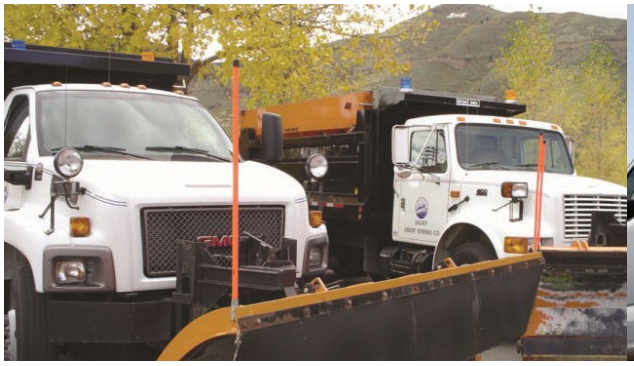
City of Golden

Municipal Fleet Electric Vehicle and Equipment Master Plan



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Executive Summary

As part of the City of Golden GoEV pledge to electrify 100% of its municipal fleet, the City seeks to reduce its diesel and unleaded gasoline consumption through the preferential replacement of combustion engines with all-electric alternatives by the end of fiscal year 2030. The scope of this Plan includes all City of Golden owned and maintained vehicles and combustion engine equipment and tools. This master plan outlines several strategies to meet this goal:

- Define the intention of the 100% goal and plan for yearly purchases of replacement vehicles to meet the 2030 target
- Document and share a new vehicle and equipment procurement justification & approval process annually for review by City staff and the Community Sustainability Advisory Board (CSAB).
- Identify current and future needs for electric vehicle charging infrastructure and seek funding for installation
- Utilize grant opportunities and technical assistance through the state and local utilities.
- Periodically review new technologies and models available for performance and potential use.

This master plan defines the City's gas-powered fleet vehicles and equipment that can be feasibly transitioned to electric by 2030 to meet the City of Golden's goals. This master plan also defines remaining vehicles that cannot be electrified at this time as no suitable alternatives are yet available for these services. These vehicles will be reviewed in future years as technology and products become available. A community plan to support private investment and electrification infrastructure changes to encourage the Golden community to convert from fossil-fuel powered vehicles to alternatives will be addressed in coming years in a separate community master plan.

Intent

The City of Golden Municipal Fleet Electric Vehicle Master Plan is a strategic guide to assist the City of Golden in preparing for and implementing actions that support increased use of plug-in electric vehicles (EVs) in municipal operations.

The Electric Vehicle Master Plan is an employee-led effort that requires supportive planning, partnerships, policies, infrastructure development and education. This Plan is a tool for the municipal government of Golden to investigate the actions that it can take to support EV adoption in the organization. While publicly available, this is an internal planning document and the strategies within the Plan are designed to be primarily within the control of, and led by, City departments.

The City aims to be a local leader in electrifying transportation and this Plan outlines how to achieve that goal for the organization. The Plan was developed in coordination with internal and external stakeholders and includes a vision and defined roles for City departments. The Plan is only one piece of a larger strategy to create a roadmap for electrifying transportation in the Golden community.

Background

The petroleum-fueled transportation sector is now one of the largest sources of greenhouse gas emissions in the nation and is a contributing factor to air pollution and climate change, threatening the health of our community and the sustainability of our planet. The 2019 City of Golden Greenhouse Gas Emission (GHG) Inventory[1] identified that 34% of the City of Golden's GHG emissions originate the transportation sector. The Denver metropolitan area, including Golden, is classified as a serious nonattainment area for federal health-based standards for ozone pollution and the primary sources are oil drilling and motor vehicles fueled by oil. The transportation sector needs support to move toward adoption of clean energy technology, including electric vehicles (EVs), that reduces dependence on a volatile global market for fossil fuels and supports a healthy environment and economy.

Electrification of cars, trucks, buses and supporting the availability of electric bicycles where travelers would otherwise use a gas-powered vehicle is needed to achieve necessary reductions in carbon pollution. The environmental benefits grow over time as electric utilities transition to higher levels of renewable energy. Increased use of EVs will be necessary for the City to reach its climate and sustainability goals. The state of Colorado has goals within the 2020 Colorado Electric Vehicle Plan and Golden, along with all municipalities, will need to take measures to support EV adoption.

Golden is dedicated to leading the use of clean energy and include the community goals that promote alternative transportation options. Golden has demonstrated leadership and a commitment to transportation electrification by installing 20 public EV charging stations and by requiring all new multifamily and commercial developments to install Level 2 chargers. In addition, to electrification of the municipal fleet, Golden also intends to lead by example in supporting the use and investment of EVs within the community and as part of the regional transportation system.

Electrification Goals

The Municipal Fleet Electric Vehicle Master Plan effort is one strategy in working toward the City's adopted sustainability goals. In February 2019, the Golden City Council updated its community and municipal sustainability goals through Resolution No. 2556 to include:

City of Golden Sustainability Goals, adopted February 2019	
Energy	Renewables. To achieve 100% renewable energy for electricity by 2030 and 100% renewable for heating by 2050. To align Greenhouse Gas Emission reductions with the Paris Accord by 2050.
	Efficiency. To reduce consumption of electricity by 15% by 2030 and reduce consumption of natural gas by 15% by 2030.
	Transportation. To achieve 20% fossil fuel-free transportation sector by 2030 and 100% fossil fuel-free transportation sector by 2050.
Waste	Recycle 80% of recyclables by 2030.
	Compost 80% of compostables by 2030.
	Reduce total trash by 20% by 2030.
	Strive for zero waste in municipal operations by 2030.

[1] City of Golden 2019 Greenhouse Gas Emission Inventory Report. www.cityofgolden.net/live/sustainability-initiative/renewable-energy

Water	Responsible Use. To reduce per capita total water use in Golden by at least 15% by 2030
	Drought Planning. To develop a resiliency plan by 2020 to prepare for a time where Golden's and Colorado's climate may be substantially warmer and drier than it is today.
	Resource Recovery. To develop and implement a plan by 2020 where Golden's surplus water is used effectively not only to manage the cost of water and sewer services, but to enhance the environment in Golden and elsewhere in our watershed. And to recover resources from the city's wastewater by 2030.

Subsequently, in December 2020, the Golden City Council adopted Resolution No. 2771 and pledged to develop policies and strategies to meet the following transportation electrification objectives:

City of Golden GoEV Pledge	
1	Improve transportation and social equity and extend the benefits of transportation electrification to low-income households and communities disproportionately affected by the harmful effects of air pollution.
2	**Create a municipal fleet electrification plan by 2021 to include a phased approach to meet 100% of the City's fleet for electrification by 2030 and adopt an "EV First" philosophy for new vehicles with electrifying other vehicles as expeditiously as practicable. The City will develop a decision-making matrix to include the total cost of vehicle ownership, including fuel and maintenance costs, and the social cost of carbon in its vehicle procurement calculations. A citywide electrification master plan including regulations and incentives shall be created by 2023.**
3	Transition to medium and heavy duty zero emission vehicles and off-road equipment as these vehicles become available in Colorado if they can fully support the needs of the departments operations and departmental budgets can accommodate both vehicle acquisition and the associated charging infrastructure.
4	Support the electric vehicle charging station infrastructure needed to accommodate the transition to electric vehicles considering the availability and sustainability of resources, council priorities and budget constraints.
5	Work with the Jefferson County School District and the Colorado School of Mines to develop a roadmap to zero-emissions electrification of all new transit and school buses by 2025.
6	Advocate for having the Regional Transportation District transition all bus routes within the city to zero-emission by 2030.
7	Work with other municipal partners and with shared fleets such as taxis, rideshare, and carshare companies to transition these shared fleet vehicles to full electric fleets by 2030.
8	Work with the community on programs, policies, incentives, and regulatory approaches to transition 20% of all vehicles within the city to zero emissions by 2030, and 100% of all vehicles by 2050.
9	Develop partnerships with micro-mobility companies to promote the use of fossil fuel-free alternative transportation options such as electric bikes and bicycles.

One item to note is that with the efforts to electrify transportation, it is projected that the municipality and community electricity consumption will increase. The City's parallel goal of working toward achieving 15% overall energy conservation target by 2030 is intended to focus on increasing the energy

efficiency of buildings and pairing additional renewable energy systems to offset the increase in electricity use.

State Actions

This Plan is expected to also assist, and benefit from, the State's leadership toward electrifying transportation. In 2020, Colorado updated its Colorado Electric Vehicle Plan 2020 which envisions a large-scale transition of Colorado's transportation system to zero emission vehicles with a long-term goal of 100% of light-duty vehicles being electric and 100% of medium- and heavy-duty vehicles being zero emission. The State proposes to accomplish its goals through five strategies:

- Increasing the number of light-duty EVs to 940,000 by 2030.
- Developing plans for transitioning medium-duty (MDV), heavy-duty (HDV) and transit vehicles to zero emission vehicles (ZEVs)
- Developing an EV infrastructure goal by undertaking a gap analysis to identify the type and number of charging stations needed across the state to meet 2030 light-duty vehicle, MDV and HDV goals
- State government agencies meeting directives and goals related to EVs from the updated Greening State Government Executive Order
- Developing a roadmap to full electrification of the light-duty vehicle fleet in Colorado

The strategies adopted by the State support Golden's sustainability goals and the strategies outlined in this Plan. The city organization should remain engaged with state programs to apply for any financial or planning incentives that may become available.

Strategies

Building on previous commitments through the City of Golden Sustainability goals (Resolution No. 2556) and the GoEV commitment (Resolution No. 2771), the organization will work toward achieving the vision through the following strategies:

1. Define and categorize which vehicles and equipment can be counted toward the City's 100% goal by 2030 and utilize a phased approach toward new purchases, including adopting an "EV first" philosophy for new vehicles if an acceptable electric or hybrid alternative is currently available and electrifying other vehicles when acceptable options are commercially developed.
2. To document and share a decision-making matrix to include the total cost of vehicle ownership, including fuel and maintenance costs and the social cost of carbon in its vehicle procurement calculations and to create a review and input process by City staff and the Community Sustainability Advisory Board.
3. To transition to medium- and heavy-duty zero emission vehicles and off-road equipment as these vehicles become available if they can fully support the needs of the department operations with prioritization for funding.
4. To electrify additional gas-powered equipment as feasible and as technology becomes available.

5. To support EV charging station infrastructure needed to accommodate the transition to EVs considering the availability and sustainability of resources, City Council priorities and budget constraints.

Electric Vehicles

The term EV includes several different types of vehicles. Specifically, all EVs can be plugged in and powered solely by electricity, however hybrid EVs are also powered using an internal combustion engine with conventional fuels such as gasoline or diesel. EVs are available for use in applications other than passenger vehicles, such as small utility vehicles, golf carts and transit vans. This Plan will also address electrification of other internal combustion engine (ICE) equipment such as mowers, chain saws, and landscaping equipment. Currently, EVs suitable for medium- and heavy-duty applications are under development.

