

Apex Sustainability Action Plan

VERSION: 2024



APEX
NORTH CAROLINA

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Executive Summary

The Town of Apex has experienced tremendous growth over the past 25 years. This growth has led the Town Council to focus on ways the Town can be a better steward of natural resources and grow in responsible, sustainable ways. The purpose of the Apex Sustainability Action Plan (The SAP) is to communicate the Town's short-term goals and strategies that reflect the Town's commitment to sustainability, resilience, and environmental stewardship within government operations. The SAP outlines action steps for the next five years and key performance indicators (KPIs) to measure progress on the defined initiatives.

The SAP was developed over the course of several years with the participation of nearly every Town department. Several Town departments were identified as key stakeholders for the SAP's initial release, and directors and their selected staff members were integral to creating this Plan. Interdepartmental effort ensured staff could contribute their knowledge and expertise towards collective actions and strategies. Staff completed sustainability education sessions, assessed the Town's past and current sustainability-related initiatives, and then designed and prioritized actions the Town could undertake in the coming years. Subsequent updates will incorporate data collected from previous years and include participation from all Town departments to ensure inclusivity.

The SAP is essential for the Town of Apex to achieve its vision and mission. Sustainability efforts will be more measurable, actionable, and aligned with industry best practices, market trends, and the Town's strategic goals. Implementation success is a key consideration in the SAP, and each goal and strategy include clearly defined metrics, roles, and action steps. The SAP's actions and strategies address the overarching categories of Facilities & Energy, Clean Mobility, and Waste Management. By incorporating effective sustainability measures into daily municipal operations, the Town can maximize efficiencies, reduce waste, and enhance the Town's operations and services for the public.

Introduction

The Town of Apex made a commitment to sustainability and environmental leadership in its Fiscal Year (FY) 2022-2023 Strategic Plan. The Town seeks to continue performing daily government operations while reducing greenhouse gas emissions, using energy efficiently in its facilities, generating renewable energy, and limiting the Town's overall impact on the natural environment. The first Apex Sustainability Action Plan (the SAP) outlines various sustainable efforts for different departments and identifies the actions and strategies for the Town to be a sustainability leader in the community. The SAP identifies specific actions for Town staff in pursuit of the Town's strategic plan Environmental Leadership objective.

Currently, the Town is prioritizing projects in three main initiative areas:



Facilities & Energy

Town facilities require substantial resources and energy to operate daily and to meet the residents' service expectations. These initiatives will allow the Town to better understand these energy expenditures and resources and develop efficiency strategies and sustainable sources.



Clean Mobility

The Town operates a fleet of vehicles and equipment that enable each department to perform their needed job functions effectively. These initiatives will allow the town to analyze and act upon fleet utilization, fuel consumption, fleet right sizing, and its expanded use of hybrid, Electric Vehicles (EV), alternative fuel vehicles, and the implementation of EV charging infrastructure.



Environmental Impact and Waste Management

Despite efforts to limit waste, the Town continues to produce waste from many sources. This section explores how the Town can better communicate ways to recycle, limit landfill waste, and explore composting to divert Town waste. This section discusses leveraging bulk purchasing and central distribution of standardized products to consolidate and limit deliveries.

These initiatives encourage a sustainable community, one that meets present-day needs while considering future generations' ability to meet their own needs. Because the Town's sustainability goals and initiatives are all-inclusive, Town departments are prioritizing sustainable projects and operations. Designated staff from each department is making progress towards sustainable operations by implementing operating procedures and providing relevant environmental project data. The Sustainability staff, under the direction of the Budget & Performance Management (BPM) Department, works with members from these Departments to help identify project areas, plans, and timelines to promote a municipal culture of environmentally responsible leadership.

The BPM team collaborated with other Town department employees and consultants to identify action steps that will contribute to the Town's intended goals:

- Collect, gather, and analyze relevant data to determine the Town's energy capacity and carbon footprint
- Reduce the Town's operational energy load
- Decrease total greenhouse gasses (GHGs) emissions generated by the Town
- Reduce waste and product consumption within Town facilities

- Remain fiscally responsible and prioritize return on investments (ROI)
- Adhere to the Town's legal authority when developing new policies and strategies

Action steps are prioritized to reflect the Town Council's vision of a sustainable and resilient government. Key performance indicators (KPIs) will measure departmental and Town-wide progress.

To communicate the progress of the initiative actions in the sustainability plan, regular updates will address:

- Foundational items (initiatives that must occur before other steps can be taken)
- Impact on community and complexity of various actions
- Implementation status (completed, ongoing, starting, planning, delayed, or removed)
- Performance reporting (progress towards targets and overall goals)
- Emerging opportunities to consider
- Challenges with items and suggestions to overcome those challenges
- Annual work plans for actions and initiatives
- Council policy priorities
- Opportunities to collaborate with community partners

The Sustainability staff, along with other Budget & Performance Management staff, will develop tools to ensure tracking is maintained easily and completed bi-annually. In addition to the KPIs outlined in the SAP, the Town will launch public-facing dashboards on the Town's website to easily track, monitor, and share progress. The dashboards will link to relevant KPIs and databases to show the Town's progress with each action item during each fiscal year.

Background

In 2019, the Apex Town Council adopted the [100% Clean Energy Resolution](#) which endorses the goal of transitioning Town operations to 80% clean energy by 2035 and 100% clean energy by 2050. As stated in the Resolution, Apex's Town Council supports proactive energy conservation and natural resource protection, acknowledges the harmful consequences of climate change, and promotes continued efforts towards sustainability and reduced greenhouse gas (GHG) emissions. This aligns with the Town Council's strategic goal of Environmental Leadership: a commitment to sustaining natural resources and environmental well-being.

"Clean energy" traditionally means energy derived from renewable, zero-emission sources and energy saved through energy efficiency measures. The clean energy umbrella includes (in order of priority) renewable energy sources and nuclear energy (per NC State Senate Bill 678), with fossil fuel consumption with carbon-capture technology providing additional means to reach net zero emission goals. Renewable energy is derived from natural processes that regenerate over short periods of time and cannot be depleted. Common renewable energy resources include solar, wind, biomass, geothermal, and hydropower. While nuclear energy produces radioactive waste, it does not produce a significant amount of carbon emitting gasses, and legislation related to North Carolina's Renewable Energy and Energy Efficiency Portfolio Standard (REPS) was passed in July 2023 to identify it as a clean energy source.

While Apex owns and operates its own electric utility and distributes energy to its residents, the Town is not a power generator and does not produce its own electricity to distribute to residents and businesses. As a member of North Carolina Eastern Municipal Power Agency (NCEMPA), the Town relies on Duke Energy Progress (DEP) to produce electricity for residents, but this electricity is derived from numerous energy resources. Achieving a clean energy future relies heavily upon DEP's decisions and the energy resource mix offered to the Town. NCEMPA has a full-requirements contract with DEP, so NCEMPA's energy resource mix is similar to DEP's resource mix.

DEP has established their own carbon neutrality plans that is detailed in their [Carbon Plan and Integrated Resource Plan \(CPIRP\)](#). The CPIRP establishes the following goals for DEP:

- Reducing carbon emissions by at least 50% from electric generation by 2030
- Reducing carbon emissions by at least 80% from electric generation by 2040
- Achieving net-zero carbon emissions from electricity generation by 2050
- Achieving 50% reduction for Scope 2 and certain Scope 3 upstream and downstream emissions by 2035
- Retiring all coal plants by 2035
- Exploring and investing in clean energy sources such as solar, wind, and other zero-emission technologies (hydrogen and advanced nuclear)

As of January 2024, DEP reports that it has reduced carbon emissions by more than 44% since 2005 and retired 56 coal plants. According to the U.S. Energy Information Administration, fossil fuels make up about 61% of national utility-scale electricity generation as of 2021. Based on the 2022 Energy Resource Mix for NCEMPA, 51% of the electricity that NCEMPA distributes is generated by fossil fuels (See [Appendix 2](#) for 2022 Energy Resource Mix from Electricities).

Due to Apex not being a traditional power generator, but rather a distributor, the Town's current goals and Clean Energy Resolution are closely tied to what DEP is able to achieve in their plans and goals. As such, the Town will need to make the appropriate decisions and investments to ensure that its energy production or consumption will be enough to offset the amounts that DEP is unable to meet in based on their own projections.

Actions: Implementing & Tracking

Sustainability staff have gathered data sources to analyze and determine baselines for specific areas related to energy use, carbon emissions, waste collection and diversion, natural gas utilization, and water consumption. BPM staff has used this data to create public facing dashboards showing usage of these categories over time. However, in-depth data analysis has yet to be performed and will be the first foundational step of each initiative listed in this plan. The data will be processed to determine where the Town currently is and to forecast anticipated resources usage, both without any changes and with the action items implemented. After this analysis is completed, actions' investment costs can be evaluated more accurately, and subsequent Return on Investment (ROI) analyses can then be evaluated. For current projects, programs, and actions, in-depth ROI analyses will begin in the first half of FY 2024-25.

The SAP requires collaboration across Town departments and services. Interviews with departmental staff were conducted in 2020, and selected department directors were interviewed in 2023. Interviews provided insight into different perspectives, concerns, and ideas for future sustainability actions within Town operations. Staff perspectives and ideas are factored into the current and future strategies of sustainability action steps, project resources, and initiation processes.

