GREENING THE FLEET

CITY OF COVINGTON

SUSTAINABLE NEWTON

Project Team

Bahar Gunes

Professor & Coach Engagement

Bahar is a 1st year MBA student. She earned an undergraduate degree in Mechanical Engineering and has professional experience with multinational energy companies.

Suhayl Mehio

Client Communications

Suhayl is an MBA candidate in his final year, with a heavy focus on sustainable business. He has professional experience in supply chain, logistics, and transportation.

Hanes Hilliard

Project Management

Hanes is a graduate student in the Sustainable Energy & Environmental Management program. He has professional experience in banking, waste diversion, and deconstruction.

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As a team, we'd like to communicate a sincere thank you to all the Covington city officials who assisted our efforts and Sustainable Newton for providing us with this opportunity.

We also want to congratulate both organizations in coming together to adopt a formal sustainability resolution on April 20th, 2020.

Taken from the resolution, here's to continued ideals of:

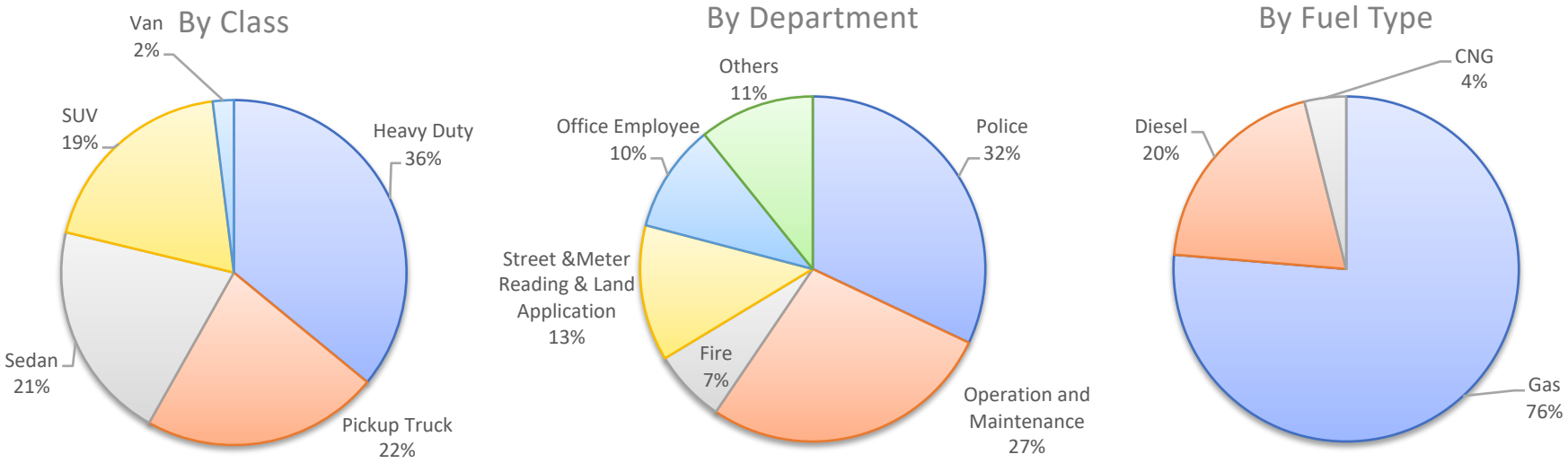
- Innovation
- Positive economic, social, and environmental action
- Preservation of our natural environment
- Considering our impact on future generations
- Leveraging public input in regard to sustainability decisions

Our team's goal is to identify sustainable options for the City of Covington's vehicle fleet and transportation energy infrastructure.

- What is the most strategic investment plan for an optimized fleet to avoid increases in operating expenses while meeting the emission target and for the relevant infrastructure to serve both local government and the public?

- By 2030, how can the City of Covington reduce a minimum of 35% of its greenhouse gas emissions from the local government vehicle fleet without any adverse impact on society?

The City's fleet is composed of 4 key vehicle classes of which pickup trucks and sedans are most widely used by police and on-site operations.