Vehicle Type	Description	Example
Plug-in Hybrid Electric Vehicle (PHEV)	PHEVs are powered by an internal combustion engine (ICE) and an electric motor that uses energy stored in a battery. The vehicle can be connected to an electric source to charge the battery. PHEVs can operate on either electricity or gasoline.	Ford Interceptor Chevrolet Volt Ford Escape hybrid Ford Maverick hybrid truck
Battery Electric Vehicle (BEV)	BEVs use a battery to store the electric energy that powers the motor. A BEV does not have an ICE and is charged by connecting to an electric source.	Nissan Leaf Ford Lightning F-150 Tesla Model Y Kia EV6 Hyundai IONIQ 5

Participants and Process

The City convened an internal Electric Vehicle Master Plan group of employees who met six times over several months in 2021 and 2022 to discuss issues, concerns, and opportunities. More than 20 employees were invited from 11 different departments to provide input which was used as the basis to create this document. The meeting topics included:

- April 1 – Review of City Council goals, master plan process, timeline, and departmental interests
- May 6 – Fleet and Equipment inventory, vehicle replacement policy, baseline evaluation, initial opportunities, and budget considerations.
- June 10 – Charging infrastructure needs, mapping of potential locations and electrical power considerations.
- June 17 – Field trip to Lightning eMotors assembly facility in Longmont. Test drives of electric passenger vans and information about electric conversions of truck and cargo van models and leasing opportunities.
- September 16 – Presentation and demonstration from City of Arvada fleet managers to show their Ford Interceptor police department SUV, which is a plug-in hybrid EV.

- March and June 2022 – Review of draft Municipal Fleet Electric Vehicle Master Plan and discussion

Key Issues

The group identified several key issues that are addressed within the master plan or are requiring additional research as needed.

- Start small but plan big. Work on smaller efforts while tracking and planning larger projects to maintain progress.
- Identify vehicle charging locations and existing electrical capacity.
- Safety concerns for vehicle accidents and battery fires.
- Concerns about the high initial cost of electric vehicles.
- Can the municipality's existing electrical capacity handle additional charging stations? What funding will be needed to install chargers?
- How will the additional electrical load affect the organization's current solar photovoltaic system in terms of production and net zero electricity status for each building? Will this affect the capacity of the backup diesel generators needed for certain buildings?
- How will an EV's battery lifespan affect the City's vehicle replacement policy?
- What heavy duty vehicles are available or could be in the future, such as asphalt rollers, snowplows, and fire engines?
- What are the environmental costs of battery disposal?
- Evaluate the need for "smart" charging stations versus manual data tracking systems.
- Every facility is different, every operation and task may require a different solution for charging – not a one size fits all approach.
- Partnerships with local utility, Xcel Energy.

Reduced GHG Emissions

Lifecycle GHG emissions of EVs are lower than gas powered cars, but how much lower depends on many factors (type of cars being compared, size of batteries, location, fuel sources of power, miles driven, etc.)[2] EVs have higher GHG emissions to manufacture (predominantly batteries) but this difference is made up within a few years due to no tailpipe emissions. Internal combustion engine (ICE) vehicles use only 12% to 30% of the input energy to move the vehicle, compared to 77% to 100% in EVs.[3] The City Fleet and Maintenance buildings where most of the future electric vehicles are likely to be charged overnight are currently "net-zero" for electricity with more than 260kW of solar photovoltaic panels offsetting the buildings electric use each year.

[2] Transportation Energy Data Book: Edition 38-2019. Available online: www.carbonbrief.org/factcheck-how-electric-vehicles-help-to-tackle-climate-change

[3] U.S. Department of Energy. Where the Energy Goes: Electric Cars. Available online: www.fueleconomy.gov/feg/atv-ev.shtml

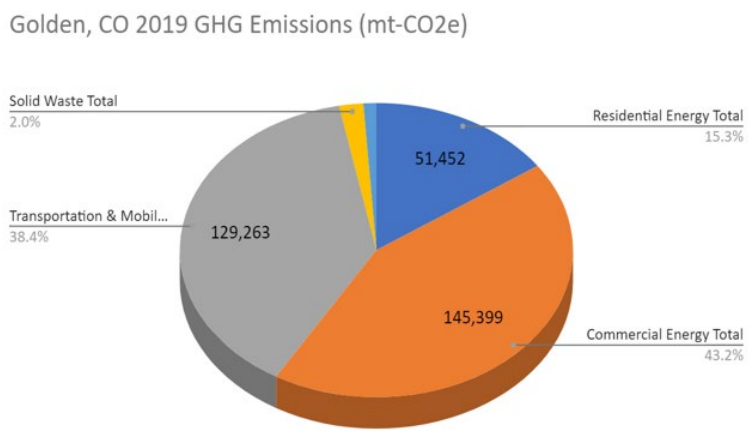
The transportation sector accounted for 34.7% of carbon dioxide emissions and 29.2% of all greenhouse gas emissions in the U.S. in 2017. The industrial sector is the only sector that accounts for more GHG emissions than the transportation sector.[4]

Total U.S. Greenhouse Gas Emissions by End-Use Sector, 2017
(million metric tons of carbon dioxide equivalent[a])

	Carbon dioxide	Methane	Nitrous oxide	Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride	Total greenhouse gas emissions
Residential	917.2	4.2	9.7	33.4	964.5
Commercial	844.7	125.7	16.0	52.1	1,038.5
Agricultural	85.7	248.8	286.3	0.1	620.9
Industrial	1,562.2	276.2	33.9	43.4	1,915.7
Transportation	1,814.5	1.4	14.6	40.1	1,870.6
Total greenhouse gas emissions	**5,224.3**	**656.3**	**360.5**	**169.1**	**6,410.2**
Transportation share of total	34.7%	0.2%	4.0%	23.7%	29.2%

Additionally, Golden's latest greenhouse gas emissions inventory report estimated that the Transportation and Mobile Sources sector accounts for 34% of Golden's community-wide emissions.[5]

Scope	Sector	Emissions (MT-CO_2e)
Scope 1	Transportation & Mobile Sources	129,263
	Commercial Energy	49,248
	Residential Energy	25,310
	Process & Fugitive Emissions	2,420
	Total	**206,241**
Scope 2	Commercial Energy	96,151
	Residential Energy	26,142
	Total	**122,193**
Scope 3	Solid Waste	6,686
	Water & Wastewater	3,587
	Total	**10,273**



EVs are an important part of meeting global goals on climate change. They feature prominently in mitigation pathways that limit warming to below 2C or 1.5C, which would be in line with the Paris Agreement's targets.

While greenhouse gas emissions are primarily produced in the electricity provided as fuel, emissions are also used to manufacture the vehicle and battery. From carbonbrief.org[6],

[4] U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2017, April 22, 2019. Available online: www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2017
[5] 2019 City of Golden Greenhouse Gas Emissions Inventory Report. Available online: www.cityofgolden.net/live/sustainability-initiative/renewable-energy
[6] www.carbonbrief.org. Available online: https://www.carbonbrief.org/factcheck-how-electric-vehicles-help-to-tackle-climate-change

- EVs are responsible for considerably lower emissions over their lifetime than conventional internal combustion engine vehicles.
- As countries decarbonize electricity generation to meet their climate targets, driving emissions will fall for existing EVs and manufacturing emissions will fall for new EVs.
- Recent studies from the International Council for Clean Transportation show that in most countries, the majority of emissions over the lifetime of both electric and conventional vehicles come from vehicle operation, tailpipe and fuel cycle, rather than vehicle manufacture.
- In addition, if the climate targets set in the Paris Agreement are to be met, electricity generation will become significantly less carbon-intensive, further increasing the advantage of electric vehicles over conventional ones. Locally, Golden's main energy utility provider, Xcel Energy, aims to provide customers with 80% of its electricity derived from renewable sources, by 2030 according to the 2019 Xcel Energy Carbon Report.

The Massachusetts Institute of Technology also studied the costs and carbon intensities of 125 light-duty vehicles and evaluate them against U.S. emission reduction targets through 2050[7]. MIT's results show that EVs do not cost more and have significant lower net GHG emissions than equivalent combustion engine vehicles, even when accounting for typical emissions from electricity plants.

Reduced Lifetime Fuel Costs

Electric vehicles can reduce fuel costs dramatically because of the high efficiency of electric-drive components. Because all-electric vehicles and PHEVs rely in whole or part on electric power, their fuel economy is measured differently than that of conventional vehicles. Miles per gallon of gasoline equivalent (MPGe) and kilowatt-hours (kWh) per 100 miles are common metrics. Depending on how they are driven, today's light-duty all-electric vehicles (or PHEVs in electric mode) can exceed 130 MPGe and can drive 100 miles consuming only 25-40 kWh.[8]

PHEVs typically achieve better fuel economy and have lower fuel costs than similar conventional vehicles. The fuel economy of medium- and heavy-duty all-electric vehicles and PHEVs is highly dependent on the load carried and the duty cycle, but in the right applications, all-electric vehicles maintain a strong fuel-to-cost advantage over their conventional counterparts.

Reduced Operating Costs

Maintenance costs for a light-duty, battery-powered car are around 40 percent less per mile than for a gas-powered car, according to a recent report from the U.S. Department of Energy's Argonne National Laboratory.[9] The report explains that electric vehicles lack timing belts, oxygen sensors, fuel filters, spark plugs, multi-speed transmissions and other parts than can prove costly to service in conventional cars. And, whereas gas-powered cars require regular oil changes, EVs have no need for motor oil.

The 2021 report found that while gasoline-powered cars cost around 10 cents per mile on average to maintain, electric cars cost only around 6 cents per mile. Hybrid cars cost around 9 cents per mile to

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[7] Environ. Sci. Technol. 2016, 50, 20, 10795–10804, Publication Date: September 27, 2016. Available online: https://doi.org/10.1021/acs.est.6b00177

[8] Electric Vehicle Benefits and Considerations. U.S. Department of Energy Alternative Fuels Data Center. Available online: afdc.energy.gov/fuels/electricity_benefits.html

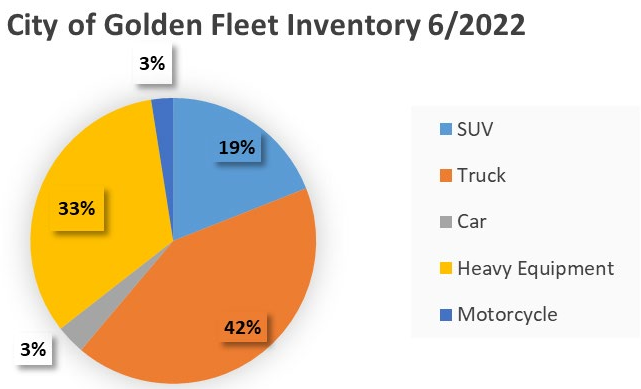
[9] Comprehensive Total Cost of Ownership Quantification for Vehicles with Different Size Classes and Powertrains. April 2021. Argonne National Laboratory. Available online: publications.anl.gov/anlpubs/2021/05/167399.pdf

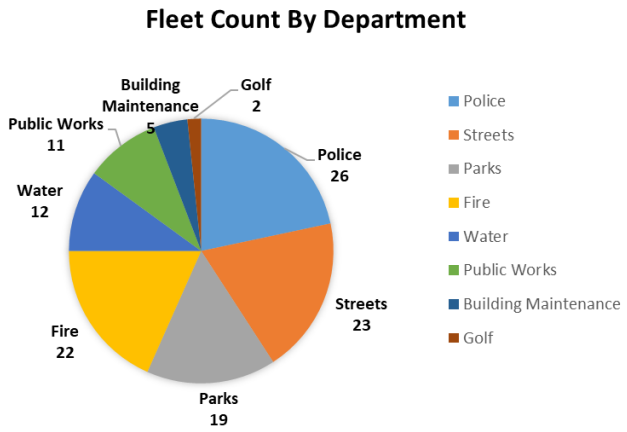
maintain, with savings on brake maintenance making them cheaper to service than conventional vehicles. The findings add to a growing body of work showing that, factoring in savings on maintenance and fuel, EVs are often cheaper to maintain and have competitive up-front purchase prices as compared to conventional vehicles.

