Operational feasibility and implementation constraints**

Measures were categorized into three priority tiers based on cost, payback, and implementation complexity, as illustrated in **Figure 11**. For General Government facilities, **Appendix E**. ECM Priority Matrix provides a prioritized list of ECMs evaluated using these criteria. For Enterprise Utilities, ECMs and their respective tier classifications are documented in the Wastewater and Water Utility audit reports provided in **Appendix D**; these measures are based on audit findings and operational assessment and are not consistently evaluated using full financial metrics. **Appendix F** provides supporting technical analysis and calculations for selected high-impact or system-level measures that require additional evaluation beyond the audit summaries.

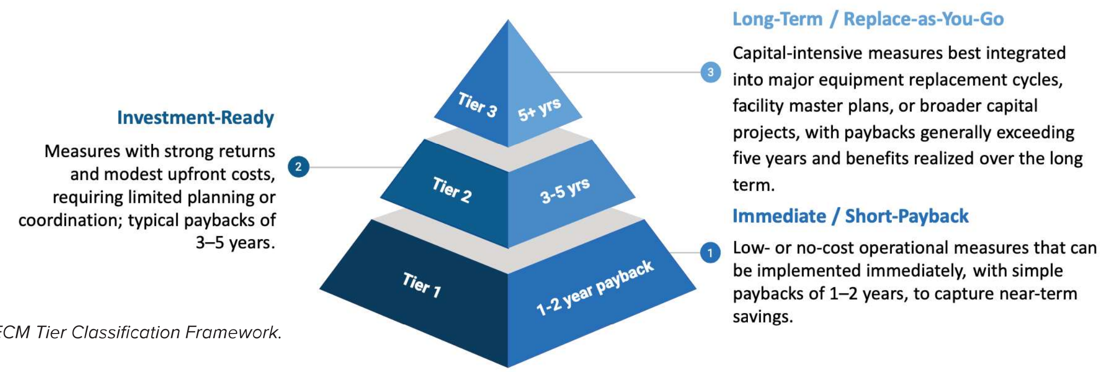


Figure 11. ECM Tier Classification Framework.

STAFF VALIDATION AND PRACTICAL SCREENING

Two workshops and follow-up discussions with City staff, and controls vendors were conducted to validate findings and refine feasibility.

This engagement confirmed:

- **Operational constraints in mission-critical facilities**
- **Building Automation System (BAS), including direct digital controls (DDC) architecture, control sequences, scheduling practices, overrides, and operational workarounds**
- **Maintenance capacity considerations**
- **Electric demand charge exposure within water and wastewater systems**

Measures were screened out when they:

- **Did not meet financial thresholds under current rates and capital costs**
- **Introduced operational or public-safety risk**
- **Delivered limited savings relative to implementation complexity**

Screened measures and rationale are documented in ***Appendix G****. Screening Logic for Non-Viable and Deferred ECMs,* which also includes a Future Watch List of measures to reconsider as conditions change. Non-viable measures include large-scale battery systems replacing generators, solar streetlights, and certain fleet electrification scenarios with extended paybacks.

This Plan prioritizes cost-effective, operationally sound measures aligned with current fiscal conditions, rate structures, and internal City capacity.

V. PRIORITY ACTIONS AND INVESTMENT LEVELS

This section summarizes recommended priority actions and associated investment levels to improve energy performance, reduce operating costs, and strengthen long-term asset management. Actions are organized from foundational operational and governance improvements to targeted efficiency and electrification measures within City utilities and facilities.

FOUNDATIONAL ENERGY MANAGEMENT FRAMEWORK SAVINGS OPPORTUNITIES

Before advancing capital projects, the City can strengthen operational performance, purchasing strategy, and governance practices. These actions are generally low-cost, reduce operational risk, and improve the return on future capital investments.

Operational Performance and Controls Optimization

The City's BAS/DDC platform (Automated Logic with WebCTRL) provides the capability to improve operational efficiency without major hardware investment. Near-term opportunities lie in optimizing existing system functionality.

Recurring issues include extended schedules, limited reset strategies, manual overrides, and lack of coordinated sequencing. In some cases, equipment-level internal controls limit supervisory flexibility, reinforcing the need to optimize accessible setpoints, schedules, and interlocks. These represent low-cost, high-impact actions well suited for near-term implementation.