- Only **11** heavy duty and pickups use CNG – average switching costs are **$11,200** per vehicle
- **$1.6M** initial capital expenditure for the Green Fuels (CNG) Facility - EV chargers being added per 2020 budget

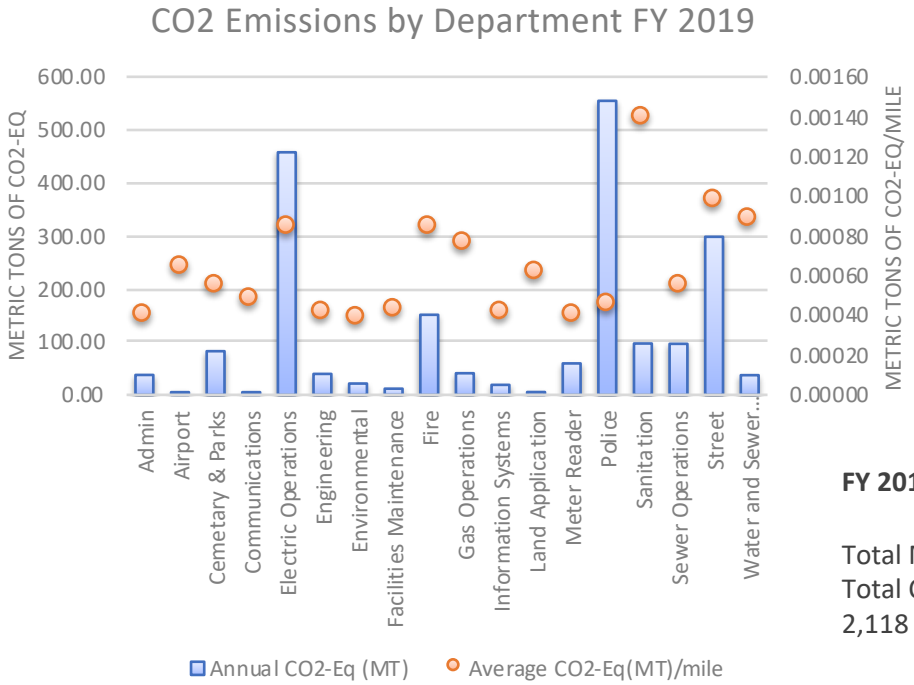
The Alternative Fuel Vehicle (AFV) market offers commercially competitive, reliable, and environmentally friendly options for the current fleet.

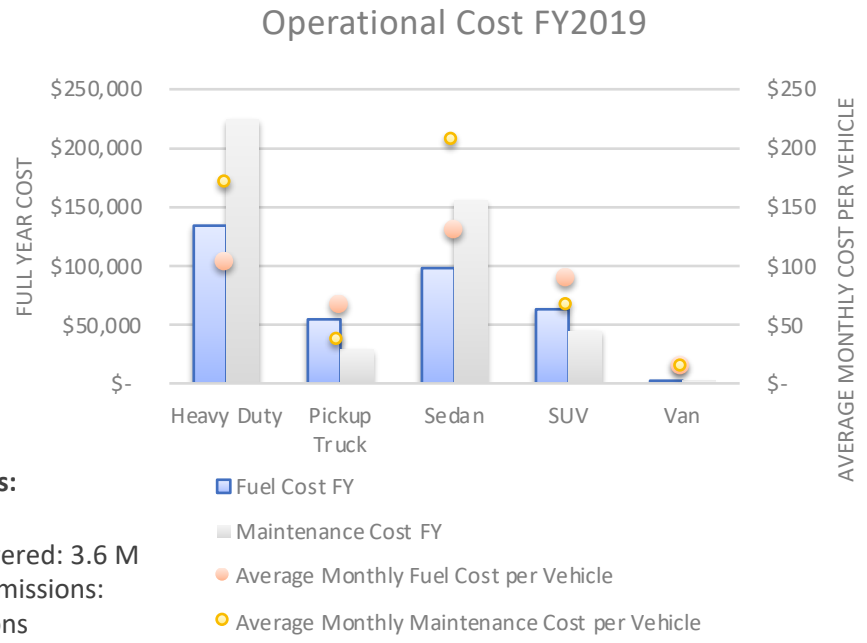
Sedan	Light Duty Truck	Heavy Duty Truck	Van	SUV
Hybrid Gas/Electric	**Hybrid Gas/Electric**	**Hybrid Diesel/Electric**	**BEV**	**Hybrid**
Chevrolet Malibu	Ford F150 (Coming soon)	Volvo FE Hybrid	Nissan e-NV200	Ford Interceptor
Police BEV, PHEV	**Bi-fuel CNG/Gas**	**CNG**	**CNG**	**BEV**
Chevrolet Bolt, Ford Fusion	Chevrolet Silverado 2500	Mack TerraPro Sanitation Truck	Chevrolet Express Cargo	Hyundai Kona
Economy BEV	**BEV**	**BEV**	**PHEV**	**PHEV**
Nissan Leaf	Rivian R1T (Coming soon)	Mack Electric LR	Ford Transit	Kia Niro

BEV: Battery Electric Vehicle
PHEV: Plug-in Hybrid Electric Vehicle
CNG: Compressed Natural Gas

Hybrid: Gas/Diesel engine with electric assist
Bi-fuel: Separate fuel tanks/lines

Heavy Duty and **Sedan** classes used by **Police** and **Site Operations** Departments have the highest negative impact both on emissions and operational costs.