City of Golden Municipal Fleet Assessment

Current Municipal Fleet Composition

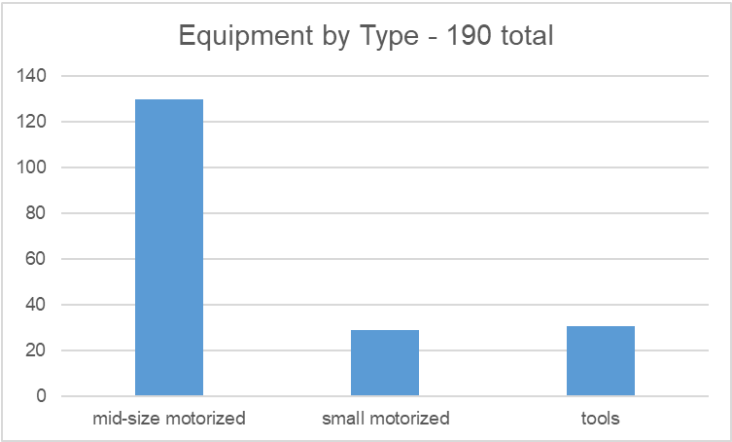
The City of Golden has a fleet of 121 vehicles spread between 8 municipal divisions as shown below. These vehicles are stored in three garages and 8 warehouse areas throughout the City.

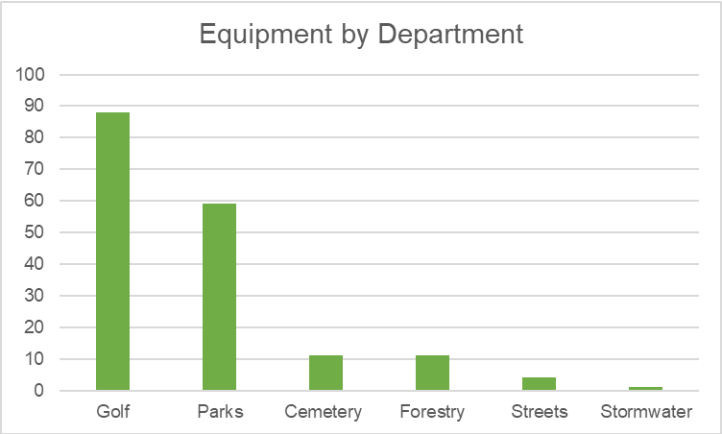




Combustion Engine Equipment Inventory

Additionally, the City has 195 gas-powered pieces of equipment, mainly used by the Parks, Utilities, Forestry, Golf and Water Treatment Plant divisions (Appendix E). Staff from these departments are aware of some battery options already available for these models and many track progress on the performance and cost of new electric alternatives. The Forestry and Parks divisions currently utilize electric models for some landscaping tools. The Fire department recently converted several on-board tools supplied on the main fire engines to electric equipment.





General Background and Use of Fleet vehicles

In 2021, City staff began working to identify, prioritize and sequence vehicles for replacement with EVs. This section describes the current fleet composition, the methodology behind the fleet electrification analysis and the results and recommendations from the analysis.

Methodology

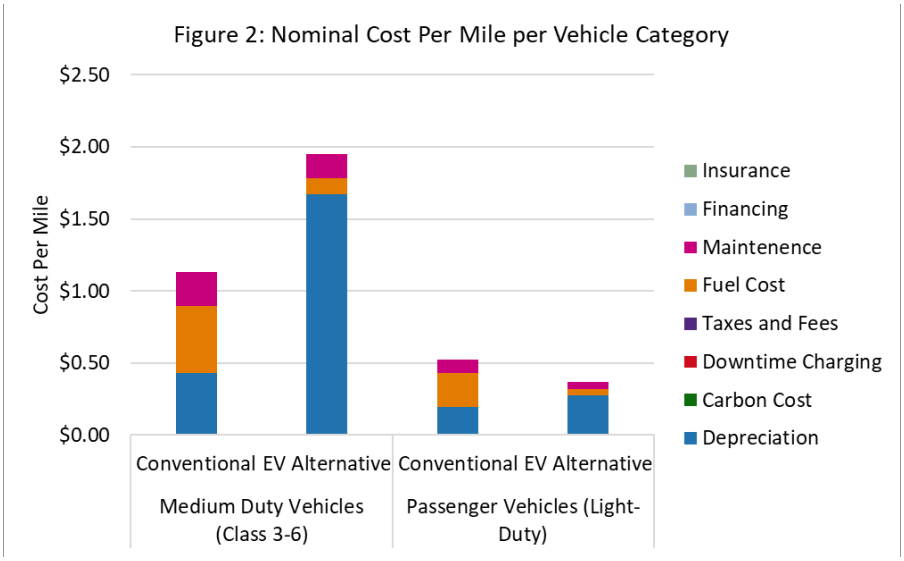
Step 1. Initial screening by City. Beginning with the full municipal fleet (314 vehicles and equipment), staff removed non-motorized vehicles (e.g. trailers, tree chippers and spades, concrete mixers, sign trailers and compressor trailers) and then sorted small motorized vehicles (e.g. skid steers, lawn mowers, tractors, utility carts, asphalt patchers and ATVs) and combustion engine equipment (e.g. chainsaws, generators, water pumps, push mowers, backpack blowers, limb chippers, aerators, edgers, and pressure washers) into a separate "equipment" category.

Step 2. Categorization and Baseline of Vehicles and Equipment. Using the DRIVE tool offered by the Electrification Coalition, the vehicles were compared with EV models available on the market today or available through the Climate Mayors EV Purchasing Collaborative. This step showed a division between vehicles that could have an electric equivalent and those that do not yet have an equivalent, mostly large medium- and heavy-duty vehicles. For example, snowplows and fire trucks do not currently have an EV replacement equivalent on the market.

Step 3. Analysis of EV replacement models. The DRIVE Electric tool and calculators available on the U.S. Department of Energy's Fuel Economy website provide information to estimate total vehicle costs for each fleet vehicle by summing the time-discounted depreciation, fuel, maintenance, and repair costs over the vehicle's lifetime, assumed to be 10 years and 100,000 miles. The DRIVE Electric tool allows for input of local assumptions, including local fuel costs (for gas, diesel and electricity) as well as information tracked by the departments (original purchase price, current mileage). The electricity cost for EVs was assumed to be $0.085 per kilowatt hour. All costs were placed into a cost per mile metric.

Total Cost of Ownership Analysis. This analysis was conducted using a total cost of ownership (TCO) approach to project the cost of all vehicles over their expected useful lives. TCO includes vehicle purchase price, operating, and maintenance cost over the life of the vehicle, as well as charging infrastructure cost, if it was included. To project the value of each vehicle, the analysis uses the depreciated value of the vehicle at the end of its useful life. Annual depreciation is calculated using the purchase price, range, and annual mileage for each vehicle and relies on a formula developed using real world used vehicle sales data. The analysis includes a calculation of the net present value (NPV) of 100 percent electrification compared to 100 percent conventional vehicle use. This takes the NPV of the TCO of all vehicles across the fleet by vehicle class.

Fleet Analysis. The charts below show the average total cost of ownership on a cost-per-mile basis across each vehicle's useful life. Figure 2 shows the average across each vehicle category, while figures 3 and 4 show the average across use cases for passenger vehicles and medium/heavy-duty vehicles.



Fleet Replacement Schedule

Administered by the Fleet division, the City of Golden vehicle replacement program lists equipment and vehicles by category. Appendix B outlines the types and replacement cycles for City vehicles, based on expected years as well as optimal mileage or hours. To ensure maximum value for life of vehicle, without jeopardizing resale value, along with maintenance costs, these formulas have been adopted but may be adjusted with consideration of electric vehicles and equipment.

Annual costs per vehicle are calculated by taking the initial purchase price, less the estimated trade value, with the balance divided by the projected years of service. These annual costs are used to budget for the City's vehicle replacement fund. These vehicle lifecycles are to be monitored and compared to the industry standard, as well as checked on an annual basis for cost effectiveness and overall usage.

As part of this master plan, the City of Golden Fleet Vehicle Replacement Schedule will be revised to reflect how decisions will be made about vehicle replacement so that at each decision point, consideration and analysis is given to purchasing a vehicle that would reduce or eliminate carbon emissions as well as established considerations of departmental needs, usage, and overall cost.

Electric Vehicle Charging Infrastructure

Charging equipment for EVs, also called electric vehicle supply equipment (EVSE), is available in different levels based on the rate that the battery is charged. The time needed to fully charge an EV will vary based on the size of the battery, how depleted the battery is, and the electric current of the EV charging equipment.

Siting of charging stations will be important to municipal operations and daily tasks. The following table provides an overview of EV charging levels, including the amount of range each level provides an EV, the connector types used, and typical applications.

Class	Electric Current	Charging Rate (from depletion)	Connectors	Primary Use

Level 1	Alternating Current (AC) 120-volt, 20 amp	8-17 hours	J1772	Residential Workplace Fleet
Level 2	AC 208/240-volt, 30 amp	4-10 hours	J1772	Residential Workplace Fleet Public
Level 3/DC Fast Charge	Direct Current 208/480V 80-200A and higher	15-30 minutes	J1772 Combo (CCS) or CHAdeMo Tesla	Fleet Public

With knowledge already gained from the installation of ten public charging stations, the City should plan to install fleet chargers as close to the service or electrical panel as possible to reduce costs. However, it will also be important to choose locations that best meet the needs of operations and overnight parking. EV charger deployments should be coordinated with other departments with communication of new efforts. Electrical panel capacity should be considered, along with the potential for future expansions. Installing larger or more conduits should be included as a best practice in most installations.

Ultimately, EV charging infrastructure costs in Colorado are considerably lower than many parts of the U.S., and the state has a history of regulatory approval and financial incentives to promote public and private charging infrastructure[10]. It is anticipated that Golden will be able to utilize funding opportunities to cover significant portions of the costs for installing fleet chargers.