Advanced controls strategies (such as demand-controlled ventilation or automated economizer optimization) were evaluated but not prioritized for universal deployment. Many facilities have steady occupancy patterns or limited control flexibility, limiting incremental savings relative to added complexity. Instead, the focus is on improving performance of existing systems through:

- **Heating, Ventilation, and Air Conditioning (HVAC) schedule alignment**
- **Economizer and outside air sequence verification**
- **Supply air and hot water temperature reset optimization**
- **Fan interlock and sequencing coordination**
- **Reduction of persistent manual overrides through trend review**

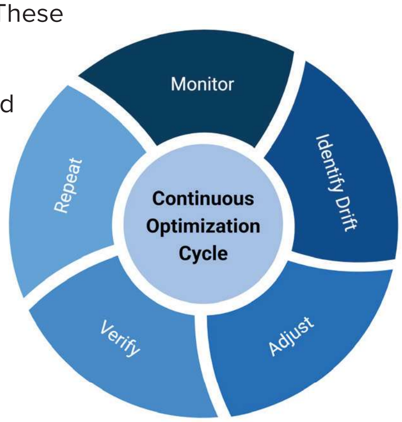


Figure 12. Continuous optimization cycle for BAS/DDC systems

BAS/DDC optimization is most effective when treated as an ongoing operational process rather than a one-time adjustment. Performance monitoring, identification of operational drift, and periodic control refinement (**Figure 12**) allow facilities staff to maintain system efficiency as equipment ages and building conditions evolve. To support ongoing performance monitoring, the City may benefit from a centralized energy management dashboard that consolidates utility billing data, interval demand data, facility characteristics, and operational metrics from building automation and Supervisory Control and Data Acquisition/Energy Management System (SCADA/EMS) systems. Such a platform would allow staff to track energy trends, identify abnormal consumption, and monitor peak demand drivers. Initial development would require consistent collection of utility data, facility information, and available BAS/DDC or SCADA trend data, with future API connections enabling more automated data integration.

OPERATIONAL PRACTICE GAPS IN SPECIALIZED SPACES
Certain facilities exhibit avoidable energy use driven by inconsistent operating practices rather than equipment limitations.

Server Room Temperature Standards
The City lacks a consistent IT-owned setpoint standard. Establishing and enforcing a Citywide standard would reduce unnecessary cooling and eliminate ad hoc adjustments.

Facilities Standard Operating Procedures (SOPs)
SOPs alone are insufficient in mission-critical, shift-based environments such as fire stations. Automated controls, commissioning, and periodic re-tuning are more reliable mechanisms for sustained savings.

UTILITY / SUPPLY-SIDE OPTIMIZATION

Utility cost optimization focuses on rate alignment, incentive utilization, demand management, and strategic purchasing.

Savings estimates incorporate applicable Idaho Power incentives for lighting and controls upgrades; HVAC and mechanical improvements (including variable frequency drives [VFDs] and system tuning); equipment upgrades; pool efficiency measures; Strategic Energy Management; demand response participation; and early design support for new construction and major renovations.

Additional cost management opportunities include:

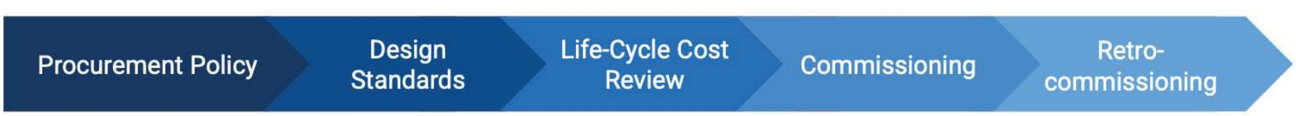
- **Electric rate optimization:** Periodic review of rate classifications and demand structures to ensure alignment with load profiles.
- **Natural Gas Procurement Review:** The WRRF consumes approximately 300,000 therms of natural gas annually. While this volume, at this time, does not independently support bulk purchasing contracts, the City could periodically evaluate cooperative purchasing opportunities or regional procurement programs as part of its ongoing utility cost management practices.
- **Regional fuel procurement:** Participation in cooperative diesel purchasing programs—potentially including renewable diesel where cost-neutral—may provide improved price stability and modest cost advantages while maintaining operational flexibility.

Leveraging incentives, rate optimization, and disciplined purchasing improves financial performance across the portfolio. Periodic review of electric rate classifications, demand structures, and fuel purchasing strategies can further reduce operating costs across the City's portfolio.