The following sections delivers a brief overview for each initiative (Facilities & Energy, Clean Mobility, and Waste Management). Each section description outlines the initiative's scope, the initiative's significance, and current progress. The planned actions identified by department directors and staff are in a table for each initiative following the description. The table identifies the lead department, estimated timeline, department priority, cost range estimates, and one of the following categories.

- **Focus** – Which area does the action focuses on?
- **Action** – What direct action will take place? (Further details after the table)
- **Lead Department** – Which Department will lead the effort or be most affected by the action?
- **Supporting Departments** – Which department(s) may be affected or are supporting the Lead Department's action?
- **Foundational Item** – Must this action be completed before others can be started?
- **Department Priority** – Is the action tied to a priority in the lead department's strategic plan?
- **Stage** – Is the project Ongoing, Starting, or Planning?
- **Anticipated Start** – If the project hasn't started yet, in which fiscal year and quarter is it expected to start?
- **Estimated Cost** – Is this project expected to have a Low (<\$50,000), Medium (\$50,000-100,000), or High (>\$100,000) cost?
 - Due to costs often changing, approximate values help establish expected ranges, so actions can still fall within expected ranges even if there are shortages or inflation. Costs may be updated after specific items are identified for procurement and a ROI is calculated.

Action steps' timelines and directions may shift due to variables including, but not limited to: staff capacity, estimated action cost, eligible funding opportunities, supply availability, and Town Council directed policies. External factors may affect action items including climate change impacts and Duke Energy Progress regulations, such as the Carbon Plan Integrated Resource Plan (CPIRP).



Significance

Energy and utility consumption at Town facilities is a significant contributor to the Town’s total greenhouse gas emissions and represents a significant cost of the annual operating budget. These utilities are crucial for heating and cooling facilities, illuminating structures and streets, operating water distribution systems, managing wastewater treatment, and supplying water for various purposes such as building use, landscaping, and parks. For the use of this document, “facilities” will be defined as any climate controlled enclosed building, installation, structure, or property (including fixtures) owned or operated by the Town, that utilizes energy and water utilities.

Reducing utility costs frees up resources for essential Town services and reduces the environmental impact. Because the most cost-effective unit of energy or water is the one that goes unused, the Town has numerous opportunities to decrease costs and consumption through utility conservation and efficiency investments. Modern renewable energy technologies, such as solar photovoltaic (PV) systems, while still requiring a significant capital investment, continue to become more financially accessible and can lower a facility’s annual energy consumption.

With escalating utility expenses and increased support from state and federal incentives, renewable energy solutions are becoming more appealing. Furthermore, integrating innovative technologies can address community needs more effectively, identify building performance and issues, reduce the environmental footprint, lower overall operating costs, and improve functionality for staff and the public.

Current Planning & Progress

The Town has made substantial progress in implementing energy efficiency strategies across its facilities. Building automation has been deployed to currently optimize the heating, ventilation, and air conditioning (HVAC) systems and increase operational efficiency at fifteen Town facilities thus far (including new facilities at Mason Street and Public Safety Station 6). HVAC equipment replacements prioritize environmentally friendly refrigerants, as seen with the Halle Cultural Arts Center update, with future replacements following suit. The Town has also replaced valves in all facility toilets with low-flow flush valves in order to reduce water consumption. Facility staff is converting facility lighting to LEDs as needed when current bulbs reach the end of their life cycle. Additionally, occupancy sensors have been installed at the Public Works Operations building and Town Hall as renovations arise to further conserve energy and collect data.

Solar photovoltaic (PV) panel arrays are currently installed on ten Town facilities, and an assessment was conducted by Optima Engineering to determine the feasibility of adding additional solar collection systems on to 38 other Town structures. Under Council’s direction, Town staff utilized the information from the assessment to develop a three-year phased plan that would add arrays to eleven facilities that were marked as “Excellent” or “Satisfactory” in the assessment (See [Appendix 3](#)). “Solar readiness” will be a factor in planning for future Town facilities and will be included into design plans. A priority for effective implementation is coordination among departments, particularly in tracking and analyzing solar energy generation and PV arrays.

The Town is exploring expanding its EV charging infrastructure. The Parks, Recreation, & Cultural Resources Department (PRCR) is considering EV charging infrastructure at Pleasant Park as the Town updates its charging

policies. The Transportation & Infrastructure Department is engaged in discussions with developers about integrating green infrastructure, potentially incorporating EV charging stations in parking lots.

Ongoing and Continuous

Solar Energy Assessment

The Town began installing solar photovoltaic (PV) arrays on one Town facility (Public Works Operations) in 2018 and installed arrays on nine more facilities in 2020. Sustainability staff and Facility staff is currently tracking and will provide monthly analysis of solar power generation to determine the efficiency and effectiveness of installations and monitor cost savings. As of February 2024, Town staff finalized and presented a solar PV Assessment for Town Council. This assessment detailed the characteristics of current facilities to determine the location and the return on investment of future PV projects. Several facilities were identified as “excellent” candidates for solar arrays (see [Appendix 4](#)), and of that list, Council indicated a group of facilities to prioritize installing solar arrays on including, but not limited to, Pleasant Park facilities and Electric Utility Department facilities. Further analysis of the assessment and the Town’s current rate structure determined that there would not be an adequate return on investment if funded solely through the Town’s General Fund. Sustainability staff will coordinate with Project Management and Planning staff to ensure that construction standards for new Town facilities and facility renovations will include solar readiness, where appropriate and feasible, to increase the Town’s clean energy production.

Water Conservation through Natural Landscape Design

Parks, Recreation & Cultural Resources (PRCR) has identified and assessed areas to eliminate or reduce irrigation where feasible and install natural landscape options to conserve water and other resources (irrigation plumbing, maintenance, etc.). PRCR has researched and implemented landscape design that utilizes native plants and low or “no-water” landscaping for Town properties that are currently maintained by PRCR staff. The Parks, Recreation, Greenways, and Open Space Master Plan includes initiatives to “improve ecological value of parks through native vegetation, tree canopy protections, and protection of creeks and wetland areas.” Sustainability staff will partner with PRCR and other departments, such as Facility Services and Planning, to determine specifications for future landscape projects to ensure long-term environmental sustainability.

LED Street and Outdoor Lighting

The Town owns and maintains most street and outdoor lighting in Apex. Electric Department staff are gradually transitioning existing street and outdoor lighting fixtures to more efficient light-emitting diodes (LEDs). Converting to LED lights reduces energy consumption and improves illumination and safety. LED lamps can last up to 70,000 hours compared to traditional high-pressure sodium lamps lasting only 24,000 hours, and generally LED lights require less maintenance and fewer replacements.

High-Efficiency Inventory Replacement

Facility staff is overseeing and installing energy efficient inventory throughout all facilities as needed. As stated previously, the Town has installed low-flow flush valves in facility toilets to reduce water consumption. Facility staff continues to convert facility lighting to LEDs as needed when current bulbs reach the end of their life cycle. Smart technology is used in several Town facilities for HVAC maintenance and equipment has been replaced to prioritize and utilize environmentally friendly refrigerants. Continued improvements will be implemented after

additional audits and assessments are conducted. Smart technology and data software will be used to determine other areas that require replacement and can reduce consumption.

Energy Consumption & Efficiency Audits

In September 2022, three Town facilities (Town Hall, Public Safety Station #3, and the John M. Brown Community Center) were piloted and received Level 2 Energy Audits using the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) standards. These audits assessed and identified the impact and payback period of proposed energy efficiency improvements. Other high-use Town buildings will be audited, and their operations and equipment will be assessed using ASHRAE standards. The success of pilot facilities' upgrades, staff capacity, and budget will determine future recommendations and timelines.

FY 2024-25

Greenhouse Gas Inventory

A greenhouse gas (GHG) inventory is a systematic and comprehensive accounting of the total greenhouse gas emissions produced by a specific entity. The Town of Apex's GHG inventory will measure the energy consumed by Town operations over a fiscal year and the impact to the environment. Sustainability staff will identify key emission sources, such as facility energy consumption, fleet transportation, waste management, and other potential means. Energy management software developed by Enpira technologies (see [Appendix 7](#)) will provide analysis based on billing and meter data to inform energy consumption data for Town facilities. Data collection will rely on existing records, such as utility bills, transportation data, and municipal waste reports. Previous Sustainability staff initiated an Inventory project, however, the previous efforts from former staff members will need to be validated to ensure accurate findings and quality assurance. Tools available to complete this include Clear Path, an emissions management software suite from the International Council for Local Environmental Initiatives (ICLEI-USA). Sustainability staff will also coordinate with external partners that provide services more directly dedicated to performing these inventories, for validation and accuracy. Sustainability Staff will be partnering with the NC Clean Energy Technology Center to conduct the Inventory. This Inventory will help the Town gain valuable insights into its emissions profile, enable informed decision-making on future priorities, and identify potential emission reduction strategies within its limited resources.

Energy Efficiency Standards in New Facility Construction

Due to new Town facilities being constructed, the Town will create and enforce sustainable standards for future Town facilities. These standards will ensure that energy efficient lighting, appliances, and equipment are installed during construction to lower energy consumption and operational costs. When designing future facilities, the Town will incorporate solar power and other renewable energy sources where appropriate, such as charging stations and low-voltage lighting. Sustainability staff will coordinate with the Town's Capital Project Management staff along with Facilities and Building Inspections staff to identify measures that should be implemented for each project.