Additional Considerations

Performance & Operational Capabilities

Driving an EV in Colorado, with its cold weather and mountainous terrain, poses unique operational considerations, specifically range uncertainty. With extremely cold outside temperatures, EV driving range and miles per kW can be reduced. While the average low temperature in Golden during the winter months is around 25 degrees Fahrenheit, temperatures can get much colder in surrounding mountainous areas.

Because BEVs do not have an internal combustion engine and therefore do not require oxygen to operate, going up steep mountain grades or passes where oxygen is sparse is much more efficient than in a conventional gasoline vehicle. Driving uphill for an extended period or while under load does, however, use more battery than driving on flat terrain. Alternatively, EVs use regenerative braking, which can add a limited amount of power back into the battery when driving downhill.

City of Golden staff duties often require vehicles with off-road or towing capabilities. The first several electric SUVs and electric light duty trucks should be tested and evaluated for performance for suitability by all departments who currently or have a potential need in the future to use a light duty truck, including the following criteria:

[10] Electric Utilities and the EV Market: A Decision-Making Tool for State-Specific Strategies, April 2020, Jaishankar and Weaver, available online: https://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/20454/MP%20Final%20Report_Jaishankar_Weaver.pdf?sequence=1&isAllowed=y

- Document experience with electric vehicle chargers.
- Understand the electric vehicle versus conventional vehicle use.
- Understand the total cost of operation, including electricity consumption, GHG emissions and equivalent fuel economy of the EV with conventional gas or diesel vehicles over a range of operation.
- Understand the range and performance of city EVs under various conditions.
- Understand the extra modifications from safety and security packages that certain community safety vehicles require, such as police and fire, beyond the original condition of stock vehicles.
- Provide opportunities for user evaluations and incorporate comments into a summary report to be made available to City staff and elected officials.

Heavy-Duty Vehicles and Charging

Medium- and heavy-duty vehicles made up 24% of US emission in 2019, making them an attractive candidate for electrification[11]. Adoption has been slow due to few available vehicle models and limited range. Cities and companies have been focusing on electrification of other medium- and heavy-duty vehicles that operate intracity, including transit buses manufactured by local company Proterra, cargo vans by Longmont-based Lightning eMotors and limited numbers of heavy vehicle prototypes being tested nationally and internationally for fire trucks and snowplows.

While charging for heavy-duty trucks is still being developed, electric transit bus technology has been widely implemented and may serve as an analogy for heavy-duty truck charging. Battery electric buses can charge through wireless (or inductive) charging, on-route overhead DC fast charging, and in-depot plug-in charging. Plug-in charging is the slowest of charging methods and is typically used for overnight refueling at the bus depot. While plug-in charging is the least expensive of the three methods, a 2018 report by the Transportation Research Board found that half of surveyed agencies use on-route overhead conductive chargers. Although limited information is available, plug-in charging has been reported to cost $50,000 and overhead DC fast charging has been reported to cost $665,000, so the only viable option for trucks currently may be plug-in charging.

City staff will need to stay abreast of the rapidly-evolving availability, operational costs and charging options for medium- and heavy-duty vehicles. Currently, these vehicle classes within Golden's fleet are not considered economically or technologically suitable for electric vehicle replacement.

Battery Production and Recycling

Critical earth elements typically found in EV batteries include lithium and cobalt, which are fully recyclable. While mining does have environmental impacts for both conventional and electric vehicles, the energy and GHG benefits of EVs mean lower life-cycle energy requirements and lower GHG emissions than conventional vehicles. Researchers are working to decrease the impacts of battery manufacturing and for manufacturers will continue to seek substitutes for rare earth metals in electric motors. When a battery does need to be replaced, it may only be necessary to replace a few cells of the battery and the old battery can be recycled or reused. The International Council on Clean Transportation publishes more resources on EV battery recycling and effects of battery manufacturing on EV lifecycle emissions[12].

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[11] Environmental Protection Agency. Fast Facts on Transportation Greenhouse Gas Emissions. (2018). Available online: www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions

[12] Effects of battery manufacturing on electric vehicle life-cycle greenhouse gas emissions. Available online: theicct.org/sites/default/files/publications/EV-life-cycle-GHG_ICCT-Briefing_09022018_vF.pdf

Many EV battery manufacturers currently offer an average warranty of 8-10 years, meaning they should not need to be replaced during the vehicle's typical lifetime within the requirements of the adopted City of Golden Fleet Replacement Schedule. However, similar to how the overall condition impacts resale of a used combustion engine vehicle, a used electric vehicle nearing the end of its battery lifecycle may have also have impacts on resale values and overall cost of ownership.

Funding

The City of Golden intends to fund electric vehicle and equipment purchase through a similar funding process and replacement timeline as it currently follows for gas-powered vehicles. In addition to City funding, some enhanced funding sources may be available to subsidize and accelerate EV replacements.

Capital Improvement Plan

The City maintains a 10-year Capital Improvement Plan (CIP) which lists projects requiring larger funding for capital items. The appropriate CIP project worksheets should be prepared and submitted for consideration of inclusion into the CIP. Using the Electric Charging Infrastructure Plan identified in previous sections, the organization should plan to install charging stations each year, in advance of receiving new vehicles and should consider potentially combining these projects with energy efficiency and renewable energy projects where feasible.

Future Planning

To better prepare for future phases of EV planning, the City should also update their annual plans to include consideration for:

- Parking for EVs and charging equipment into remodels and new construction of municipal buildings.
- An annual review of new vehicles that may be arriving to market.
- A strategy to consider medium and heavy-duty vehicles which will require more power and may become available from the market as PHEVs first.
- Partnerships with other private entities that perform duties related to traditional community services, such as waste haulers that may utilize electric garbage trucks and electric school buses. The City should also consider charging station incentives for companies providing these uses.

Grants and Incentives

There are several existing incentives and funding sources related to EVs both at the national and state levels. Colorado is one of the leading states in the country for availability of EV-related incentives, offering incentives of up to $7,000 for a light-duty EV, as well as $9,000 in grants for Level 2 charging stations and $30,000 in grants for DC fast charging infrastructure. While funding for EVs and EV infrastructures is available in 2022, programs are subject to change due to a variety of reasons, including market conditions and the inability for the municipal organization to take advantage of tax credits. Other potential sources of funding include:

- The federal Transit Administration low or no emission Vehicle Program offers varying amounts of funding to state and local governments are eligible to receive program funds to purchase or lease zero-emission and low emission transit buses and supporting fueling facilities.

- The federal Public Transportation Innovation Program offers funding to a variety of eligible recipients to develop research, demonstration, and deployment projects and assist transit agencies in meeting the needs of their customers.
- The federal Bipartisan Infrastructure Bill provides $8 million for FY22 and more than $57 million for the next five years.
- The Environmental Protection Agency and Diesel Emission Reduction Act (DERA) provides funding and supports replacement of diesel vehicles, engines and equipment including heavy-duty vehicles, construction, and cargo equipment.
- The Charge Ahead Colorado provides up to $30,000 per charger or vehicle through The Colorado Energy Office (CEO) and the Regional Air Quality Council (RAQC) provide grants to support EV adoption by individual drivers and fleets. CEO and RAQC will fund 80% of the cost of EV charging, up to specified amounts. RAQC will fund 80% of the incremental cost difference between a qualified EV and a comparable gasoline vehicle, up to the specified amount.
- The Colorado Energy Impact Assistance Fund Grant provides funding through The Colorado Department of Local Affairs (DOLA) provides funding for the incremental cost of EVs for public fleets. DOLA funding can cover the matching funds required by the RAQC grant program.
- The Climate Mayor EV Purchasing Collaboration leverages the collective buying power of governments across the U.S. to accelerate the conversion of public fleets to EVs and provides an online procurement portal for local governments to competitively bid EVs and charging infrastructure and financing options.

Recommendations

By replacing its vehicle fleet with EVs, Golden can reduce both fleet emissions and operating costs. Golden will establish incremental City fleet targets for purchases of light duty EVs and consider EV procurement for any vehicle replacements when suitable EV options are available with equivalent operational capability.

1. The City will pursue electrification opportunities within the City's fleet and equipment through the following:

Action		Lead Department(s)	Deadline
1A	Adopt a phased approach to EV, hybrid and plug-in hybrid purchases and develop a decision-making matrix for internal use for all future vehicle purchases. The organization should understand and communicate the demands of a fully electric fleet and work toward acquiring electric vehicles balanced with meeting the service needs of the organization.	All	Citywide policy
1B	Increase EVs in the City fleet by purchasing BEVs or PHEVs for all new light-duty truck procurement.	Fleet	2025

1C	Adopt a decision-making matrix to evaluate, document and share decisions made for each vehicle purchase to be transparent in how the organization is proceeding toward its target goals. Appendix A provides a template for City use in evaluating and deciding whether an electric option for future vehicles is appropriate. Considerations include a total cost of ownership analysis for each vehicle (vehicle cost, fuel, maintenance, insurance, etc.), life-cycle greenhouse gas emissions, embodied energy of manufacturing and disposal, ability to achieve the City's sustainability goals and ability to meet departmental needs.	Fleet Sustainability Finance	August 2022 and ongoing refinement
1D	Publish planned EV replacements for next calendar year for review and provide input. Revisit and update Master Plan decision-making process as needed.	Fleet Sustainability CSAB	Annually
1E	Purchase two fully electric BEV light duty trucks and two PHEV police vehicles in 2022.	Fleet	Ordered, awaiting delivery
1F	Develop a plan to maintain an inventory and schedule of replacement of gas-powered equipment by 2030.	Parks Fire Facilities	2023
1G	Evaluate fleet efficiency to consider consolidation of miles on fewer vehicles and reducing vehicle miles traveled.	Fleet	Bi-annually, beginning in 2023
1H	Pursue the feasibility of a pilot program to try electric technologies in larger trucks – street sweepers or a partnership with a waste services provider to consider electric garbage trucks.	Sustainability Fleet	2023
1I	When possible, prioritize transit, carshare and rideshare.	All	Citywide policy
1J	Aggregate purchasing and shared services across departments.	All	Citywide policy

2. Infrastructure Development. The City will evaluate current conditions and create an Electric Charging Infrastructure Plan to include the following:

Action		Lead Divisions	Deadline
2A	Identify potential municipal fleet parking sites and install 2-5 fleet EV chargers to prepare for the delivery and wider use of the initial electric truck vehicles.	Sustainability Fleet	2022
2B	Create an EV Infrastructure Implementation Plan that outlines the specific steps that will be taken to install EV charging station and infrastructure for the municipal EV fleet. The Plan should include:	Fleet Facilities Sustainability	2023

	1. Determine locations needed for overnight charging, with consideration of accessibility and security concerns.	Fleet Facilities Sustainability	
	2. Contract with a local installer to provide high level estimates of installation at each site.	Facilities	
	3. Evaluate and select appropriate charging station equipment and consider feasibility of future local maintenance, and ability to collect data.	Sustainability Fleet	
	4. Assess electrical needs of each facility, additional equipment needed and create phased installation timeline.	Facilities	
	5. Evaluate and project charging periods, time of use, electric rates for overnight versus daytime.	Sustainability	
	6. Plan and install signage, concrete bollards, striping, and any access to charging controls.	Streets	
2C	Create an annual maintenance schedule to report problems and include budget expenses for maintenance and annual equipment data subscription costs.	Fleet	2023
2D	Evaluate a partnership with Xcel Energy to install EV charging infrastructure (primarily for Level 2 and DC fast charge). Additional consideration should be provided for infrastructure lead time since it does not always coincide with vehicle purchase lead times.	Sustainability	2023

3. Funding Opportunities. The City will seek outside funding to offset and potentially accelerate achievement of the electrification goals.