POLICY & GOVERNANCE

Energy performance should be embedded in routine procurement and capital decisions to avoid locking in avoidable operating costs. Recommended actions:

- **Adopt procurement standards** requiring commercial-grade ENERGY STAR® appliances, premium-efficiency motors and drives, and lighting systems with integrated controls.
- **Update design standards** to require defined energy performance criteria and energy modeling for new construction and major renovations, and apply a lifecycle cost screen so investments are evaluated on total cost of ownership rather than first cost alone.
- **Require commissioning** at project completion and periodic recommissioning for major facilities to ensure systems perform as intended over time.



These measures require minimal capital but reduce long-term operating costs and performance drift across the City's asset portfolio.

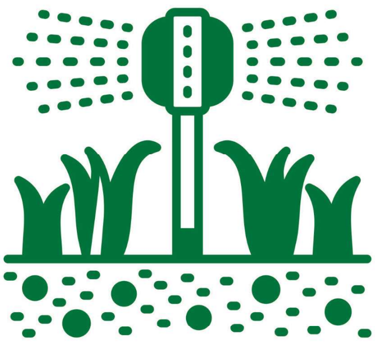
GENERAL GOVERNMENT TIER 1 - 3 QUANTIFIED SAVINGS OPPORTUNITIES

The General Government reporting category includes City Hall, fire stations, police headquarters and training facilities, recreation buildings (Homecourt and the Meridian Pool), streetlighting, and other occupied municipal spaces. Opportunities are summarized below by Tier to reflect implementation timing and capital intensity. A full list of priority General Government ECMs, including estimated capital cost, savings, payback, GHG reduction, and implementation considerations, is provided in **Appendix E**. Selected ECMs are further documented in **Appendix F** with supporting audit summaries provided in **Appendix D**.

CITYWIDE CAPITAL & TECHNOLOGY ECMs

LED Lighting Upgrades (Tier 1–3):

LED lighting upgrades reduce electricity use and maintenance costs by replacing older lighting technologies with high-efficiency fixtures and controls. The City has already completed many LED conversions across its facilities. Remaining opportunities span Tier 1–3 depending on scope: Tier 1 includes optimizing existing lighting controls and schedules; Tier 2 includes LED retrofits within existing fixtures and adding controls; and Tier 3 includes full fixture replacement during capital upgrades. Audit summaries identify remaining opportunities in General Government facilities, though detailed inventories for Enterprise Utilities were not available. Idaho Power incentives are available for LED lamps, fixture upgrades, and lighting controls, improving project economics.

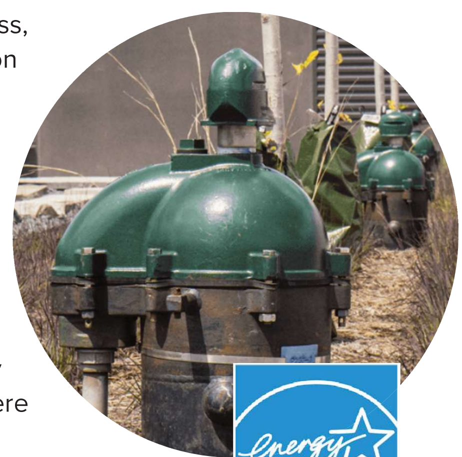


Smart Irrigation (Tier 2):

Smart irrigation systems use weather data, soil moisture sensors, and automated controllers to adjust watering schedules based on landscape conditions rather than fixed timers. Literature and field studies indicate water savings of roughly 15–40%, with irrigation pumping energy reductions of approximately 5–15%. Preliminary analysis using Discovery Park irrigation data suggests potential savings of ~14,000–38,000 kWh annually ($700–$2,000). A feasibility review is recommended to confirm controller compatibility and irrigation zones across City parks.

Ground Source Heat Pumps (GSHPs) (Tier 3):

Select GSHP applications may achieve payback periods of eight years or less, with a representative $200,000 investment yielding approximately $4 million in avoided energy and operating costs over 20 years. Federal incentives remain available through 2034. Due to system complexity and capital requirements, these systems are best evaluated through medium-term capital planning and informed by regional pilot results.