Table 1: Facilities & Energy Actions

These facilities and energy actions are currently planned or are being implemented:

Focus	Action Item	Lead Department	Supporting Department(s)	Foundational Item	Department Priority	Stage	FY Start	Anticipated Start	Estimated Cost
Data Analysis	Greenhouse Gas (GHG) Inventory	Budget & Performance Management (Sustainability)	Public Works	Yes	Yes	Planning	FY 24-25	Qtr 2	Low <\$50,000
Renewable Energy	Solar Energy Assessment	Public Works (Facility Services)	Budget & Performance Management (Sustainability)	Yes	Yes	Completed	FY 23-24	Completed	Low <\$50,000
Energy	High-Efficiency Inventory Replacement	Public Works (Facility Services)	N/A	No	Yes	Ongoing	FY 22-23	Ongoing	High >\$100,000
Water	Water Conservation Landscape Design	Parks, Recreation, & Cultural Resources	N/A	No	No	Ongoing	Ongoing	Ongoing	Med \$50,000-\$100,000
Policy	Energy Efficiency Standards in Town-Owned Facility Construction	Administration (Capital Projects)	Public Works (Facility Services) / Building Inspections	No	No	Ongoing	FY 24-25	Ongoing	Low <\$50,000
Facilities	Energy Consumption & Efficiency Audits	Budget & Performance Management (Sustainability)	Public Works (Facility Services)	Yes	No	Ongoing	FY 22-23	N/A	Low <\$50,000
Lighting	LED Street and Outdoor Lighting	Electric	N/A	No	Yes	Ongoing	FY 21-22	Ongoing	High >\$100,000

**Foundational Item: Must this action be completed before others can be started?*

**Department priority: Is the action is tied to a priority in the lead department's strategic plan?*

Key Performance Indicators & Target Areas

To measure the carbon reduction impact of facility initiatives, staff will monitor the baseline and annual changes in GHG inventories and energy consumption (per facility and per square foot). Evaluating the energy supply portfolio and clean energy production enables the Town to gauge progress towards reliance on cleaner sources.

Tracking Key Performance Indicators (KPIs) is crucial for ongoing and future projects because it provides continuous monitoring, analysis, and strategic decision-making to optimize resource allocation, improve energy efficiency, reduce environmental impact, and ensure long-term sustainability. The greenhouse gas (GHG) inventory specifically helps identify key emission sources and devise reduction strategies that align with the Town's commitment to minimizing its environmental footprint.

The following KPIs will establish the Town's baseline and measure progress for facilities and energy initiatives:

1. Return on investment
2. Greenhouse Gas (GHG) Inventory and the GHG footprint of facilities
3. Peak kilowatts (kW) for per billing cycle
4. Kilowatt-hours (kWh) for each conditioned facility
5. Clean Energy Production by Solar Panels
6. Water Consumption per department/facility

For more detailed descriptions of the methodology behind these KPIs, see [Appendix 6](#).

Significance

The Town uses various equipment and vehicles to perform the Town's daily operations. These include light-duty and heavy-duty vehicles, police cruisers, pickup trucks, dump trucks, refuse haulers, fire engines, lawn maintenance equipment, and other heavy machinery for construction and waste management. Fuel is a substantial annual operating fleet cost, and most of the Town's equipment and vehicles requires unleaded and diesel fuels. External factors, such as inflation and supply availability, can increase and destabilize fuel prices.

Hybrid vehicles and those powered by alternative fuels increase fuel efficiency, enabling the Town to uphold its service standards. Although such vehicles have a higher purchase price, reducing the fleet's fuel use has long-term benefits because of decreased vehicle emissions. New vehicles come with improved warranties that allow time for training of the Town's Fleet technicians on new EV and hybrid systems.

As the Town's expands, demand for services will be heightened and will necessitate a growing fleet. A larger fleet increases fuel consumption and associated costs, so effectively and efficiently managing fuel consumption is crucial for the Town's budget to remain fiscal responsible.

Current Planning & Progress

The Town has advanced its Clean Mobility Initiative through multifaceted endeavors since 2014. With funding from a NC Department of Transportation grant, the Town procured three all-electric Nissan Leaf vehicles and one plug-in range-extended hybrid Chevrolet Volt, and the Town installed two dual Level 2 EV chargers at Town Hall and one dual Level 2 EV charger and one Level 3 Direct Current Fast Charger (DCFC) at the Saunders Street Parking Lot. In 2021, two dual-port Level 2 EV charging stations were installed at the Public Works campus, along with an additional dual-port charging station at the Electric Utility's facility. Further, a Vehicle Assessment was initiated in September 2021 to develop a 10-year plan to "right-size" the Town fleet, evaluate vehicle life cycles and replacement, approach efficiency proactively, in adherence to best practices. The priority of the Fleet Manager and the Division of Fleet Services is to re-evaluate and validate current fleet data to ensure that the Assessment will be accurate and that information will be collected correctly. Additionally, leveraging an Air Quality Improvement Grant, the Town retrofitted municipal vehicles with smart electric power take-off units to proactively reduce emissions and enhance environmental sustainability.

The Planning Department is providing and partnering with programs associated with long-range transit, such as establishing GoApex's bus Route 1, with additional Routes being planned. While the program is operated by an external partner, public transit options are pivotal in reducing environmental impacts, ensuring vital accessibility to diverse groups, and promoting social equity. All of which aligns with the Town's Sustainability objectives.

The Transportation & Infrastructure Department is developing plans and repairing Town streets and roads, via landscaping and green infrastructure, to complement the broader strategy of Clean Mobility. Also, the Parks, Recreation, & Cultural Resources Department (PRCR) is piloting alternative fuel equipment and driving EV and Hybrid vehicles which highlights comprehensive approach to achieving Clean Mobility.

Ongoing and Continuous

Telematic Fleet Technology

Telematic technology is used to monitor cars, trucks, and equipment by using GPS technology and incorporating the manufacturers on board diagnostic systems to allow for proper fleet optimization, compliance reporting, and safety initiatives. Integrating telematic data into a fleet management and maintenance system allows fleet staff to monitor and analyze vehicle and driver performance remotely which facilitates accurate data analysis. Fleet Services staff is currently completing installation of GeoTab telematic devices on all fleet vehicles. The installation of telematics devices is scheduled to be completed by the end of the current fiscal year (FY 24). Once installations are completed it will allow the Division of Fleet services to produce accurate and actionable data to be used as it moves towards proper fleet management and sustainability goals. Data acquired through the use of vehicle telemetry are pivotal to the implementation of Electric vehicles, fleet rightsizing, and the placement of charging infrastructure.

Right-Size Fleet Assessment

Fleet rightsizing is a management practice that can assist fleet staff maintain an ideal vehicle inventory based on the evaluation of vehicle size, utilization, and needed job functions. By evaluating fleet size and fleet composition staff can optimize vehicle use, conserve fuel, reduce emissions and save money. The Division of Fleet Services will evaluate the existing vehicle fleet to justify eliminating or reassigning underutilized vehicles and equipment. Data obtained for fleet right-sizing will also be used to determine the size and location of communal vehicle pools along with ensuring proper procurement oversight and fleet standardization is occurring. Fleet right-sizing is an essential portion of the Sustainability Action Plan as it has the potential to reduce greenhouse gas emissions drastically in a fiscally responsible manner.

Electric & Alternative Fuel Equipment

PRCR staff continues to research and identify electric and alternative fuel equipment, such as lawnmowers and leaf blowers, for daily operations. They are also introducing new equipment to reduce usage of traditional fuels and mixed fuels. Sustainability staff will work with PRCR staff to determine results and costs of operating the new equipment to better inform equipment purchases and standards development. Sustainability Staff and the Division of Fleet Services will continue to research other large alternative fuel equipment for use by the Town in its larger landscaping and development projects.

Public Transit Options

Public transit options provide vital access to jobs, healthcare, and education for diverse groups, including residents and visitors of all ages and those without personal vehicles. Providing transportation options may reduce transportation cost burdens for residents and support environmental sustainability by alleviating congestion and enhancing air quality. Continued investment in public transportation options, exemplified by the GoApex Bus, facilitates mobility options for all people in Apex, promotes regional connectivity, supports the local economy, increases transportation equity, and contributed to sustainability goals.

Vehicle Replacement Analysis

A vehicle replacement analysis is a tool that can be used to determine how and when to replace vehicles and equipment. A well-designed replacement plan can help reduce costs, improve quality of service and align with the town's sustainability goals. The Division of Fleet Services will conduct a vehicle replacement analysis to determine the optimal point of replacement based on data from current management software such as Fleetio, and GeoTab. At the time of replacement, Fleet Services will evaluate the vehicle needs and use reliable data to consider a more environmentally friendly asset. Having a well-planned replacement strategy would not only move us towards the town's sustainability goals but also provide justification for any new vehicle purchases as well as vehicle disposals.

Vehicle Evaluation Criteria

To ensure the fleet replacement schedules are in line with verifiable data, the Division of Fleet Services will review and revise vehicle replacement criteria on an annual basis. This allows the division to make decisions based on actual lifecycle costs in real time throughout the life of the vehicle/equipment. The automotive and equipment market can change rapidly so ensuring the analysis is continuously updated ensures we continue to make educated replacement recommendations. Fleet services will collaborate across town departments to ensure the needs of each department are being met while introducing additional EV and hybrid vehicles into the fleet when appropriate.