Action		Lead Divisions	Deadline
3A	Evaluate EV charger funding via the State of Colorado Energy Office, Charge Ahead Colorado grant program and other sources.	Sustainability	2022
3B	Evaluate EV charger design assistance, fleet programs and incentives offered by Xcel Energy	Sustainability	2022
3C	Evaluate opportunities for bulk purchasing programs offered by the Climate Mayors initiative.	Sustainability	2023
3D	Evaluate leasing of electric vehicles in consideration of fast-changing improvements to battery technology and evaluate leasing versus full ownership terms.	Finance Fleet	2022

4. Data Tracking. The City will publish an annual report to include the progress made toward the goals to date and details about upcoming vehicle and equipment purchases.

Action		Lead Divisions	Deadline
4A	Create a report template to include the number and type of vehicles by class, vehicles replaced with electric version each year, available electric or PHEV options for each vehicle, greenhouse gas emissions impacts, and vehicles identified for future replacement but without current available electric versions.	Sustainability Fleet	2022
4B	Publish the next calendar year's planned vehicle purchases to allow review and comment by City staff and the Community Sustainability Advisory Board before the annual budget review process by City Council.	Fleet Sustainability	Annually, in July
4C	Update the Fleet Purchasing Policy to require documentation and the completion of the decision-making matrix for each vehicle purchase.	Finance	2022
4D	Track fleet vehicle miles traveled or use telematics to evaluate gas and electric vehicles and seek opportunities to benchmark against other municipalities in the region.	Fleet	Annually

5. Education. The City will increase understanding and awareness of EV opportunities within the City staff and promote examples of new electric investments to the community.

Action		Lead Divisions	Deadline
5A	Increase awareness and use of EVs among City employees through quarterly education and promotional materials.	Sustainability Fleet	Annually
5B	Establish guidance for employees about driving EVs, including how to maximize PHEV electric miles	Fleet Sustainability	2023
5C	To understand the latest in new technologies, EV models, performance and charging infrastructure, funding for training opportunities should be made available to Fleet staff and representatives from user departments.	Finance	2022
5D	Electric vehicles and equipment should include signage and badging as a visible promotion and demonstration to the community.	Fleet	Annually

City of Golden

Municipal Fleet Electric Vehicle & Equipment Master Plan

The City acknowledges support and approval of the Plan by the Golden City Council, adopted by Resolution No. 2871 by the Golden City Council on July 26, 2022.

Endorsed by the City of Golden Community Sustainability Advisory Board on June 22, 2022.

With collaboration from City of Golden departments and divisions:

- Sustainability
- Fleet
- Finance
- Public Works
- Facilities
- Parks & Recreation
- Streets
- Police
- Fire
- Utilities
- Water
- Stormwater
- Engineering
- Golf

GOLDEN SUSTAINABILITY

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Appendix A – Decision Making Matrix

City of Golden Electric Vehicle Decision-Making Matrix (Example)

Requesting Department	Public Works
Submittal Date	7/18/2022
Fleet Review Date	7/21/2022

Description of Vehicle Use and Essential Functions

Step 1: Determine if a suitable electric alternative exists for the planned purchase.

Use the DRIVE Electric tool using the existing vehicle VIN to identify a compatible model.

If the vehicle is not a replacement, use the Department of Energy Fuel Economy website to identify compatible models.

Step 2: Using the information from step 1, visit www.fueleconomy.gov to use Compare Side-by-Side tool to source and complete the following information

Specifications	Electric Vehicle	Hybrid Vehicle	Gasoline Vehicle
Year	2022	2022	2022
Manufacturer	Ford	Ford	Ford
Model	Ford F-150	Ford F-150	Ford F-150
Trim	Lightning 4WD Pro	4WD HEV	4WD
Engine	electric	3.5L V6 PHEV	3.5L V6
Vehicle Class	2	2	2
Standard or Extended Range Battery	Extended	n/a	n/a

Performance	Electric Vehicle	Hybrid Vehicle	Gasoline Vehicle
Horsepower Rating (hp)	580	430	400
Tow Capacity (lbs)	10,000	12,700	14,000
Payload Capacity (lbs)	2,235	2,120	
Gross Vehicle Weight Rating (lbs)	6,500	6,250	6,010
Acceleration (0-60, seconds) ***Police only***	4.5	5.8	4
Torque	775		
Power to Weight Ratio (Divide horsepower by weight)			

Fuel Economy	Electric Vehicle	Hybrid Vehicle	Gasoline Vehicle
EPA Fuel Economy (MPGe or MPG, combined)	70	23	20
Total Range (mi.)	320		460-520
Fuel Savings or Expenditure ($)	$ (8,250.00)	$ 2,250.00	$ 4,500.00
Annual Fuel Cost ($)	$ 950.00	$ 3,050.00	$ 3,500.00
Average annual mileage			

Energy & Environment	Electric Vehicle	Hybrid Vehicle	Gasoline Vehicle
Annual Petroleum Consumption (barrels)	0.1	12.9	14.9
Greenhouse Gas Tailpipe Emissions (U.S. tons per ye	0.0	6.4	7.3
Price per ton of carbon for 7 year average life ($50/ton)		$2,240	$2,555

(continued on next page)

Price & Replacement	Electric Vehicle	Hybrid Vehicle	Gasoline Vehicle
Purchase Price ($)	$ 39,974.00	$ 42,000.00	$ 35,510.00
Source			
State Grant Incentive Available ($)	$ -	$ -	$ -
Net Price	$ -	$ -	$ -
Leasing option (yes/no)			
Leasing Price ($)	$ -	$ -	$ -
Leasing Term (yrs)			
City of Golden Replacement Schedule (yrs)			
Step 3: Rank five criteria			
Criteria 1: Performance			
Criteria 2: Average Fuel Economy			
Criteria 3:			
Criteria 4: Price			
Criteria 5: Ability to Meet Departmental Needs			
Step 4: Decision			
Additional Considerations			
Is there an available existing charger where the vehicle will be stored?			
If not, has a charger been included for installation?			

Appendix B – City of Golden Vehicle Replacement Schedule (2022)

Administered by the Fleet division, the City of Golden vehicle replacement program breaks down our equipment and vehicles by category. Listed below are types and replacement cycles for City vehicles, based on expected years as well as optimal mileage / hours. To ensure maximum value for life of vehicle, without jeopardizing resale value, along with maintenance costs, these formulas have been put in place. (Adjustments to these formulas may be necessary under the Municipal EV Master Plan.)

An annual cost per vehicle can be calculated by taking the initial purchase price, less the estimated trade value, with the balance divided by the projected years of service. These annual costs are used to budget for the City's vehicle replacement fund.

These vehicle lifecycles are to be monitored and compared to the industry standard, as well as checked on an annual basis for cost effectiveness and overall usage.

Some vehicles will not meet the criteria set below due to use and mileage and will be assessed on an individual basis. Adjustments to the replacement fund will also be made on an individual basis to cover these assessments.

Vehicle Type	Not older than		Or, not greater than	
Police Patrol	5	years	70,000	miles
Police Investigation	5	years	70,000	miles
Police Administrative	7	years	70,000	miles
Police Vans	10	years	90,000	miles
Police Motorcycles	5	years	50,000	miles
Fire Administrative	10	years	90,000	miles
Fire Light duty truck	10	years	90,000	miles
Fire SUV	10	years	70,000	miles
Light duty truck (>12,000 lbs GVW)	10	years	90,000	miles
Light duty van	10	years	90,000	miles
Medium duty truck (>12,000 lbs GVW)	10	years	70,000	miles
Heavy duty truck, single axle	10	years	100,000	miles
Heavy duty truck, tandem axle	10	years	100,000	miles
Mechanical sweeper	5	years	5,500	hours
Air Sweeper	5	years	5,500	hours
Sewer jet truck	10	years	10,000	hours
Loaders	12	years	10,000	hours
Backhoes	12	years	10,000	hours
Graders	20	years	15,000	hours
Skid Steer loaders	10	years	5,000	hours
Air compressors	15	years	5,500	hours
Turf tractors	10	years	5,000	hours
Riding mowers	4	years	2,000	hours
Turf trucks >2,000 lbs GVW	5	years	2,500	hours
Turf trucks <2,000 lbs GVW	10	years	4,000	hours
Turf sweepers	10	years	3,500	hours
Brush chipper	12	years	4,500	hours
Tree spade	12	years	3,000	hours

Golf carts	5	years	3,500	hours

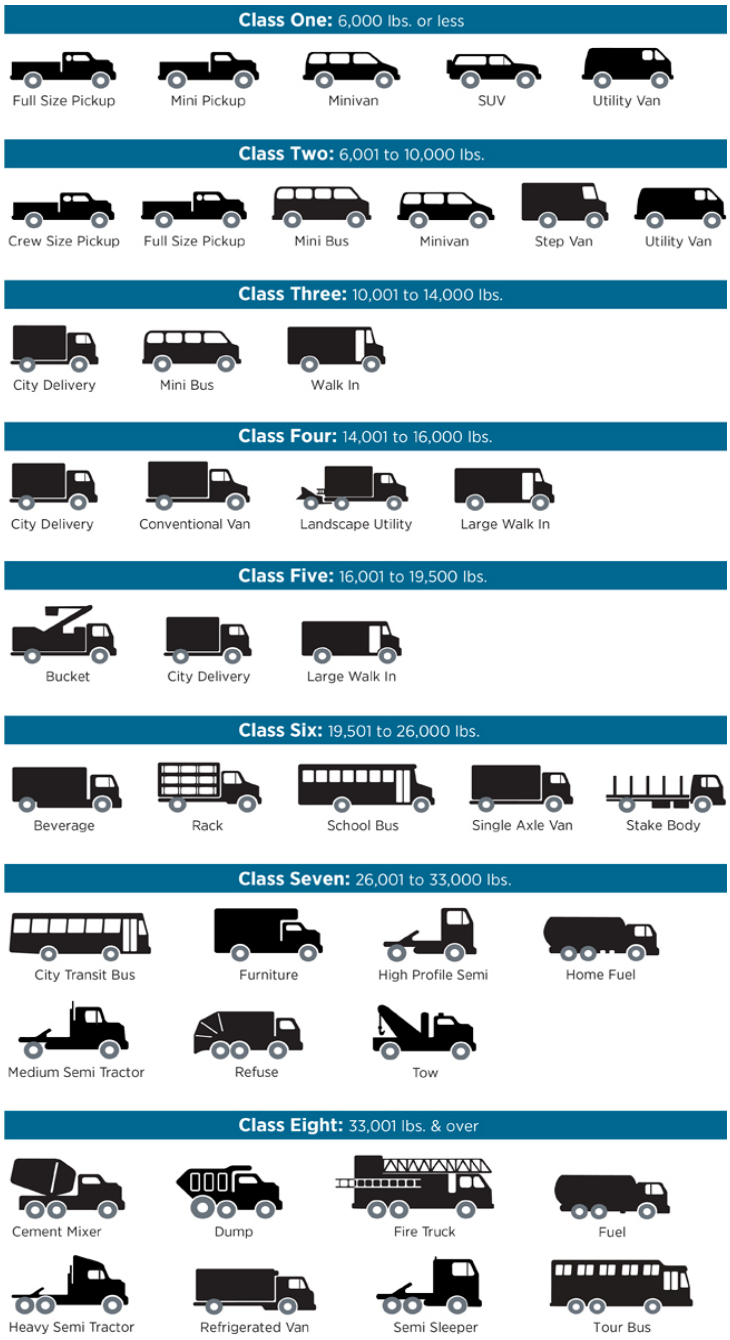
Trailers should be replaced on an as needed basis and budgeted for by the Department that requires them.