ENERGY STAR® Appliances (Tier 3):

An appliance audit of four fire stations and six municipal workspaces identified 25 non-ENERGY STAR refrigeration units, 12 washers/dryers, and seven dishwashers. Replacing these with commercial-grade, high-efficiency appliances, at end-of-life, including ENERGY STAR–certified equipment where applicable, is projected to save ~8,500 kWh annually (~$850), representing a 17% reduction in appliance energy use. Because the audit covered roughly half the City's facilities, similar savings may exist elsewhere. A citywide procurement standard requiring ENERGY STAR or equivalent appliances would ensure future replacements reduce operating costs.

Transportation & Fleet – Hybrids Replacement (Tier 3); EV Replacement (Deferred):

Electric vehicles do not currently demonstrate a positive lifecycle return over a 10-year period under current cost and operating assumptions. However, declining vehicle costs, expansion of shared charging infrastructure, and potential fuel price increases are expected to improve future economics. Hybrid vehicle replacement represents a practical, replace-as-you-go Tier 3 strategy, delivering fuel savings and emissions reductions without requiring charging infrastructure. High-utilization light-duty fleet vehicles—such as Public Works vehicles—are strong candidates for early adoption due to predictable duty cycles. Police vehicles may benefit from EV powertrains as purpose-built models continue to mature. The City currently operates one charging station at the Public Safety facility.

At a high level, hybrid vehicles typically involve an incremental upfront cost of approximately $3,000–$8,000 per vehicle, with annual fuel and maintenance savings on the order of $500–$1,200 per vehicle, resulting in simple payback periods of approximately 3–8 years depending on utilization.

Rooftop Solar Photovoltaics (Tier 3):
Rooftop solar photovoltaic (PV) systems generate electricity on-site and reduce grid electricity purchases at municipal facilities. Planning-level analysis of City Hall indicates a system could generate approximately 547,000 kWh annually, reducing electricity costs by about $29,000 per year. Estimated installation costs are ~$500,000 with federal Direct Pay incentives or ~$700,000 without, resulting in simple payback periods of roughly 17–24 years. Current federal incentives remain available if projects begin construction by July 2026 or are completed by the end of 2027. Due to higher upfront costs and longer payback periods than efficiency measures, rooftop PV is best pursued during roof replacement, major facility upgrades, or when incentives or grant funding are available.

CITY HALL

CITY HALL

Tier 1: Optimize fountain pump schedules; increase server room temperature setpoints; implement daylighting controls in lobby; add window tinting or automated shading on east façade (evaluate applicability to west façade). Upfront costs range from $0 to approximately $2,800, with paybacks from <1 year to ~4 years and annual savings of $3,100 to nearly $6,500.

Tier 3: Comprehensive retro-commissioning aligned with long-term asset optimization; estimated annual savings of $12,000–$18,000 with longer payback.

PUBLIC SAFETY

POLICE DEPARTMENT

Police Department Headquarters (PD HQ) Tier 1: Increase server room temperature setpoints; air seal doors; add controls to sally port exhaust (estimated $500–$1,000 cost; ~ $700 annual savings). Combined Tier 1 savings ~ $1,500 annually.

Police Safety and Training Center (PSTC) Tier 1: Schedule HVAC in mechanical and server rooms; reset vestibule heater controls (up to ~ $400 annual savings).

Both PD HQ & PSTC Tier 3: HVAC setpoint commissioning at Headquarters; demand-controlled ventilation (DCV) commissioning and door weatherization at PSTC (potential combined annual savings ~$17,000–$25,000). Electric motorcycles may be evaluated for select use; preliminary payback ~11 years (includes one battery replacement), with payback potentially improving as battery costs decline.

FIRE DEPARTMENT

Tier 1: Commission thermostat settings; optimize electric heater operational settings; add bay door interlock controls; address thermostat obstructions at Fire Stations 6–8. Estimated annual savings ~ $1,000 per station (facility-dependent).

Tier 2: Window tinting; commissioning occupancy sensors; high-volume, low-speed (HVLS) fans where absent (primarily Fire Stations 1–5). Idaho Power incentives up to $2,000 per HVLS fan; estimated payback <3 years with improved comfort.

PARKS AND RECREATION

PARKS AND RECREATION MAINTENANCE FACILITY

Tier 1: Commission thermostat settings; verify electric and gas heater operation (combined upfront costs under $200; payback <1 year).

Tier 2: Smart power strips; interlock controls for maintenance bays (estimated $550–$1,100; annual savings up to ~$240).

Tier 3: DCV commissioning; HVLS fans in shop spaces.