Electric Vehicle & Hybrid Procurement Guidelines

Sustainability staff and the Division of Fleet Services will continue researching and networking with external organizations to help fund the clean fleet transition through the use of tax incentives, federal, and state grants. To ensure proper procurement is taking place as we move towards a more sustainable future, the Division of Fleet Services will be the sole procuring department for all vehicles and equipment. Standard procurement guidelines will be established particularly for EVs, hybrid vehicles, and alternative fuel vehicles. This would allow proper vehicle acquisitions to be made focusing on sustainability, proper upfitting and rightsizing the fleet. This would also allow appropriate fleet management, and sustainability advancement to take place while ensuring proper oversight is accomplished.

Charging Infrastructure Location Study

Staff will select a consultant or partnering company to forecast the Town's EV charging infrastructure locations and installation over the next 5 to 10 years to support the fleet transition. The Town's current partnership with BlueArrow and GeoTab can be utilized to perform this, as these partners utilize telemetric data from Fleet vehicles to provide the data for such analyses. Results would include a map of necessary charger locations for Town Fleet and a timeline for installation based on Town properties, service areas, and telematic data. Vehicle driving and dwell locations sourced from the telemetry data will be a contributing factor to these assessments.

Centralized Fleet Program

The Division of Fleet Services will research and work towards the implementation of a centralized fleet program to improve operational efficiency. With the goal of replacing the current system of many departments owning

vehicles and equipment, Public Works would operate a charge-back system where Public Works owns the Town's fleet and leases out vehicles and equipment to different town departments as needed. By evaluating utilization patterns, the program would optimize resource allocation and ensure that each department has access to necessary vehicles. It would also enable the creation and governance of vehicle and equipment pool programs while minimizing under-utilized assets. Overall, this program would promote collaboration through a pool of shared Town resources and enhance the productivity and cost-effectiveness of the Town's operations. This would also enable the Division of Fleet services to act upon the fleet's needs which is currently being hindered due to the segmented procurement processes.

Electric Vehicle & Hybrid Vehicle Training – Maintenance and Usage

Performing maintenance and repair on electric vehicles can introduce serious safety concerns for town staff when proper training and equipment has not been provided. As new electric and hybrid vehicles are added to the Town's fleet, maintenance, repair procedures, and equipment must adjust accordingly. To best prepare the Town's Fleet Maintenance team with the knowledge, skills, and confidence to work on these new vehicles, the Division of Fleet Services and Risk Management will determine and develop a training curriculum and schedule that will be administered through certified teaching institutions to help the technicians develop their skills and ability needed to work on this new class of vehicle. Sustainability staff will coordinate with the Division of Fleet Services and Risk Management to build a training program and educational materials for all Town staff in order to promote EV usage from the future pool program. This will include developing comfortability driving EVs as well as how to search for and use charging stations for Fleet vehicles, both within and outside of the Town.

FY 2025-26

Vehicle Idle Reduction Guidelines

The Department of Energy's Clean Cities program has found that an idling vehicle wastes up to a half gallon of gas per hour and releases 20 pounds of carbon dioxide into the atmosphere for every gallon of gas burned. Just one hour of idling is equivalent to roughly 30 miles of driving so avoiding idling has a multitude of benefits including: fuel savings, lower maintenance costs, extended vehicle life, and lower greenhouse gas emissions. The Division of Fleet Services staff will analyze vehicle idling time using telemetric data to develop sufficient and appropriate idle-reduction guidelines. This analysis will use sophisticated geofencing to ensure idle reduction reporting does not include roadside visibility situations or normal job duties that require an idling vehicle. Fleet Service staff will collaborate with each department to ensure the proper guidelines are being abided by and provide driver coaching when needed.

Table 2: Clean Mobility Actions

These clean mobility actions are currently planned or are being implemented:

Focus	Action Item	Lead Department	Supporting Department(s)	Foundational Item	Department Priority	Stage	FY Start	Anticipated Start	Estimated Cost
Vehicle Fleet	Telematic Fleet Technology	Public Works (Fleet Services)	Budget & Performance Management (Sustainability)	Yes	Yes	Ongoing	FY 19-20	Ongoing	High >\$100,000
Vehicle Fleet	Centralized Fleet Program	Public Works (Fleet Services)	Budget & Performance Management	No	Yes	Planning	FY 24-25	Qtr 4	High >\$100,000
Vehicle Fleet	Vehicle Replacement Analysis	Public Works (Fleet Services)	Budget & Performance Management (Sustainability) / Finance (Purchasing)	Yes	Yes	Starting	FY 23-24	Ongoing	Low <\$50,000
Vehicle Fleet	Vehicle Evaluation Criteria	Public Works (Fleet Services)	All Departments	Yes	Yes	Starting	FY 23-24	Ongoing	Low <\$50,000
Vehicle Fleet	Electric Vehicle & Hybrid Procurement Guidelines	Public Works (Fleet Services)	Finance (Purchasing) / Budget & Performance Management (Sustainability)	Yes	Yes	Planning	FY 23-24	Qtr 4	Low <\$50,000
Vehicle Fleet	Right-size Fleet Assessment	Public Works (Fleet Services)	Budget & Performance Management (Sustainability)	Yes	Yes	Ongoing	FY 20-21	Ongoing	Low <\$50,000
Sustainability	Vehicle Idling Reduction Guidelines	Public Works (Fleet Services)	Budget & Performance Management (Sustainability)	Yes	Yes	Planning	FY 25-26	Qtr 4	Low <\$50,000
Equipment	Electric & Alternative Fuel Equipment	Parks, Recreation, & Cultural Resources	Budget & Performance Management (Sustainability)	Yes	Yes	Ongoing	FY 21-22	Ongoing	Low <\$50,000

Focus	Action Item	Lead Department	Supporting Department(s)	Foundational Item	Department Priority	Stage	FY Start	Anticipated Start	Estimated Cost
Training	Electric Vehicle & Hybrid Maintenance Training	Public Works (Fleet Services)	N/A	Yes	Yes	Planning	FY 24-25	Qtr 1	Low <\$50,000
Sustainability	Charging Infrastructure Location Study	Public works (Facility Services & Fleet Services)	Budget & Performance Management (Sustainability)	Yes	Yes	Planning	FY 23-24	Qtr 4	Med \$50,000-\$100,000
Transit	Public Transit Options	Planning (Transit)	N/A	No	Yes	Ongoing	FY 22-23	Ongoing	High >\$100,000

**Foundational Item: Must this action be completed before others can be started?*

**Department priority: Is the action is tied to a priority in the lead department's strategic plan?*

Key Performance & Target Areas

Well-defined and meaningful metrics are instrumental in measuring and evaluating various facets of ongoing and future projects aimed at enhancing the Town's sustainability and operational efficiency. For instance, key performance indicators (KPIs) related to telematics systems and vehicle data analysis play a pivotal role in assessing vehicle utilization, emissions, and performance. These metrics support ongoing initiatives, such as vehicle replacement analysis, EV planning, and right-sizing the fleet, and inform decisions about transitioning to cleaner, more efficient vehicles.

Vehicle inventory metrics can help in identifying underutilized vehicles and equipment and eliminating excess assets, or redirect them into a communal motor pool program. Additionally, the data collected on EV charging stations, existing EVs and plug-in hybrids, and locations of these vehicles inform charging infrastructure decision and planning, aligning them with the Town's transition to cleaner transportation options.

Furthermore, the emphasis on EV and alternative fuel equipment, EV maintenance training, and idle reduction guidelines show that the Town's is committed to sustainable fleet practices. Collecting data and analyzing metrics for these initiatives enable the Town to effectively procure environmentally-friendly equipment, properly train staff, and proactively devise strategies to reduce emissions and fuel consumption. These metrics collectively drive informed decision-making, facilitate resource optimization, and pave the way for a more sustainable and efficient fleet management system within the Town of Apex.

The following KPIs establish the Town's baseline and measure progress for clean mobility initiatives:

1. EV and Hybrid Percentage of Fleet
2. Fuel efficiency of EVs compared to ICE vehicles
3. Idling time/Battery drain time
4. Greenhouse Gas (GHG) emissions
5. Annual operational cost
6. Total cost of ownership
7. Ratio of EV Charging Ports to EVs
8. Utilization of charging stations

For more detailed descriptions of the methodology behind these KPIs, see [Appendix 6](#).



Environmental Impact and Waste Management

Significance

The Town's Waste Management initiatives are driven by challenges stemming from the town's rapid growth and advancement in collection best practices. The aim is to enhance efficiency and reduce the carbon footprint associated with waste management, as can be monitored and managed by Town staff. Current loose yard waste in streets currently has the potential to negatively impact water quality and stormwater systems, necessitating a reevaluation of collection methods and ordinances.

Because the Town faces uncertainties in yard waste markets, staff is exploring processing and hauling alternatives, such as in-housing initial processing and creating a transfer station model to minimize long hauling distances and landfilling. This strategic shift prepares the Town for long-term, sustainable yard waste and organic material management.

Recycling is pivotal in reducing the strain on finite resources and preserving space in the local landfill, which is projected to reach full capacity by 2040. Preserving landfill capacity has environmental benefits and is fiscally responsible because disposal costs will rise post-landfill closure. Increases recycle efforts ensure compliance with North Carolina state disposal laws, such as the ban on aluminum cans and plastic beverage bottles in landfills.