Specialized maintenance equipment, water pumps, compaction machinery, crack sealing machines, arrow board trailers, etc., should also be budgeted for and acquired on an as needed basis. Rental of this limited use equipment is strongly recommended.

Trailers and specialty equipment will be maintained by the Fleet division and billed back to the division via actual overhead and maintenance (O&M) costs.

Appendix C – U.S. Department of Energy Vehicle Weight Classes & Categories

Federal Highway Administration	
Vehicle Class	GVWR Catagory
Class 1: <6,000 lbs	Light Duty <10,000 lbs
Class 2: 6,001 – 10,000lbs	
Class 3: 10,001 – 14,000 lbs	Medium Duty 10,001 – 26,000 lbs
Class 4: 14,001 – 16,000 lbs	
Class 5: 16,001 – 19,500 lbs	
Class 6: 19,501 – 26,000 lbs	
Class 7: 26,001 – 33,000 lbs	Heavy Duty >26,001 lbs
Class 8: >33,001 lbs	



These charts illustrate the vehicle weight classes and categories used by the Federal Highway Administration (FHWA)

The vehicle weight classes are defined by FHWA and are used consistently throughout the industry. These classes, 1-8, are based on gross vehicle weight rating (GVWR), the maximum weight of the vehicle, as specified by the manufacturer. GVWR includes total vehicle weight plus fluids, passengers, and cargo.

FHWA categorizes vehicles as Light Duty (Class 1-2), Medium Duty (Class 3-6), and Heavy Duty (Class 7-8). Source: https://afdc.energy.gov/data/10380

Appendix D – Fleet Inventory

Department	Vehicle #	Description	Type	Fuel Type	Average Annual Fuel	Purchase Cost	Average Life	Total maintenance costs
00 REC / BUILD MAINTENANCE DEPARTMENT	08-22	CHEVY TRAILBLAZER	SUV	gas	45	17000	12	$ 13,352.74
00 REC / BUILD MAINTENANCE DEPARTMENT	13-2	GMC 2500 4X4 UTILITY	Truck	gas	265	32000	8	$ 11,293.33
00 REC / BUILD MAINTENANCE DEPARTMENT	16-6	CHEVY COLORADO	Truck	gas	130	24000	8	$ 5,066.98
00 REC / BUILD MAINTENANCE DEPARTMENT	16-7	CHEVY COLORADO	Truck	gas	130	24000	8	$ 3,697.48
00 REC / BUILD MAINTENANCE DEPARTMENT	17-10	FORD F-150 4X4	Truck	gas	100	26000	8	$ 6,289.20
01 POLICE DEPARTMENT	15-3	FORD INTERCEPTOR SEDAN	Car	gas	100	46000	4	$ 24,693.35
01 POLICE DEPARTMENT	15-4	FORD INTERCEPTOR SEDAN	Car	gas	100	46000	4	$ 24,354.56
01 POLICE DEPARTMENT	TC	FORD CROWN VIC - TAXI	Car	gas		0		$ -
01 POLICE DEPARTMENT	TF	2007 CHRYSLER 300 - DTF	Car	gas		0		$ -
01 POLICE DEPARTMENT	14-5	HARLEY DAVIDSON FLHTP	Motorcycle	gas	20	11000	5	$ 20,157.26
01 POLICE DEPARTMENT	19-8	HARLEY DAVIDSON FLHTP	Motorcycle	gas	135	23000	5	$ 10,010.07
01 POLICE DEPARTMENT	20-2	HARLEY DAVIDSON FLHTP	Motorcycle	gas	135	23000	5	$ 10,586.50
01 POLICE DEPARTMENT	11-13	FORD EXPLORER	SUV	gas	30	32000	4	$ 29,908.57
01 POLICE DEPARTMENT	16-16	CHEVY TRAX - PARKING	SUV	gas	120	20000	7	$ 6,910.51
01 POLICE DEPARTMENT	16-21	CHEVY EQUINOX	SUV	gas	100	28000	6	$ 7,639.69
01 POLICE DEPARTMENT	16-22	CHEVY EQUINOX	SUV	gas	100	28000	6	$ 7,200.03
01 POLICE DEPARTMENT	18-1	FORD INTERCEPTOR SUV	SUV	gas	1800	46000	4	$ 28,278.23
01 POLICE DEPARTMENT	18-2	FORD INTERCEPTOR SUV K-9	SUV	gas	1200	46000	5	$ 21,208.65
01 POLICE DEPARTMENT	18-12	DODGE DURANGO DTF	SUV	gas	1300	26000	5	$ 9,547.10
01 POLICE DEPARTMENT	19-1	FORD INTERCEPTOR SUV	SUV	gas	2080	46000	4	$ 20,783.64
01 POLICE DEPARTMENT	19-2	FORD INTERCEPTOR SUV	SUV	gas	2080	46000	4	$ 20,258.24
01 POLICE DEPARTMENT	19-3	FORD INTERCEPTOR SUV	SUV	gas	2080	46000	4	$ 19,108.00

01 POLICE DEPARTMENT	19-4	FORD INTERCEPTOR SUV	SUV	gas	2080	46000	4	$ 18,779.94
01 POLICE DEPARTMENT	19-9	CHEVY EQUINOX	SUV	gas	100	28000	6	$ 6,212.68
01 POLICE DEPARTMENT	19-18	VOLKSWAGEN TIGUAN	SUV	gas	160	28000	6	$ 4,419.16
01 POLICE DEPARTMENT	16-9	CHEVY COLORADO 4 DOOR	Truck	gas	480	29000	7	$ 13,967.68
01 POLICE DEPARTMENT	18-10	FORD F-150 PURSUIT	Truck	gas	850	44000	5	$ 16,245.52
01 POLICE DEPARTMENT	02-10	GMC SAVANA CUBE VAN	Van	gas	25	26500	10	$ 20,278.27
02 FLEET DEPARTMENT	14-14	FORD F-250 4X4 UTILITY	Truck	gas	120	30000	10	$ 4,883.30
02 FLEET DEPARTMENT	15-16	CHEVY 4 DOOR COLORADO	Truck	gas	200	26000	8	$ 2,186.92
03 STREETS DEPARTMENT	03-11	CASE 845 GRADER	Heavy Equipment	diesel	120	205000	20	$ 72,266.80
03 STREETS DEPARTMENT	05-29	CASE 410 SKID STEER	Heavy Equipment	diesel	85	48000	20	$ 38,065.84
03 STREETS DEPARTMENT	11-17	CASE 621E LOADER	Heavy Equipment	diesel	215	165000	12	$ 69,570.38
03 STREETS DEPARTMENT	12-1	CASE 580SN WT BACKHOE	Heavy Equipment	diesel	120	105000	12	$ 42,799.33
03 STREETS DEPARTMENT	12-4	INTERNATIONAL PATCH TRUCK	Heavy Equipment	diesel	260	225000	12	$ 62,027.74
03 STREETS DEPARTMENT	13-24	WACKER RD-12A ROLLER	Heavy Equipment	gas	15	21000	15	$ 4,133.16
03 STREETS DEPARTMENT	14-16	FREIGHTLINER 108SD TANDEM DUMP	Heavy Equipment	diesel	560	265000	10	$ 94,780.91
03 STREETS DEPARTMENT	14-17	VOLVO DD38HF ROLLER	Heavy Equipment	diesel	25	55000	15	$ 2,599.39
03 STREETS DEPARTMENT	15-8	CASE TR270 TRACK SKID STEER	Heavy Equipment	diesel	55	55000	12	$ 34,089.50
03 STREETS DEPARTMENT	15-10	CASE 621F LOADER	Heavy Equipment	diesel	480	185000	12	$ 57,490.68
03 STREETS DEPARTMENT	15-17	FREIGHTLINER 114SD 4X4 DUMP	Heavy Equipment	diesel	420	225000	10	$ 66,160.33
03 STREETS DEPARTMENT	15-18	FREIGHTLINER 104SD DUMP	Heavy Equipment	diesel	400	210000	10	$ 38,122.83
03 STREETS DEPARTMENT	16-19	FREIGHTLINER 108SD DUMP	Heavy Equipment	diesel	400	210000	10	$ 20,082.57
03 STREETS DEPARTMENT	16-20	FREIGHTLINER 108SD 4X4 DUMP	Heavy Equipment	diesel	420	225000	10	$ 50,261.28
03 STREETS DEPARTMENT	17-16	ELGIN BROOM BEAR / FREIGHTLINER	Heavy Equipment	diesel	1600	315000	6	$ 52,353.78
03 STREETS DEPARTMENT	18-18	FORD F-550 DUMP	Heavy Equipment	diesel	360	80000	10	$ 15,130.45
03 STREETS DEPARTMENT	18-19	GLOBAL M4HSD SWEEPER	Heavy Equipment	diesel	1720	315000	6	$ 39,442.94
03 STREETS DEPARTMENT	19-17	FREIGHTLINER 108SD 4X4 PLOW	Heavy Equipment	diesel	420	225000	10	$ 12,377.80
03 STREETS DEPARTMENT	20-1	BOBCAT S595 SKIDSTEER	Heavy Equipment	diesel	30	66000	12	$ 827.99
03 STREETS DEPARTMENT	13-3	GMC 2500 4X4 UTILITY	SUV	gas	1050	28500	8	$ 19,711.64
03 STREETS DEPARTMENT	13-9	FORD F-150 4X4 PICK UP	Truck	gas	80	28500	8	$ 12,095.41