RECREATION FACILITIES: HOMECOURT, CLUBHOUSE, AND POOL

Homecourt Tier 1: Thermostat commissioning; door weatherstripping (up to ~$1,350 annual savings). Meter consolidation: consolidate seven meters to one to reduce customer and demand charges; potential savings ~ $10,000 annually.

Homecourt Tier 2: Bay interlocks; rigid foam coverings for roll-top doors; DCV on HVAC (potential savings > $3,000 annually).

Pool Tier 1: Winterization during unoccupied periods; thermostat commissioning; pool cover at night; monitor electric heater savings; reduce pool heating in fall (up to ~$13,000 annual savings).

Pool Tier 2: Solar water heating (estimated $50,000–$75,000) with potential savings ~ $10,000 annually.

STREETLIGHTS

Continue conversion from HPS to LED fixtures in coordination with Idaho Power incentives. The City has already made meaningful progress in transitioning streetlighting to LED, and the recommended strategy refines the timing and sequencing of replacements to maximize financial alignment rather than change direction. With an investment of approximately $220,000 per year, each annual phase of replacements is projected to reduce electricity costs by about $10,200, resulting in more than $70,000 in net savings over 20 years after accounting for cumulative replacement costs. Savings would increase further if electricity prices rise faster than the assumed 3% annual escalation rate.

ENTERPRISE UTILITIES: TIER 1 - 3 SAVINGS OPPORTUNITIES

The Enterprise Utilities Reporting Category includes Water Wells, the WRRF (including lift stations), and supporting buildings (Wastewater Administration and Operations Buildings and the Water Administration Building). These assets operate continuously, are process-driven, and are highly electricity-intensive, with demand charges representing a significant share of utility costs. Financial leverage is concentrated in operational discipline, demand management, pumping strategy, and capital-cycle planning rather than isolated building retrofits.

Within this category, the greatest near-term financial opportunity lies in water well demand mitigation and pumping optimization, while the WRRF represents the City's largest long-term energy exposure due to its scale and constant process loads.

Opportunities are summarized below and organized by Tier to reflect implementation timing and capital intensity. Facility audit summaries, including system assessments and preliminary energy savings opportunities, are provided in ***Appendix D****. Facilities Audit Summaries and Heat Maps.* **Appendix F** provides in-depth technical analysis of select high-impact ECMs, including quantified savings estimates, system-level opportunities, and implementation pathways that build on and extend the facility-level findings identified in the audit summaries. These ECMs are not included in the **Appendix E** prioritization matrix because they require more detailed energy and cost data to develop consistent financial metrics.

WASTEWATER UTILITY

WRRF – LARGEST ENERGY ASSET

The WRRF is the City's largest single energy consumer. Energy intensity is driven by 24/7 treatment processes, aeration, pumping, and process equipment rather than space conditioning. Performance is consistent with national benchmarks; measures focus on incremental optimization, resilience, and cost control.

Tier 1: Operational consistency and motor efficiency standards embedded into replacement practices.

Tier 2: Supervisory Control and Data Acquisition/Energy Management System (SCADA/EMS) based monitoring and control refinement to align process operations with energy efficiency while maintaining reliability and regulatory compliance.

Tier 3: Capital-cycle system integration and major equipment upgrades aligned with asset replacement planning. Because of the WRRF's scale, modest percentage improvements can produce significant lifecycle savings.

WASTEWATER ADMINISTRATION & OPERATIONS BUILDINGS – MODERATE, OPERATIONAL GAINS

Tier 1: HVAC scheduling alignment, ventilation optimization, domestic hot water control, elimination of unnecessary runtime.

Tier 2: Envelope performance verification and operator training to sustain control effectiveness.

Tier 3: Expanded EMS integration, submetering, lighting modernization, and energy recovery at replacement; incorporate into planned capital cycles.

WATER UTILITY

WATER WELLS – HIGHEST RECURRING FINANCIAL LEVERAGE

The water well system presents the City's most immediate opportunity for recurring cost reduction. Because demand charges are triggered by the single highest interval demand within a billing cycle, brief operational spikes can materially increase monthly costs. Modest reductions in peak demand can therefore produce meaningful and recurring annual savings.

Tier 1: Operational alignment and standardized efficiency practices, including motor standards, HVAC control corrections, lighting improvements, and reduction of continuous electrical loads such as replacing electric resistance generator block heaters with heat pump-assisted systems embedded into routine maintenance and replacement protocols.