Educational initiatives and internal training are crucial to encouraging proper recycling practices, as contamination poses a threat to the recycling process and escalates service costs over time. Consistent and standardized bins and signage across Town facilities contribute to reducing confusion and improve the quality of collected materials.

Source reduction strategies, prioritized in the Environmental protection Agency's (EPA) waste management strategy, focus on eliminating the need to purchase materials that are later disposed. This approach effectively saves resources and reduces costs. Exploring alternatives to non-recyclable materials further diminishes overall disposal and contamination in the recycling process. The overarching goal is to establish a comprehensive waste management system internally that incorporates sustainability principles and addresses the environmental and fiscal challenges associated with current practices.

Current Planning & Progress

Public Works has begun installing data and location tracking software on waste collection equipment for efficiency studies and benchmarking studies on best practices have been conducted. Electric and alternative fuel vehicles and equipment are being considered as solid and yard waste inventory is replaced.

The Town encourages Town-wide recycling and various initiatives in Town facilities. However, there are inconsistencies in collection and insufficient collection bins exist in some areas. Some departments are leading initiatives, such as the Parks, Recreation, & Cultural Resources (PRCR) and Planning Departments. These departments have taken steps to enhance recycling and diversion, such as PRCR adding recycling bins to public areas, and the Planning Departments adding recycling bins in an effort to reduce waste in their offices.

The Water Resources Department focuses on water quality in Jordan Lake and land conservation around water sources, aligning with sustainability goals. Both the Planning and Transportation & Infrastructure Departments

are prioritizing infrastructure solutions to help maintain the existing tree canopy and are building green infrastructure that reduces the impact of yardwaste and natural debris on the stormwater system.

Ongoing and Continuous

Paper Waste Reduction

Staff will continue to explore source reduction strategies such as identifying paper-heavy tasks that can be transitioned to electronic versions or electronically signed documents, except where prohibited by law. This prioritizes tasks that can transition from printed paper to electronic processes to increase workplace efficiency and reduce paper waste.

FY 2024-25

Yardwaste Collection Assessment

Solid Waste Services and Sustainability staff will evaluate alternatives to the current curbside yardwaste collection process and ordinances. The goals are to reduce collection equipment's environmental footprint, provide safer collection practices for Public Works employees, and reduce the environmental burden on stormwater systems and water quality. They will also evaluate long-range options for efficiently transferring and processing yardwaste to ensure the sustainability of reliable processing facilities and commercial composters, and reduce the environmental impacts of hauling and handling. Fleet will assist by utilizing route and vehicle data to create low-emission routes to increase efficiency.

Recycling Standards & Signage to Improve Waste Diversion

Public Works staff will develop a comprehensive and standardized waste management system for Town facilities that emphasizes diversion strategies. This system will encourage and enhance access to recycling, implementing consistent and effective collection bins, and create clear signage for accurate disposal and diversion. Additionally, Public Works staff will educate staff in all departments on proper recycling materials and methods to optimize recycling efforts within Town facilities and will monitor the janitorial contractor to ensure all materials are collected and diverted appropriately. Furthermore, Public Works will evaluate the feasibility of increased recycling at Town events and assess the diversion potential of non-traditional recyclables generated from Town operations, such as scrap metal and recyclable or reusable materials from construction and renovation projects. This approach aims to establish a robust waste management framework that prioritizes sustainability and maximizes diversion opportunities across various facets of Town operations.

FY 2025-26

Town Composting Assessment

After the Recycling Standards are established and progress can be tracked for success, Solid Waste Services staff will evaluate what types of waste are most frequently generated in Town facilities to advise on the feasibility of adding compost collections to higher volume and more populated Town facilities and areas.

Eco-preferred Purchasing Policy

The Town's eco-preferred purchasing policy would prioritize warehouse orders, define preferring ordering and delivery policies, and pre-determined eco-friendly products, such as more sustainable paper and business cards. This policy would leverage bulk purchasing and centralized distribution of standardized products while managing overall inventory and limiting deliveries and transportation.

Table 3: Waste Management Actions

These waste management actions are currently planned or are being implemented:

Focus	Action Item	Lead Department	Supporting Department(s)	Foundational Item	Department Priority	Stage	FY Start	Anticipated Start	Estimated Cost
Waste/ Water Resources	Yardwaste Collection Assessment	Public Works (Solid Waste Services)	Budget & Performance Management (Sustainability)	Yes	Yes	Planning	FY 24-25	Qtr 1	High >\$100,000
Waste	Recycling Standards & Signage	Public Works (Solid Waste Services)	Budget & Performance Management (Sustainability)	Yes	Yes	Planning	FY 24-25	Qtr 4	Med \$50,000-100,00
Waste	Town Composting Assessment	Public Works (Solid Waste Services)	Budget & Performance Management (Sustainability)	No	No	Planning	FY 25-26	Qtr 1	Low <\$50,000
Purchasing	Eco-preferred Purchasing Policy	Budget & Performance Management (Sustainability)	Public Works (Solid Waste Services) / Finance (Procurement)	No	No	Planning	FY 26-27	Qtr 1	Low <\$50,000
Waste	Paper Waste Reduction	Budget & Performance Management (Sustainability)	Public Works (Solid Waste Services)	No	No	Ongoing	FY 23-24	Ongoing	Low <\$50,000

**Foundational Item: Must this action be completed before others can be started?*

**Department priority: Is the action is tied to a priority in the lead department's strategic plan?*

Key Performance Indicators & Target Areas

The identified metrics are central in evaluating and measuring the success of ongoing and future projects aimed at enhancing sustainability within the Town of Apex. Trash and recycling data, including the material types and amounts collected, will allow for assessing diversion rates and waste reduction efforts. This data allows for continuous monitoring of progress towards waste reduction goals, directly impacting initiatives, like paper waste reduction and the development of recycling standards and signage. Data on avoided disposal from switching to recyclable or reusable materials and data from the composting feasibility study will serve as crucial indicators of progress toward more sustainable waste management practices. The metrics listed below will help facilitate informed decision-making towards reducing non-recyclable waste, optimize resource allocation, and drive continuous improvement towards more sustainable and environmentally conscious Town infrastructure and operations.

The following KPIs will establish the Town's baseline and measure progress for waste management related initiatives:

1. Amounts of Trash and Commingled Recycling Collected
2. Diversion Rate
3. Recycling & Waste Bin Inventory
4. Composted Material Diversion at Special Events

For more detailed descriptions of the methodology behind these KPIs, see [Appendix 6](#).

Summary










The Town of Apex is committed to environmental leadership as shown by these initiatives. The initiatives outlined in the SAP demonstrate the multifaceted efforts that the various Town departments have implemented and are planning for, as well as key action steps to reduce greenhouse gas emissions, enhance energy efficiency, and minimize the Town's impact on the environment.

Collecting, analyzing, and reporting data are central to measuring progress across these initiatives and will guide informed decision-making and resource allocation. The Town's commitment to regular reporting and reviews ensures transparency, tracks progress, and offers insights into challenges and emerging opportunities. Metric tracking and other collaborative efforts across departments will drive these sustainability goals forward. By publishing public-facing dashboards on the Town's website, the Town will display its commitment to transparency and engagement with the community.

In addition to minimizing environmental impact for the Town, these initiatives emphasize maintaining fiscal responsibility, determining acceptable return on investments, and adhering to legal authority in policy development. Through all of these efforts, the Town of Apex will continue to prove itself as an environmental steward and sustainable leader in the region.

Appendix

1. Timeline of Apex’s Sustainable Steps

	<p>2014 The NC Department of Transportation awarded a grant for the Town to purchase three all-electric Nissan Leafs and one plug-in range-extended hybrid Chevrolet Volt and to install two dual Level 2 electric vehicle (EV) chargers at Town Hall and an EV charging station in the Saunders Street parking lot in downtown Apex.</p>
	<p>2014 The Town was awarded an Air Quality Improvement Grant to retrofit three municipal bucket lift truck vehicles with smart electric power take-off (PTO) units to shorten idling periods and reduce vehicle emissions.</p>
	<p>2018 The Town’s first rooftop solar PV array was installed at the Public Works Operations building.</p>
	<p>2019 Apex’s Town Council adopted the 100% Clean Energy Resolution. The Town was awarded the SolSmart Gold Community designation for reducing barriers to deploying solar photovoltaics (PV).</p>
	<p>2020 Rooftop solar PV arrays were installed on nine Town facilities: Fire Station #3, John M. Brown Community Center, Police Department Headquarters, Public Safety Stations 4 and 5, Purchasing and Inventory Warehouse, Town Hall, Water Reclamation Facility, and Water Resources Administration.</p>
	<p>2021 The Town was awarded a grant to help purchase and install four Level 2 EV charging stations at the Public Works campus and two stations at the Electric Utility facility.</p> <p>A Vehicle Assessment was conducted including a fleet right-sizing plan, vehicle replacement and infrastructure support plan for the next 10 years, recommendations for vehicle support efficiency, and an evaluation of how well the Town follows the best practices and recommendations for improvements.</p>
	<p>2021 A Waste Audit of five Town facilities, including Apex Community Park, Public Safety Station #5, Public Works Administrative Building, and Town Hall, was conducted and resulted in a Solid Waste Assessment Report with eleven recommendations to reduce and manage waste within Town operations.</p>
	<p>2022 Three Energy Assessments were conducted and provided reports with energy efficiency recommendations for John M. Brown Community Center, Public Safety Station 5, and Town Hall.</p>
	<p>2024 Solar Assessment completed by Optima Engineering to determine Solar readiness of 40 Town Facilities. 11 of 40 were determined as good projects to phase in.</p>

2. Energy Resource Mixes

The following provides the breakdown of what type of energy was used by the Town of Apex by mega-watt hour (MWh) and percentage over the span of 2020 to 2022. Annual reports are provided to the Town by Electricities in either June or July of the following year.