03 STREETS DEPARTMENT	16-15	FORD F-250 4X4 PICKUP	Truck	gas	1750	30000	8	$ 14,035.53
03 STREETS DEPARTMENT	18-8	DODGE RAM 1500 PICKUP	Truck	gas	240	26000	8	$ 5,685.57
04 WATER DEPARTMENT	11-15	JOHN DEERE 410J BACKHOE	Heavy Equipment	diesel	260	105000	12	$ 38,696.27
04 WATER DEPARTMENT	13-23	FREIGHTLINER TANDEM DUMP	Heavy Equipment	diesel	3120	190000	10	$ 44,401.86
04 WATER DEPARTMENT	15-1	ARGO 750 8X8 AND TRAILER	Heavy Equipment	gas	N/A	20000	10	$ 2,905.33
04 WATER DEPARTMENT	16-17	CHEVY TRAX	SUV	gas	80	20000	8	$ 3,868.11
04 WATER DEPARTMENT	12-9	FORD F-150 4X4	Truck	gas	280	28000	8	$ 11,456.93
04 WATER DEPARTMENT	14-12	FORD F-250 4X4 EXT CAB UTILITY	Truck	gas	1040	32000	8	$ 17,379.63
04 WATER DEPARTMENT	16-18	FORD F-250 UTILITY WITH CRANE	Truck	gas	980	30000	8	$ 13,892.63
04 WATER DEPARTMENT	17-14	FORD F-250 4X4 UTILITY	Truck	gas	1060	29000	8	$ 12,461.34
04 WATER DEPARTMENT	19-10	FORD F-250 CREW CAB 4X4	Truck	gas	1080	42000	8	$ 9,284.89
04 WATER DEPARTMENT	19-11	FORD RANGER 4X4 CREW CAB	Truck	gas	55	28000	8	$ 1,104.46
04 WATER DEPARTMENT	13-22	CHEVY G3500 CAMERA VAN	Van	gas	100	42000	12	$ 8,020.04
05 WATER TREATMENT DEPARTMENT	18-7	DODGE RAM 1500 PICKUP	Truck	gas	60	26000	8	$ 2,309.69
06 ENGINEERING DEPARTMENT	18-5	CHEVY EQUINOX	SUV	gas	60	26500	8	$ 1,386.46
06 ENGINEERING DEPARTMENT	18-11	DODGE RAM 1500 PICKUP	Truck	gas	1040	26000	8	$ 4,537.17
07 FIRE DEPARTMENT	17-17	PIERCE PUMPER	Heavy Equipment	diesel	N/A	?		N/A
07 FIRE DEPARTMENT	19-19	POLARIS UTV	Heavy Equipment	gas	N/A	12000	15	$ 196.50
07 FIRE DEPARTMENT	ATTACK 1	03 INTERNATIONAL 4X4	Heavy Equipment	diesel	N/A	?	20	$ 25,434.02
07 FIRE DEPARTMENT	PARADE	47 GMC PARADE TRUCK	Heavy Equipment	gas	N/A	?	20	N/A
07 FIRE DEPARTMENT	P-1	01 PIERCE 12474 PUMPER	Heavy Equipment	diesel	N/A	?	20	$ 12,351.65
07 FIRE DEPARTMENT	P-2	92 PIERCE E-7334 PUMPER	Heavy Equipment	diesel	N/A	?	20	$ 21,389.52
07 FIRE DEPARTMENT	R-1	93 PIERCE E-7972 RESCUE	Heavy Equipment	diesel	N/A	?	20	$ 25,733.12
07 FIRE DEPARTMENT	R-4	99 PIERCE ED-402 RESCUE	Heavy Equipment	diesel	N/A	?	20	$ 64,096.58
07 FIRE DEPARTMENT	T-4	12 PIERCE 75 FT LADDER	Heavy Equipment	diesel	N/A	?	20	$ 10,284.61
07 FIRE DEPARTMENT	TOWER 1	95 PIERCE E-9458 TOWER	Heavy Equipment	diesel	N/A	?	20	$ 25,726.91
07 FIRE DEPARTMENT	WR-21	FREIGHTLINER WATER RESCUE	Heavy Equipment	diesel	N/A	?	20	$ 5,949.57
07 FIRE DEPARTMENT	14-2	FORD EXPEDITION SSV	SUV	gas	380	33000	10	$ 10,743.65
07 FIRE DEPARTMENT	17-7	CHEVY EQUINOX	SUV	gas	240	26500	10	$ 6,979.84

07 FIRE DEPARTMENT	11-5	CHEV 4 DOOR 4X4 PICK UP	Truck	gas	120	31000	8	$ 11,520.63
07 FIRE DEPARTMENT	11-6	CHEV 4 DOOR 4X4 PICK UP	Truck	gas	120	31000	8	$ 9,979.91
07 FIRE DEPARTMENT	12-11	FORD F-250 4DR 4X4 PICK UP	Truck	gas	160	32000	8	$ 18,557.26
07 FIRE DEPARTMENT	13-14	DODGE 1500 4 DR 4X4 PICK UP	Truck	gas	120	28500	8	$ 13,631.26
07 FIRE DEPARTMENT	15-9	GMC DENALI PICK UP	Truck	gas	360	24000	10	$ 9,716.21
07 FIRE DEPARTMENT	15-15	CHEVY 4 DOOR COLORADO	Truck	gas	220	28000	10	$ 11,424.46
07 FIRE DEPARTMENT	18-9	CHEVY 4 DOOR COLORADO	Truck	gas	N/A	32000	10	$ 3,755.89
07 FIRE DEPARTMENT	19-13	FORD F-550 BRUSH TRUCK	Truck	diesel	N/A	110000	20	$ 23,007.41
07 FIRE DEPARTMENT	19-16	FORD F-250 4X4 WITH PLOW	Truck	gas	N/A	46000	10	$ 6,154.59
08 CEMETERY DEPARTMENT	01-16	TRANSENDER	Heavy Equipment	electric	0	8000	50	$ 6,615.58
08 CEMETERY DEPARTMENT	01-17	CUSHMAN TRUCKSTER	Heavy Equipment	gas	20	19000	25	$ 14,470.53
08 CEMETERY DEPARTMENT	13-20	JOHN DEERE 310 SK BACKHOE	Heavy Equipment	diesel	185	105000	12	$ 15,661.63
08 CEMETERY DEPARTMENT	16-14	CHEVT 1 TON 4X4 DUMP	Heavy Equipment	gas	90	35000	10	$ 4,694.87
08 CEMETERY DEPARTMENT	14-10	FORD F-250 4X4 WITH PLOW	Truck	gas	160	28000	8	$ 9,308.76
09 PARKS DEPARTMENT	14-7	KUBOTA L4060HSTC TRACTOR	Heavy Equipment	diesel	165	32000	10	$ 41,616.52
09 PARKS DEPARTMENT	14-8	KUBOTA B2320HSD TRACTOR	Heavy Equipment	diesel	90	20000	10	$ 19,146.17
09 PARKS DEPARTMENT	16-12	CHEVY 1 TON DUMP	Heavy Equipment	gas	500	32000	10	$ 5,053.37
09 PARKS DEPARTMENT	14-13	FORD F-250 UTILITY / LIFT GATE	Truck	gas	1060	27000	8	$ 8,929.93
09 PARKS DEPARTMENT	15-13	FORD F-250 4 DOOR UTILITY	Truck	gas	1060	35000	8	$ 8,658.12
09 PARKS DEPARTMENT	15-14	FORD F-250 EXT CAB WITH PLOW	Truck	gas	1800	38000	8	$ 13,606.06
09 PARKS DEPARTMENT	16-11	FORD F-150 4X4 PICK UP	Truck	gas	1060	26000	8	$ 8,287.25
09 PARKS DEPARTMENT	18-17	DODGE RAM 3500 PICKUP	Truck	gas	960	32000	8	$ 8,158.52
09 PARKS DEPARTMENT	19-12	DODGE RAM 1500 4X4 PICKUP	Truck	gas	420	26000	8	$ 4,668.84
09 PARKS DEPARTMENT	19-15	DODGE RAM 1500 4X4 4 DOOR PICKUP	Truck	gas	360	27000	8	$ 5,069.94
10 FORESTRY DEPARTMENT	15-11	CHEVY 1 TON WATER TRUCK	Truck	gas	380	24000	10	$ 10,740.28
10 FORESTRY DEPARTMENT	15-12	CHEVY 1 TON 4X4 DUMP	Truck	gas	265	35000	10	$ 12,889.15
10 FORESTRY DEPARTMENT	TS-1	FORD F-350 / TS 30 LIFT	Truck	gas		n/a		
11 FOSSIL TRACE GOLF COURSE	13-15	DODGE 1500 4 DR 4X4 PICK UP	Truck	gas	N/A	38000	8	$ 2,268.62
11 FOSSIL TRACE GOLF COURSE		2021 FORD F-250	Truck	gas				

12 BALLFIELDS - PARKS DEPARTMENT	16-13	CHEVY COLORADO	Truck	gas	100	24000	8	$ 2,896.16
14 POLICE ADMINISTRATION	18-16	FORD EXPLORER	SUV	gas	245	31000	5	$ 6,097.93
14 POLICE ADMINISTRATION	19-7	FORD EXPEDITION	SUV	gas	320	42000	7	$ 8,167.67
14 POLICE ADMINISTRATION	17-5	CHEVY COLORADO 4 DOOR	Truck	gas	130	26000	7	$ 18,680.93
15 ENVIRONMENTAL DEPARTMENT	16-8	CHEVY COLORADO 4X4	Truck	gas	40	26000	8	$ 5,500.23
15 ENVIRONMENTAL DEPARTMENT	17-4	CHEVY COLORADO 4X4	Truck	gas	190	26000	8	$ 5,151.79
16 BUILDING INSPECTIONS	18-4	CHEVY EQUINOX	SUV	gas	90	26000	8	$ 2,308.63
17 STORM WATER - DRAINAGE	14-4	FORD F-150 4X4 PICK UP	Truck	gas	210	24000	8	$ 10,402.24
17 STORM WATER - DRAINAGE	15-2	CHEVY 1 TON UTILITY	Truck	gas	345	32000	10	$ 13,301.99
17 STORM WATER - DRAINAGE	18-14	CHEVY 3500 DUMP	Truck	gas	320	40000	10	$ 5,200.14
20 PUBLIC WORKS / PLANNING DEPARTMENTS	18-6	CHEVY EQUINOX	SUV	gas	35	26500	8	$ 1,240.71

Appendix E – Gas Equipment Inventory

(to be updated monthly)