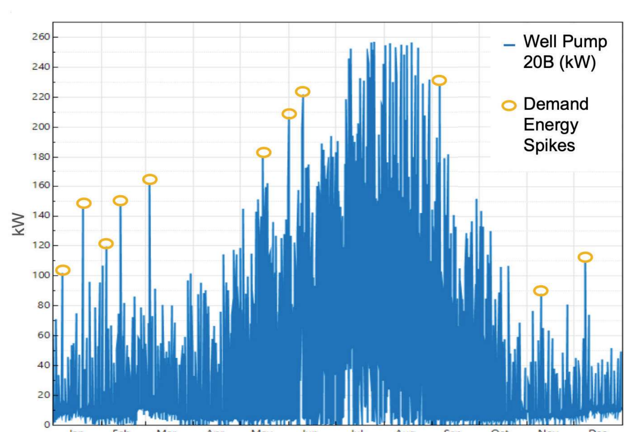
Tier 2: Strengthen monitoring and SCADA-informed performance review to improve visibility into demand patterns and abnormal consumption. In addition, a comprehensive data-driven program to identify and eliminate leaks in the system will result in consistent energy savings.

Tier 3: Highest leverage measures including strategic use of water storage tanks to shift pumping away from peak periods, refinement of pump sequencing, targeted optimization of high-demand wells to materially reduce annual demand charges, and the use of high-efficiency heat pump block heaters for large emergency generators.

ECM HIGHLIGHT:

Reduce Well 20B Demand Charge Exposure

Well 20B experiences periodic demand spikes that disproportionately increase annual demand charges. Adjustments to pump sequencing, pressure setpoints, and control strategies could reduce peak demand, generating recurring savings while reducing stress on pumps and electrical equipment.



WATER ADMINISTRATION BUILDING – INCREMENTAL IMPROVEMENT OPPORTUNITY

Tier 1: HVAC schedule alignment, ventilation control refinement, domestic hot water optimization.

Tier 2: Envelope verification and staff training to sustain EMS utilization.

Tier 3: Retro-commissioning or energy recovery at replacement aligned with capital cycles. Savings impact is incremental relative to system-level water and wastewater assets.

VI. STRATEGY ROADMAP

This section organizes the City of Meridian's prioritized ECMs into a phased implementation roadmap. Measures are grouped into three tiers: operational improvements, targeted efficiency investments, and capital-cycle upgrades.

Tables 3–5 summarize the evaluated actions, estimated investment ranges, and potential savings across Citywide operations, General Government facilities, and Enterprise Utilities, respectively. A phased implementation timeline is proposed, with approximate implementation years shown in parentheses. These tables provide a practical framework for implementation planning and budget discussions. Several high-impact measures—including solar PV, GSHPs, and fleet electrification (including hybrid vehicles)—were analyzed at a representative project scale to demonstrate feasibility, cost, and potential benefits. These results are not extrapolated across all applicable facilities or assets. Accordingly, the long-term energy, cost savings, and greenhouse gas reduction potential presented in this plan should be considered conservative. For example, a single GSHP project evaluated in this study for City Hall indicates lifecycle savings on the order of ~$4M, illustrating the scale of opportunity when applied more broadly. A comprehensive assessment of full Citywide potential would require additional site-specific analysis, capital planning alignment, and expanded modeling.

Implementation pace depends on annual funding levels. Lower funding prioritizes Tier 1 operational measures, moderate funding enables broader Tier 2 deployment, and higher sustained investment accelerates Tier 3 projects aligned with capital replacement planning. These investments reduce long-term operating costs through improved efficiency and system performance.

Investment ranges presented for ECMs reflect capital and implementation costs and do not include ongoing staff time or internal labor. An exception is made for near-term operational energy management activities, which are supported by an estimated annual investment of approximately $40,000. This funding may be allocated across part-time staff capacity (e.g., ~0.5 FTE), energy management software, and technical support to sustain ongoing performance improvements. This flexible approach enables ongoing controls optimization, (e.g., adjusting schedules and setpoints) utility monitoring, and dashboard management without requiring additional full-time staffing.