A. 2020



2020 Energy Resource Mix for: APEX

Fuel Source	Energy Received from NCEMPA (MWh)	% of Energy Consumed	Tons of CO ₂ Produced	REPS Requirement	REPS Requirement (MWh)
Nuclear	188,807	50.59%	-		
Gas(CT)	138,633	37.14%	63,078		
Fuel Oil	511	0.14%	544		
Coal	37,796	10.13%	41,765		
Unbundled Renewable Energy	7,384	1.98%	-		
Solar	-	0.00%	-	0.20%	695
SEPA Hydro	111	0.03%	-	0.03%	111
Other Renewable Energy	-	0.00%	-	9.77%	33,943
TOTAL	373,243	100%	105,387	10.00%	34,749

2020 Energy Resource Mix for: NCEMPA

Fuel Source	Energy Received (MWh)	% of Energy Consumed	Tons of CO ₂ Produced	REPS Requirement	REPS Requirement (MWh)
Nuclear	3,639,212	50.33%	-		
Gas(CT)	2,672,120	36.96%	1,215,815		
Fuel Oil	12,010	0.17%	12,791		
Coal	728,518	10.08%	805,013		
Unbundled Renewable Energy	142,324	1.97%	-		
Solar	-	0.00%	-	0.20%	13,691
SEPA Hydro	36,054	0.50%	-	0.53%	36,054
Other Renewable Energy	-	0.00%	-	9.27%	634,806
TOTAL	7,230,239	100%	2,033,619	10.00%	684,551

2020 CO ₂ Intensity		
APEX	0.5647	lbs CO ₂ /kWh
NCEMPA	0.5625	lbs CO ₂ /kWh
Duke Energy Carolinas	0.5635	lbs CO ₂ /kWh

Notes:

- Calculated CO₂ Intensity # using EIA 2019 CO₂ emissions rates
- Duke Energy Carolinas includes DEC and DEP combined
- 10% REPS requirement calculated from Retail Load Served (EIA-861)
- REPS requirements limit SEPA amount to 3%

2021 Energy Resource Mix for: APEX

Fuel Source	Energy Received from NCEMPA (MWh)	% of Energy Consumed	Short Tons of CO ₂ Produced	REPS Requirement	REPS Requirement (MWh)
Nuclear	201,558	50.06%	-		
Gas(CT)	147,716	36.69%	67,211		
Fuel Oil	1,120	0.28%	1,192		
Coal	45,833	11.38%	51,103		
Unbundled Renewable Energy	6,283	1.56%	-		
Solar	-	0.00%	-	0.20%	753
SEPA Hydro	110	0.03%	-	0.03%	110
Other Renewable Energy	-	0.00%	-	9.77%	36,809
TOTAL	402,619	100%	119,506	10.00%	37,672

2021 Energy Resource Mix for: NCEMPA

Fuel Source	Energy Received (MWh)	% of Energy Consumed	Short Tons of CO ₂ Produced	REPS Requirement	REPS Requirement (MWh)
Nuclear	3,730,374	49.88%	-		
Gas(CT)	2,733,883	36.56%	1,243,917		
Fuel Oil	22,713	0.30%	24,190		
Coal	848,257	11.34%	945,807		
Unbundled Renewable Energy	116,284	1.55%	-		
Solar	-	0.00%	-	0.20%	14,378
SEPA Hydro	26,579	0.36%	-	0.37%	26,579
Other Renewable Energy	-	0.00%	-	9.43%	677,925
TOTAL	7,478,091	100%	2,213,913	10.00%	718,882

2021 CO ₂ Intensity		
APEX	0.5936	lbs CO ₂ /kWh
NCEMPA	0.5921	lbs CO ₂ /kWh
Duke Energy Progress	0.5926	lbs CO ₂ /kWh

Notes:

- Calculated CO₂ Intensity # using EIA 2020 CO₂ emissions rates
- Duke Energy Progress Resource Mix Source: NCUC December 2021 DEP Monthly Fuel Report
- 10% REPS requirement calculated from Retail Load Served (EIA-861)
- REPS requirements limit SEPA amount to 3%



2022 Energy Resource Mix for: APEX

Fuel Source	Energy Received from NCEMPA (MWh)	% of Energy Consumed	Short Tons of CO ₂ Produced	REPS Requirement	REPS Requirement (MWh)
Nuclear	196,114	47.44%	-		
Gas(CT)	165,773	40.10%	80,400		
Fuel Oil	1,619	0.39%	1,975		
Coal	44,219	10.70%	49,968		
Unbundled Renewable Energy	5,570	1.35%	-		
Solar	-	0.00%	-	0.20%	705
SEPA Hydro	109	0.03%	-	0.03%	109
Other Renewable Energy	-	0.00%	-	9.77%	34,442
TOTAL	413,403	100%	132,342	10.00%	35,256

2022 Energy Resource Mix for: NCEMPA

Fuel Source	Energy Received (MWh)	% of Energy Consumed	Short Tons of CO ₂ Produced	REPS Requirement	REPS Requirement (MWh)
Nuclear	3,590,732	47.30%	-		
Gas(CT)	3,035,212	39.98%	1,472,078		
Fuel Oil	32,089	0.42%	39,149		
Coal	809,634	10.66%	914,886		
Unbundled Renewable Energy	101,989	1.34%	-		
Solar	-	0.00%	-	0.20%	14,319
SEPA Hydro	22,394	0.29%	-	0.31%	22,394
Other Renewable Energy	-	0.00%	-	9.49%	679,243
TOTAL	7,592,050	100%	2,426,113	10.00%	715,957

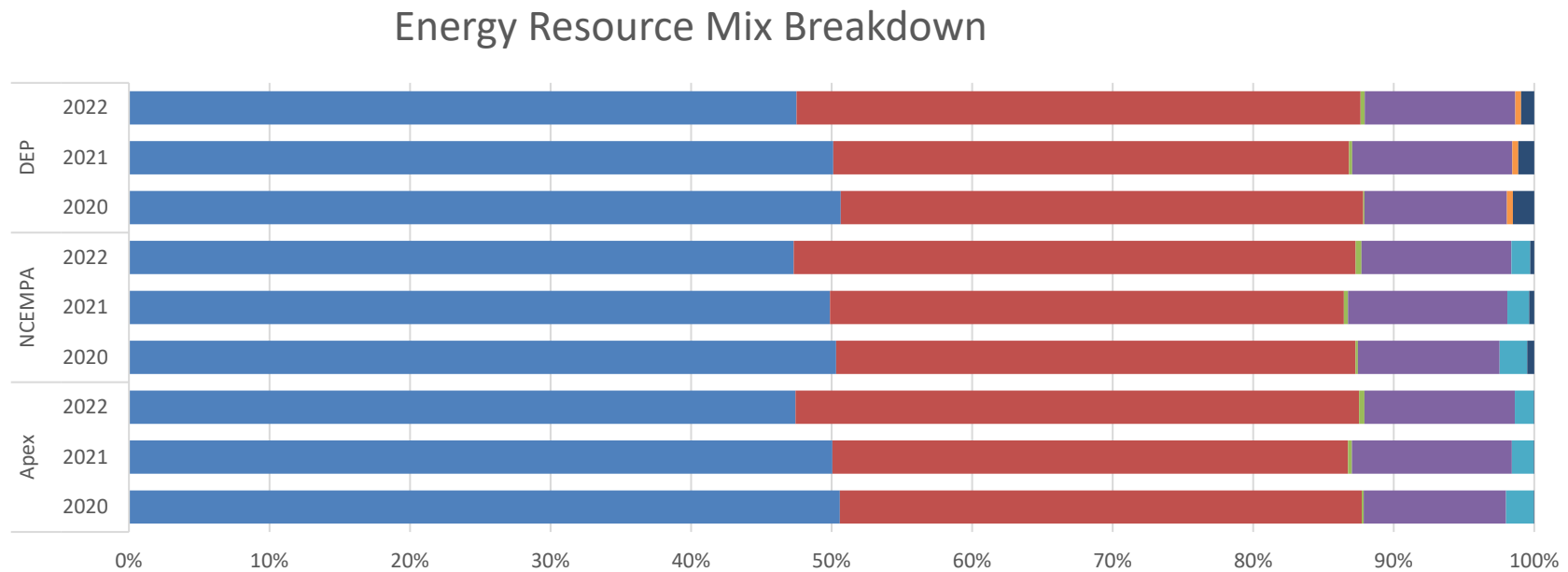
2022 CO ₂ Intensity		
APEX	0.6403	lbs CO ₂ /kWh
NCEMPA	0.6391	lbs CO ₂ /kWh
Duke Energy Progress	0.6385	lbs CO ₂ /kWh

Notes:

- Calculated CO₂ Intensity # using EIA 2021 CO₂ emissions rates. (Source: [EIA](#))
- Duke Energy Progress Resource Mix applied. (Source: [NCUC December 2022 DEP Monthly Fuel Report](#))
- REPS requirement limits SEPA contribution to 3%. (Source: [REPS](#))
- 10% REPS requirement calculated from 2022 Retail Load Served (EIA-861).