Department	Item	Equipment	Type	Fuel Typ	Quantity
03 STREETS DEPARTMENT	97-17	FOSTER SKID STEER TRAILER	mid-size motorized	gas	1
03 STREETS DEPARTMENT	00-25	SUPERIOR TRAILER-ROLLER	mid-size motorized	gas	1
03 STREETS DEPARTMENT	09-1	CIMLINE CRACK SEALER	mid-size motorized	gas	1
03 STREETS DEPARTMENT	AZ-1	ASPHALT ZIPPER	mid-size motorized	gas	1
04 UTILITY		EU 2000 Inverter	tools	gas	1
04 UTILITY		3" Hand Trash Pump	tools	gas	1
04 UTILITY		Air Systems Performance Blower SVB-68	tools	gas	1
04 UTILITY		Eagle Equipment Industrial Trash Pump TP300	small motorized	gas	1
04 UTILITY		Power Smoker Hurco Tech SMK18CS	small motorized	gas	1
04 UTILITY		Stihl 026 chainsaw	tools	gas	1
04 UTILITY		Honda EM 6500 SX - Generator	tools	gas	1
04 UTILITY		Stihl TS 750 Demo Saw	tools	gas	1
04 UTILITY		Stihl TS 410 Demo Saw	tools	gas	1
04 UTILITY		Wacker Newson Rammer BS60-21 Jumping Jack	tools	gas	1
04 WATER DEPARTMENT	92-15A	EASEMENT JETTER TRAILER	mid-size motorized	gas	1
04 WATER DEPARTMENT	97-5	INGERSOL RAND AIR COMPRESSOR	tools	gas	1
05 WATER TREATMENT		snow blower	small motorized	gas	1
05 WATER TREATMENT		chainsaw multi tool	tools	gas	1
05 WATER TREATMENT		water pump	small motorized	gas	1
05 WATER TREATMENT		large generator	small motorized	gas	1
08 CEMETERY		generator	small motorized	gas	1
08 CEMETERY		push mower	tools	gas	1
08 CEMETERY		string trimmer	tools	gas	2
08 CEMETERY		snow thrower	tools	gas	1
08 CEMETERY		backpack blower	tools	gas	1
08 CEMETERY		chain saw	tools	gas	1
08 CEMETERY DEPARTMENT	12-3	KUBOTA F-3080 MOWER	mid-size motorized	gas	1
08 CEMETERY DEPARTMENT	14-6	TORO WORKMAN HDX-D	mid-size motorized	gas	1
08 CEMETERY DEPARTMENT	16-10	JACOBSEN TURFCAT MOWER	mid-size motorized	gas	1
08 CEMETERY DEPARTMENT	17-9	POLARIS BRUTUS HD	mid-size motorized	gas	1
08 CEMETERY DEPARTMENT	18-13	JACOBSEN TURFCAT MOWER	mid-size motorized	gas	1
09 PARKS	19-05	Vermeer CXT100 Mini Skid	mid-size motorized	Diesel	1
09 PARKS	19-06	Massey Ferguson1740M Loader Tractor	mid-size motorized	Diesel	1
09 PARKS	18-03	Massey Ferguson GC1705L Tractor	mid-size motorized	Diesel	1
09 PARKS	18-15	Toro Workman GTX Utility Cart	mid-size motorized	gas	1
09 PARKS	17-11	Toro 6' Turf Mower	mid-size motorized	Diesel	1
09 PARKS	17-12	Morbark Beever Tree Limb Chipper	mid-size motorized	Diesel	1
09 PARKS	17-15	John Deere X758 Tractor	mid-size motorized	Diesel	1
09 PARKS	16-05	Toro 4100D 11' Turf Mower	mid-size motorized	Diesel	1
09 PARKS	15-19	Kabota RTV X90 Utility Cart	mid-size motorized	Diesel	1
09 PARKS	14-07	Kabota L4060 Tractor	mid-size motorized	Diesel	1
09 PARKS	14-08	Kabota B2320 Tractor	mid-size motorized	Diesel	1
09 PARKS	012-03	Kabota F3080 Snow Thrower	small motorized	Diesel	1
09 PARKS	011-01	Smithco Sweepstar Turf Sweeper	mid-size motorized	Diesel	1
09 PARKS	010-12	Kabota Turf Mower	mid-size motorized	Diesel	1

09 PARKS	010-15	EZ GO Utility Cart	mid-size motorized	gas	1
09 PARKS	99-01	Vermeer Tree Spade	mid-size motorized	gas	1
09 PARKS	95-12	Diamond Single Axle Water Trailer	mid-size motorized	gas	1
09 PARKS	94-27	Diamond Single Axle Water Trailer	mid-size motorized	gas	1
09 PARKS	FT-1	Innovative Chemical Spray Trailer	mid-size motorized	gas	1
09 PARKS	OST-1	Chemical Spray Trailer	mid-size motorized	gas	1
09 PARKS		Lift Truck Lift Engine	mid-size motorized	gas	1
09 PARKS		Backpack Blowers (10)	tools	gas	1
09 PARKS		Bluebird Hand Aerator	tools	gas	1
09 PARKS		Brush Trimmers (2)	tools	gas	1
09 PARKS		Craftsman Soil Tiller	small motorized	gas	1
09 PARKS		Eagle Generator	tools	gas	1
09 PARKS		Eagle Pressure Washer	tools	gas	1
09 PARKS		Edge Master Lawn Edgers (2)	tools	gas	1
09 PARKS		Handheld Lawn Edger	tools	gas	1
09 PARKS		Hedge Trimmers (2)	tools	gas	1
09 PARKS		Honda Generator	tools	gas	1
09 PARKS		Honda Snow Thrower	small motorized	gas	1
09 PARKS		John Deere Snow Throwers (2)	small motorized	gas	1
09 PARKS		Little Wonder Lawn Edger	tools	gas	1
09 PARKS		Mantis Soil Tiller	small motorized	gas	1
09 PARKS		McLane Lawn Edger	tools	gas	1
09 PARKS		North Star Generator	tools	gas	1
09 PARKS		Scag Mowers (3)	small motorized	gas	1
09 PARKS		Skid Plate	small motorized	gas	1
09 PARKS		Toro Aerators (2)	small motorized	gas	1
09 PARKS		Toro Push Mower	small motorized	gas	1
09 PARKS		Yard Machine Push Mower	small motorized	gas	1
09 PARKS		Yellow Water Tank	small motorized	gas	1
09 PARKS DEPARTMENT	05-20	KUBOTA RTV900 UTILITY	mid-size motorized	gas	1
09 PARKS DEPARTMENT	10-15	EZ-GO MPT1200G CART	mid-size motorized	gas	1
09 PARKS DEPARTMENT	11-1	SMITHCO TURF SWEEPER	mid-size motorized	gas	1
09 PARKS DEPARTMENT	15-19	KUBOTA RTV WITH PLOW	mid-size motorized	gas	1
09 PARKS DEPARTMENT	16-5	TORO GROUNSMASTER MOWER	mid-size motorized	gas	1
09 PARKS DEPARTMENT	17-6	TORO WORKMAN UTILITY	mid-size motorized	gas	1
09 PARKS DEPARTMENT	17-11	TORO 3280D 72 INCH MOWER	mid-size motorized	gas	1
09 PARKS DEPARTMENT	17-15	JOHN DEERE X758 TRACTOR	mid-size motorized	gas	1
09 PARKS DEPARTMENT	18-3	MASSEY FURGESON 1705 TRACTOR	mid-size motorized	gas	1
09 PARKS DEPARTMENT	19-14	TORO WORKMAN GTX	mid-size motorized	gas	1
09 PARKS DEPARTMENT	19-6	MASSEY FURGESON 1740 M TRACTOR	mid-size motorized	gas	1
10 FORESTRY		chainsaw	tools	gas	7
10 FORESTRY		chainsaw	tools	battery	1
10 FORESTRY		chipper	mid-size motorized	diesel	1
10 FORESTRY		bucket	mid-size motorized	gas	1
10 FORESTRY		mini skid steer	mid-size motorized	diesel	1
10 FORESTRY		tank pump	small motorized	gas	2
10 FORESTRY		tank pump	small motorized	batterty	1
10 FORESTRY		blower	tools	gas	1
10 FORESTRY		blower	tools	battery	1

10 FORESTRY		tree spade	mid-size motorized	gas	1
10 FORESTRY DEPARTMENT	19-5	VERMEER CTX 100 MINI SKID	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		John Deere Tractor 4600	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro 4500D Rough Mower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro 4500D Rough Mower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Jacobsen Fwy 3400 Mower #1	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Jacobsen Fwy 3400 Mower #2	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Jacobsen Fwy 3400 Mower #3	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Kubota Tractor	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Jacobsen TurfCat 628D	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Jacobsen GK IV	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Jacobsen GK IV	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Jacobsen GK IV	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Greensmaster 1600 #1	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Greensmaster 1600 #2	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Greensmaster 1600 #3	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Greensmaster 1600 #4	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Greensmaster 1600 #5	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Greensmaster 1600 #6	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		John Deere Commercial 48 #1	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		John Deere Commercial 48 #2	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		EZ-Go MPT 1000E	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		EZ-Go MPT 1000E	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		EZ-Go MPT 1000E	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		EZ-Go MPT 1000E	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Jacobsen Cushman	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Jacobsen Cushman	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Workman 1100 #1	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Workman 1100 #1	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Workman 1100 #1	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Workman 1100 #1	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		EZ-Go Workhorse #1	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		EZ-Go Workhorse #2	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		EZ-Go Workhorse #3	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		EZ-Go Workhorse #4	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Cushman JR	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Workman 3300D #1	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		john deere diesel	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Workman 3300D #2	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Kawasaki Mule	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Polaris Ranger	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Polaris Ranger	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		John Deere ProGator 2030a	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Greens Aerifier #1	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Greens Aerifier #2	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		toro procore aerifier	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		buffalo blower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Turfco Topdressor Widespin 1550	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Flex 21 greensmower	mid-size motorized	gas	1

11 FOSSIL TRACE GOLF COURSE		Toro Flex 21 greensmower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Flex 21 greensmower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Flex 21 greensmower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Flex 21 greensmower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Flex 21 greensmower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Workman	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Workman	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Workman	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		John Deere Gator	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		John Deere Gator	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Jacobsen Fwy Mower 3400	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Polaris Ranger	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		John Deere Tractor	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Smithco Roller	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Sprayer 5700	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro 4500D rough mower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Cushman ezgo cart	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Cushman ezgo cart	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Triflex greensmower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Triflex greensmower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Ventrac	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Workman	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Cushman electric EZGO	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Triflex Greens/Tee mower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Toro Triflex Greens/Tee mower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Polaris Ranger	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Electric Toro Workman	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Honda Pushmower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Honda Pushmower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Honda Pushmower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		Honda Pushmower	mid-size motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		RedMax Weedeater	small motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		RedMax Weedeater	small motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		RedMax Weedeater	small motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		RedMax Weedeater	small motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		RedMax Weedeater	small motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		RedMax Weedeater	small motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		RedMax Backpack Blower	small motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		RedMax Backpack Blower	small motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		RedMax Backpack Blower	small motorized	gas	1
11 FOSSIL TRACE GOLF COURSE		RedMax Backpack Blower	small motorized	gas	1
12 BALLFIELDS - PARKS DEPARTMENT	08-11	JOHN DEERE GATOR TS	mid-size motorized	gas	1
12 BALLFIELDS - PARKS DEPARTMENT	08-16	KUBOTA F-3080 MOWER	mid-size motorized	gas	1
12 BALLFIELDS - PARKS DEPARTMENT	13-7	JOHN DEERE GATOR TX	mid-size motorized	gas	1
12 BALLFIELDS - PARKS DEPARTMENT	13-8	JOHN DEERE GATOR TX	mid-size motorized	gas	1
12 BALLFIELDS - PARKS DEPARTMENT	17-8	JOHN DEERE GATOR TX	mid-size motorized	gas	1
17 STORM WATER - DRAINAGE	ATV-1	POLARIS 850 ATV	mid-size motorized	gas	1
				TOTAL	198