Table 3. Citywide Strategy Roadmap & Phased Timeline

Scope	Investment Range	Estimated Annual Savings	Notes
Tier 1 ECMs (2027). LED bulb replacements, BAS optimization, energy dashboard development and management, utility bill review, operational best practices, demand management; annual fleet assessments; draft project owner requirements (adopt in 2028)	$0k–$40k/year (staff time)	$67k+	Supports persistence and expansion of savings
Tier 2 ECMs (2028). Targeted lighting and fixture upgrades, control improvements; smart irrigation feasibility study & implementation	Moderate	**Lighting and controls:** 40–80% energy reduction **Irrigation:** 15–40% water savings; 5–15% pumping energy reduction	Site verification recommended
Tier 3 ECMs (2029+). Implement as feasible: major lighting fixture replacements, controls, Energy Star appliance replacement, rooftop solar PV, GSHPs, fleet transitions	$480k+	$30k+	Enables incentives

Table 4. General Government Strategy Roadmap & Phased Timeline			
Scope	**Investment Range**	**Estimated Annual Savings**	**Notes**
Tier 1 ECMs (2027). HVAC scheduling, minor envelope improvements, pool efficiency	$0–$40k	$27k–$38k	Short paybacks
Tier 2 ECMs (2027). Bay door interlocks, DCV, window tinting	$60k - $109k	$12k–$15k	Strong ROI
Tier 3 ECMs (2029+). Retro-commissioning, major HVAC upgrades, weatherization	$594k - $1.1M	~63k-84k	Align with capital replacement

Table 5. Enterprise Utilities Strategy Roadmap & Phased Timeline			
Scope	**Investment Range**	**Estimated Annual Savings**	**Notes**
Tier 1 ECMs (2027). Operational alignment and energy management, including pump scheduling, HVAC/ventilation optimization, motor efficiency standards embedded in replacement practices, and reduction of unnecessary runtime and continuous electrical loads (e.g., electric resistance heaters)	$1,000+	$80k+	Strong financial leverage
Tier 2 ECMs (2028). SCADA/EMS -based monitoring and control refinement, operator-driven optimization, enhanced performance visibility (including demand patterns and leak detection), and envelope verification with staff training to sustain performance	Implemented as operational conditions warrant	$100k+	Improves resilience
Tier 3 ECMs (2029+). Capital-cycle system integration and major equipment upgrades, including pump sequencing optimization, strategic load shifting (e.g., storage utilization), expanded EMS integration and submetering, lighting modernization, and energy recovery measures aligned with asset replacement planning	$2M–$5M	$500k–$600k	Aligns with capital cycles

Collectively, the roadmap reflects a phased strategy: optimize first, invest second, and integrate improvements with capital replacement cycles. Long-term energy, emissions, and lifecycle financial outcomes are presented in Section VII.

VII. LONG-TERM ENERGY OUTCOMES

This analysis modeled three implementation scenarios using the ECM tiers to evaluate impacts on municipal energy use, emissions, and operating costs through 2044.

IMPLEMENTATION SCENARIOS

All scenarios incorporate projected population growth and associated increases in municipal service demand. The modeled scenarios include:

- **Business-As-Usual.** Continuation of current operating practices without additional ECM implementation. The scenario assumes broader energy system trends, including changes in the regional electricity generation mix and continued adoption of EVs and heat pumps based on technology improvements and federal incentives in place at the time of modeling.
- **Achievable Efficiency.** Implementation of Tier 1 (Immediate) and Tier 2 (Investment-Ready) ECMs by 2029, representing moderate capital investment, operational improvements, and conventional efficiency upgrades.
- **Deep Efficiency.** Implementation of Tier 1–3 ECMs by 2029, including fleet electrification and broader building electrification.

The modeling uses the National Renewable Energy Laboratory's (NREL's) State and Local Planning for Energy (SLOPE) platform and applies the commercial building profile to represent the City's General Government facilities, which consist primarily of office and administrative buildings. Assumptions reflect technology costs and policy conditions at the time of analysis. Policy changes may influence adoption rates but do not materially change the relative comparison between scenarios.

Enterprise Utilities were evaluated separately because SLOPE is designed for commercial buildings. Energy and emissions outcomes for water and wastewater operations were therefore assessed using projected performance and operational optimization opportunities.

Modeled results for the Achievable Efficiency and Deep Efficiency pathways are directional and conservative, as several high-impact measures (e.g., PV), GSHPs), and fleet electrification) were evaluated at a representative project scale and not extrapolated across all applicable assets. As a result, full Citywide energy savings and emissions reduction potential is likely materially higher.