3. Energy Resource Mix Graph

The following provides a visual breakdown of the types of energy that Apex currently utilizes from NCEMPA, and provides a comparison to the energy mix of both NCEMPA and Duke Energy Progress.



	Apex			NCEMPA			DEP		
	2020	2021	2022	2020	2021	2022	2020	2021	2022
■ Nuclear	50.59%	50.06%	47.44%	50.33%	49.88%	47.30%	50.65%	50.12%	47.50%
■ Gas(CT)	37.14%	36.69%	40.10%	36.96%	36.56%	39.98%	37.19%	36.71%	40.13%
■ Fuel Oil	0.14%	0.28%	0.39%	0.17%	0.30%	0.42%	0.09%	0.22%	0.30%
■ Coal	10.13%	11.38%	10.70%	10.08%	11.34%	10.66%	10.14%	11.40%	10.71%
■ Unbundled Renewable Energy	1.98%	1.56%	1.35%	1.97%	1.55%	1.34%	0.00%	0.00%	0.00%
■ Solar	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.43%	0.42%	0.41%
■ SEPA Hydro	0.03%	0.03%	0.03%	0.50%	0.36%	0.29%	1.52%	1.14%	0.94%
■ Other Renewable Energy	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

4. Optima Engineering Solar Assessment – Table 6



Table 6:
Town of Apex Facilities – Summary

#	FACILITY	IS SOLAR RECOMMENDED	APPROXIMATE SOLAR CAPITAL COST (\$)	STRUCTURAL COST	SYSTEM SOLAR SIZE (KW DC)	ROOF TYPE	ROOF AGE	SOLAR POTENTIAL	25YR LEVELIZED COST OF ENERGY (\$/KWHR)	PROJECT RANKING (ORDER OF BEST JOB TO COMPLETE FIRST)	NOTES
1	Parks/Rec Maint. Building	Yes	\$ 34,800.00	\$ -	11.6	Metal	8	Satisfactory	\$ 0.14	6	Tree shading issues
2	Seymour Fields Restroom/Shelter	Yes	\$ 14,700.00	\$ -	4.9	Shingle	8	Satisfactory	\$ 0.14	7	Roof may need replaced
4	Nature Park Amphitheater	Yes	\$ 34,800.00	\$ -	11.6	Metal	8	Poor	\$ 0.16	16	Bad Orientation and Tree shading issues
10	Parks/Rec Maint. Building	Yes	\$ 10,200.00	\$ -	3.4	Shingle	22	Poor	\$ 0.15	18	Tree shading issues, and roof needs replaced
12	Kelly Rd Restroom/Shelter	No	\$ 14,700.00	\$ 10,000.00	4.9	Shingle	unknown	Poor	\$ 0.15	NA	Major Structural and roof would exceed solar gain, Tree shading issues
15	Pleasant Park - Maintenance Building	Yes	\$ 32,100.00	\$ -	10.7	SS metal	New	Excellent	\$ 0.15	2	
19	Pleasant Park - Shelter #2	Yes	\$ 34,800.00	\$ -	11.6	Shingle	New	Excellent	\$ 0.19	5	
20	Pleasant Park - Signature Fieldhouse	Yes	\$ 43,800.00	\$ -	14.6	SS Metal	New	Excellent	\$ 0.14	1	
22	Seagroves Restroom/Shelter	Yes	\$ 21,900.00	\$ -	7.3	Shingle	10	Excellent	\$ 0.14	4	Roof may need replaced
23	Hunter St Restroom/shelter	Yes	\$ 21,900.00	\$ -	7.3	Shingle	10	Satisfactory	\$ 0.16	12	Roof may need replaced
26	Jaycee Park Restroom/Shelter	No	\$ 14,700.00	\$ 10,000.00	4.9	Shingle	unknown	Satisfactory	\$ 0.14	NA	Major Structural and roof would exceed solar gain, Tree shading issues
27	Fire Station # 2	Yes	\$ 80,100.00	\$ -	26.7	Metal	24	Satisfactory	\$ 0.17	15	Difficult Electrical Service connection
28	Electrical Main Office	Yes	\$ 340,500.00	\$ -	113.5	Metal	0	Excellent	\$ 0.16	3	Difficult Electrical Service connection
29	Electrical Warehouse	Yes	\$ 196,500.00	\$ -	65.5	Metal	0	Satisfactory	\$ 0.19	8	Difficult Electrical Service connection
30	Electrical Covered Storage	Yes	\$ 93,000.00	\$ -	31	Metal	0	Satisfactory	\$ 0.17	9	Difficult Electrical Service connection
31	Water Resources Meter Shop	Yes	\$ 17,400.00	\$ -	5.8	Shingle	unknown	Poor	\$ 0.15	19	Roof needs replaced, Tree shading issues
32	Public Works Operations	Yes	\$ 187,800.00	\$ -	62.6	Metal	23	Poor	\$ 0.15	17	Tree shading issues
33	Public Works Operations Covered Storage	Yes	\$ 152,700.00	\$ -	50.9	Metal	23	Satisfactory	\$ 0.16	14	
35	Halle Cultural Arts Center	No	\$ 10,200.00	\$ 15,000.00	3.4	Flat/Membrane	12	Poor	\$ 0.15	NA	Structural cost and limited solar
36	Senior Center	Yes	\$ 291,000.00	\$ -	97	Metal	0	Satisfactory	\$ 0.16	13	
37	Public Safety Station 6	Yes	\$ 148,500.00	\$ -	49.5	Metal	New	Satisfactory	\$ 0.15	10	
38	Mason St Municipal Building	Yes	\$ 74,100.00	\$ -	24.7	Flat(Membrane)/Metal	New	Satisfactory	\$ 0.15	11	

5. Optima Engineering Solar Assessment – Table 7



Table 7:
Town of Apex Facilities – Ranking Order

#	FACILITY	APPROXIMATE SOLAR CAPITAL COST (\$)	STRUCTURAL COST	SYSTEM SOLAR SIZE (KW DC)	25YR LEVELIZED COST OF ENERGY (\$/KWHR)	PROJECT RANKING (ORDER OF BEST JOB TO COMPLETE FIRST)	NOTES
20	Pleasant Park - Signature Fieldhouse	\$ 43,800.00	\$ -	14.6	\$ 0.14	1	
15	Pleasant Park - Maintenance Building	\$ 32,100.00	\$ -	10.7	\$ 0.15	2	
28	Electrical Main Office	\$ 340,500.00	\$ -	113.5	\$ 0.16	3	Difficult Electrical Service connection
22	Seagroves Restroom/Shelter	\$ 21,900.00	\$ -	7.3	\$ 0.14	4	Roof may need replaced
19	Pleasant Park - Shelter #2	\$ 34,800.00	\$ -	11.6	\$ 0.19	5	
1	Parks/Rec Maint. Building	\$ 34,800.00	\$ -	11.6	\$ 0.14	6	Tree shading issues
2	Seymour Fields Restroom/Shelter	\$ 14,700.00	\$ -	4.9	\$ 0.14	7	Roof may need replaced
29	Electrical Warehouse	\$ 196,500.00	\$ -	65.5	\$ 0.19	8	Difficult Electrical Service connection
30	Electrical Covered Storage	\$ 93,000.00	\$ -	31	\$ 0.17	9	Difficult Electrical Service connection
37	Public Safety Station 6	\$ 148,500.00	\$ -	49.5	\$ 0.15	10	
38	Mason St Municipal Building	\$ 74,100.00	\$ -	24.7	\$ 0.15	11	
23	Hunter St Restroom/Shelter	\$ 21,900.00	\$ -	7.3	\$ 0.16	12	Roof may need replaced
36	Senior Center	\$ 291,000.00	\$ -	97	\$ 0.16	13	
33	Public Works Operations Covered Storage	\$ 152,700.00	\$ -	50.9	\$ 0.16	14	
27	Fire Station # 2	\$ 80,100.00	\$ -	26.7	\$ 0.17	15	Difficult Electrical Service connection
4	Nature Park Amphitheater	\$ 34,800.00	\$ -	11.6	\$ 0.16	16	Bad Orientation and Tree shading issues
32	Public Works Operations	\$ 187,800.00	\$ -	62.6	\$ 0.15	17	Tree shading issues
10	Parks/Rec Maint. Building	\$ 10,200.00	\$ -	3.4	\$ 0.15	18	Tree shading issues, and roof needs replaced
31	Water Resources Meter Shop	\$ 17,400.00	\$ -	5.8	\$ 0.15	19	Roof needs replaced, Tree shading issues
12	Kelly Rd Restroom/Shelter	\$ 14,700.00	\$ 10,000.00	4.9	\$ 0.15	NA	Major Structural and roof would exceed solar gain, Tree shading issues
26	Jaycee Park Restroom/Shelter	\$ 14,700.00	\$ 10,000.00	4.9	\$ 0.14	NA	Major Structural and roof would exceed solar gain, Tree shading issues
35	Halle Cultural Arts Center	\$ 10,200.00	\$ 15,000.00	3.4	\$ 0.15	NA	Structural cost and limited solar
	Total	\$ 1,870,200.00	\$ 35,000.00	623.4	\$ 0.16 (avg)		

6. KPI Methodology Breakdown

Facilities

KPI	Initiative	Metric(s)	Methodology
Return on Investment (ROI)	<ul style="list-style-type: none"> Energy Consumption & Efficiency Audits High-Efficiency Inventory Replacement Energy Efficiency Standards in New Facility Construction 	<ul style="list-style-type: none"> Dollars (\$) Spent on Area of Interest Before and after Implementation of Project Percent Change ($\Delta\%$) in Cost for Area of Interest Before and after Implementation of Project 	To evaluate the success of an energy efficiency project, the Return on Investment (ROI) will examine the project's ability to reduce cost. Cost analysis of projects, both before and after implementation, will be performed in order to assess its cost impact. ROI will be calculated based on capital expenditures (upgrades or replacements): ROI = Net Financial Gain/Capital Expenditure.
Greenhouse Gas Inventory/footprint of facilities	<ul style="list-style-type: none"> Greenhouse Gas Inventory 	<ul style="list-style-type: none"> Metric tons of Carbon Dioxide equivalent (CO₂e) 	Greenhouse gas (GHG) emissions from energy consumption in each climate-controlled facility will be measured based on data from the Town's utility billing. A climate-controlled facility is defined as an enclosed space within a building that is heated or cooled. The Town will provide this information to Enpira through the readings captured in monthly billing. Enpira will then provide data on energy usage (electricity, natural gas, etc.) for each facility and provide figures on GHG emissions using emission factors, such as CO ₂ equivalents per kWh.
Peak Kilowatts per Billing Cycle	<ul style="list-style-type: none"> Energy Consumption & Efficiency Audits 	<ul style="list-style-type: none"> Kilowatts (kW) during Peak Consumption Hours 	Tracking kW over time will indicate where potential areas of improvement are to make energy efficiency upgrades. Determining peak hours will also tracked via smart Advanced Metering Infrastructure (AMI) meters, currently being implemented. Once AMI meters are installed, the meters will record the peak demand automatically.
Kilowatt-Hours for Each Conditioned Facility	<ul style="list-style-type: none"> Energy Consumption & Efficiency Audits 	<ul style="list-style-type: none"> Kilowatt-Hours (kWh) at each conditioned facility owned & operated by Town 	Tracking energy consumption for each conditioned facility (heated or cooled spaces) will inform what facilities are using the most energy and provide insight into potential energy expenditure to reduce overall costs. Kilowatt-Hours tracked and reported in the Town's monthly billing will be reported in the Enpira Energy Management Software and used for analysis.
Clean Energy Production by Solar Panels	<ul style="list-style-type: none"> Solar Energy Assessment 	<ul style="list-style-type: none"> Number (#) of Kilowatt-Hours (kWh) produced by Solar Panels 	Kilowatt-Hours produced by solar panels arrays on town facilities will be monitored, calculated, and tracked in Fronius and SolarEdge software platforms. Total amounts will be calculated and tracked in Enpira Energy Management Software and used for analysis.
Water Consumption	<ul style="list-style-type: none"> Energy Consumption & Efficiency Audits Water Conservation through Natural Landscape Design 	<ul style="list-style-type: none"> Cumulative gallons consumed 	Water usage will be measure in conditioned and landscaped spaces by cumulative amount, by facility, and by square foot (sq. ft.) of conditioned and landscaped space. Gallons tracked and reported in the Town's monthly billing will be reported in the Enpira Energy Management Software and used for analysis.

Fleet

KPI	Initiative	Metric(s)	Methodology
EV and Hybrid Percentage of Fleet	<ul style="list-style-type: none"> • Vehicle Replacement Analysis • Right-Size Fleet Assessment • Vehicle Evaluation Criteria 	<ul style="list-style-type: none"> • Number of EVs & Hybrids • Total number of fleet vehicles 	<p>As fleet vehicles are replaced, we will track how many new vehicles have been added each year that are EVs and Hybrids, and then calculate what percentage of the fleet they make up. Tracking the percentages over time will demonstrate how much growth the town is making on its initiative.</p> <p>(Percentage of EVs & Hybrids = (Number of EVs & Hybrids) / Total number)</p>
Fuel efficiency of EVs compared to ICE vehicles	<ul style="list-style-type: none"> • Telematic Fleet Technology • Vehicle Evaluation Criteria 	<ul style="list-style-type: none"> • Ratio of Miles Per Gallon equivalent (MPGe) for EVs to ICE vehicles within Town Fleet • Ratio of Miles Per Gallon (MPG) for EVs to ICE vehicles within Town Fleet 	<p>By tracking fuel/power consumption of each vehicle, a gasoline gallon equivalent (GGE) can be used to determine the efficiency of each vehicle. This can be used to show how vehicles will compare on range/mileage. Analysis of fuel and electricity costs that the town makes can also be used to determine which fuel source is more cost effective over time. Information will be provided by GeoTab telematics and Fleetio database.</p>
Idling time/Battery drain time	<ul style="list-style-type: none"> • Vehicle Idle Reduction Guidelines 	<ul style="list-style-type: none"> • Hours (hh:mm) of idling • Percentage (%) of battery drain 	<p>GeoTab Telematics will track when a fleet vehicle is stopped and still running, and track the amount of time that both Internal Combustion Engine (ICE) vehicles are running for and how much energy is pulled from the batteries on EVs.</p>
Greenhouse Gas (GHG) emissions	<ul style="list-style-type: none"> • Telematic Fleet Technology • Greenhouse Gas Inventory • Vehicle Idle Reduction Guidelines 	<ul style="list-style-type: none"> • Metric Tons of CO₂e 	<p>Greenhouse gas (GHG) emissions from the Town's vehicles will be measured based on data provided from Fleetio and GeoTab. The Town will provide this information to Enpira through the weekly fuel reports. Enpira will then provide data on GHG emissions for Town Fleet vehicles.</p>
Annual operational cost	<ul style="list-style-type: none"> • Vehicle Replacement Analysis • Vehicle Evaluation Criteria 	<ul style="list-style-type: none"> • Dollars (\$) spent on operational expenses for all Town vehicles • Dollars (\$) spent on operational expenses, divided by total number of Town vehicles 	<p>Calculate the total operational cost per vehicle by combining the costs of fuel, repairs, general maintenance and service.</p> <p>(Operational Cost = Fuel cost + Service cost + other cost)</p>
Total cost of ownership	<ul style="list-style-type: none"> • Vehicle Replacement Analysis • Vehicle Evaluation Criteria 	<ul style="list-style-type: none"> • Dollars (\$) spent on all expenses for all Town vehicles • Dollars (\$) spent on all expenses, divided by total number of Town vehicles 	<p>Assess the comprehensive cost of owning and operating each vehicle by considering operation costs, depreciation, and purchase price, while also subtracting any surplus value (e.g., resale value).</p> <p>(Total Cost = (Operation cost + Depreciation cost + Purchase cost) – Surplus Cost)</p>
Ratio of EV Charging Ports to EVs	<ul style="list-style-type: none"> • Charging Infrastructure Location Study 	<ul style="list-style-type: none"> • Ratio of charging ports/pedestals to combined number of EVs/Hybrids 	<p>Tracking the amount current charging ports available for existing EV fleet will inform what town-owned areas and facilities are most in need of new EV infrastructure to support new EV replacements.</p>
Utilization of charging stations	<ul style="list-style-type: none"> • Charging Infrastructure Location Study 	<ul style="list-style-type: none"> • Percentage (%) of time used • Length of time used • Power Output 	<p>Monitoring data from charging stations for frequency, duration, power output, and peak charging times will be used to ensure that stations are being used and how much power each station is utilizing to charge. This information will be obtained from Fleetio and GeoTab software and inform how efficient charging operations are and how much cost is being attributed to charging fleet vehicles.</p>

Waste Management

KPI	Initiative	Metric(s)	Methodology
Amounts of Trash and Commingled Recycling Collected	<ul style="list-style-type: none"> Recycling Standards & Signage to Improve Waste Diversion 	<ul style="list-style-type: none"> Metric Tons of waste collected Metric Tons of recycling collected 	Based on volume of containers/carts/dumpsters and service frequency (through GFL contract), tracking the quantities of trash and commingled recycling collected can help assess the total amount of waste that the Town creates. (Metric Tons collected = Volume of cart/dumpster * number of carts/dumpsters * service frequency)
Diversion Rate	<ul style="list-style-type: none"> Recycling Standards & Signage to Improve Waste Diversion 	<ul style="list-style-type: none"> Percentage (%) of materials diverted from landfill (recycled) 	Measure the effectiveness of waste diversion efforts by comparing recycled materials to total waste generated. (Diversion rate = (amount of recycled/(amount of trash + amount of recycled))*100)
Recycling & Waste Bin Inventory	<ul style="list-style-type: none"> Recycling Standards & Signage to Improve Waste Diversion 	<ul style="list-style-type: none"> Number (#) of bins per facility Number (#) of bins at all Town facilities 	Count current inventory of bins and determine the appropriate amount of waste diversion bins per designated area
Composted Material Diversion at Special Events	<ul style="list-style-type: none"> Recycling Standards & Signage to Improve Waste Diversion Town Composting Assessment 	<ul style="list-style-type: none"> Metric Tons of compostable materials diverted from landfill. 	Measure the weight (in pounds) of materials recycled or composted during events and record to evaluate waste management practices. (Metric Tons = Volume of cart/dumpster * number of carts/dumpsters)

7. Enpira Energy Management Software Example