Detailed modeling assumptions, inputs, and forecast results are provided in ***Appendix H**. Meridian SLOPE Analysis & Energy Efficiency Scenario Modeling.*

CITYWIDE & GENERAL GOVERNMENT MODELED ENERGY, EMISSIONS, AND FINANCIAL OUTCOMES

Table 6 summarizes projected energy use, emissions, capital investment requirements, and financial outcomes for General Government facilities under the three implementation scenarios through 2044.

Because Idaho Power's grid is expected to become significantly cleaner under its 2045 clean energy target, emissions decline under all scenarios—even without additional efficiency measures. However, emissions do not reach zero due to continued natural gas use in buildings and gasoline and diesel use in municipal operations.

Table 6. General Government Modeled Energy, Emissions, and Financial Outcomes by Implementation Scenario (2044 Projection includes Population Growth)

Scenario	Total CAPEX	Total Energy Use (2044 MMBTu)	Energy Use Change	Total Emissions (2044 $MTCO_2e$)	Emissions Change	20-Year Cost Savings
Business As Usual	N/A	142,000	20%	2,600	-73%	Baseline
Achievable Efficiency	$134k	136,000	15%	2,100	-79%	$1.6M
Deep Efficiency	$1.7M	69,000	-42%	350	-96%	$3.5M

ENTERPRISE UTILITIES ENERGY AND EMISSIONS OUTLOOK

Enterprise Utilities were not included in the SLOPE financial modeling due to the process-driven nature of their energy use. Preliminary analysis indicates that optimization of wastewater treatment processes and pumping systems could reduce energy intensity by approximately 5–8% in the near term, with additional reductions possible through future equipment upgrades and control improvements. Assuming the same percentage of population and energy demand increases from the General Government SLOPE Analysis, the table below shows the potential avoided energy use and emissions over a 20-year period.

These operational improvements would reduce electricity consumption and associated emissions while improving system efficiency.

Refining the full energy and financial potential of Enterprise Utilities efficiency measures will require process-level feasibility studies, additional submetering, and more detailed operational data. These actions are recommended as part of the City's next phase of energy management planning.

Table 7. Enterprise Utilities Projected Energy and Emissions Outcomes by Implementation Scenario (20-Year Projections include Population Growth)

Scenario	Annual Energy Avoided (kBTu)	Avoided Energy (kBTu/20 years)	Annual Avoided Emissions ($MTCO_2e$)	Avoided Emissions ($MTCO_2e$/20 years)
Business As Usual	Baseline			
Achievable Efficiency	6,503,750	130,075,000	592	11,844
Deep Efficiency	21,433,925	428,678,500	1,951	39,010

VIII. CONCLUSION AND NEXT STEPS

This Energy Strategy Plan provides a practical framework for improving energy efficiency and managing energy costs across City operations. Based on the analysis presented, the recommended next step is to proceed with implementation of Tier 1 and Tier 2 measures through existing budget processes while strengthening internal energy management practices to sustain results.

A key component of this effort is establishing consistent, data-driven monitoring through energy management dashboards and reporting tools—integrating utility data, BAS inputs, and operational metrics—to enable ongoing tracking of energy use, costs, and performance across facilities. These tools support identification of anomalies, verification of savings, and informed decision-making.

Additional actions beyond these measures can be evaluated as priorities, conditions, and funding opportunities evolve. Sustaining these operational improvements requires periodic monitoring and follow-through, supported by modest ongoing investment in staff capacity, these tools and analytical capabilities, and technical support, to maintain and build on performance gains over time.

Modeled results for the Achievable Efficiency and Deep Efficiency pathways are directional and conservative, as several high-impact measures (e.g., solar photovoltaic (PV), ground source heat pumps (GSHPs), and fleet electrification) were evaluated at a representative project scale and not extrapolated across all applicable assets. As a result, full Citywide energy savings and emissions reduction potential is likely materially higher.

APPENDICES

Appendix A. City of Meridian Overall Energy Analysis

Appendix B. GHG Inventory Documentation

Appendix C. Peer Benchmarking

Appendix D. Facilities Audit Summaries and Heat Maps

Appendix E. Energy Conservation Measure (ECM) Priority Matrix

Appendix F. ECM Technical Analysis and Supporting Calculations

Appendix G. Screening Logic for Non-Viable and Deferred ECMs

Appendix H. Meridian SLOPE Analysis & Energy Efficiency Scenario Modeling