FY 2019 Results:

Total Miles Covered: 3.6 M
Total CO2-Eq Emissions: 2,118 metric tons

By growing the fleet with Enterprise over time, a smart transition to AFV's can become a reality.

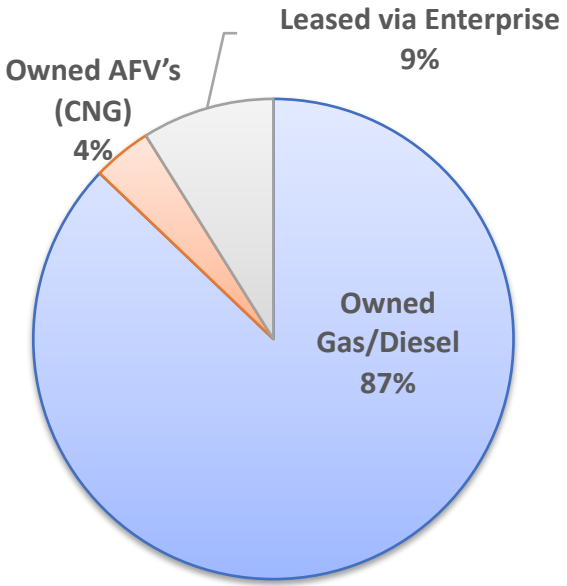
enterprise FLEET MANAGEMENT

PROGRAM FEATURES

- Open-ended lease structure with unlimited miles
- Fixed and budgeted maintenance cost with unlimited wear & tear

ENTERPRISE AFV ADVANTAGES

- Telematics, a utilization of smart measurement & tracking technology
- Flexible exit conditions via Selling service, addresses devaluation
- EVSA (Electric Vehicle Suitability Assessment) add-on to Telematics
- Purchase service, wholesale + multitude of AFV's at tax incentivized prices



Other government fleets in GA are providing financial, economic, and social benefits while becoming greener.

Cobb County

- 73 AFV's in fleet amidst 20-year journey
- Partnered with Nissan for financing & free EV chargers
- Engages with civic & NGO partnerships for ideas and grants

City of Savannah

- Earned buy-in from staff via EV sedan trial & test drives
- Partnership with electric utility provider invaluable
- Part of broader long-term sustainability goals

City of Thomasville

- In 2019, installed 2 EV Chargers free to public.
- Similar to Covington's population, MEAG member
- Over ½ of vehicles are CNG, including majority of sanitation trucks

City of Norcross

- The City has installed 3 EV chargers free to the public, one at park & 2 downtown
- MEAG member town
- Introduced a Toyota Prius Hybrid to the fleet

The CNG filling station can leverage savings in fuel costs to provide strong ROIs on fleet conversions to CNG.

- According to a recent BCC research report:

"Any time that one can fuel a commercial vehicle with CNG for at least fifty cents per DGE less than with diesel fuel, then one will have at least a 3-year or shorter payback by having equipped for CNG instead of diesel."

- To achieve ROI within 3 years, CNG fuel needs to be utilized when it is $0.50 cheaper than an equivalent gallon of diesel.
- Larger savings on CNG fuel costs = larger ROI & payback period.

Assumptions	**Values**
Switching Costs per vehicle	$ 11,200.00
4/22 CNG Price per gal.	$1.99
4/22 Diesel Price per gal.	$2.80
Average CNG Vehicle MPG	10
Average Annual Miles per vehicle	65000
Costs to convert 40 vehicles…	$ 448,000.00
They drive this many miles per year…	2600000
Which uses this many gallons of fuel…	260000
CNG Fuel Costs	$ 517,400.00
Diesel Fuel Costs	$ 728,000.00
Annual Fuel Savings est.	$ 210,600.00
Return on Investment (1st year)	**47%**
Payback Period (years)	**2.13**

Multi-criteria decision analysis is adopted to drive sustainable recommendations.

Current Fleet Status
- Vehicle Profiles
- Use Cases

+

AFV Options
- Market Availability
- Technology Readiness

+

Key Performance Criteria
- CO2 Emissions
- Operational Costs

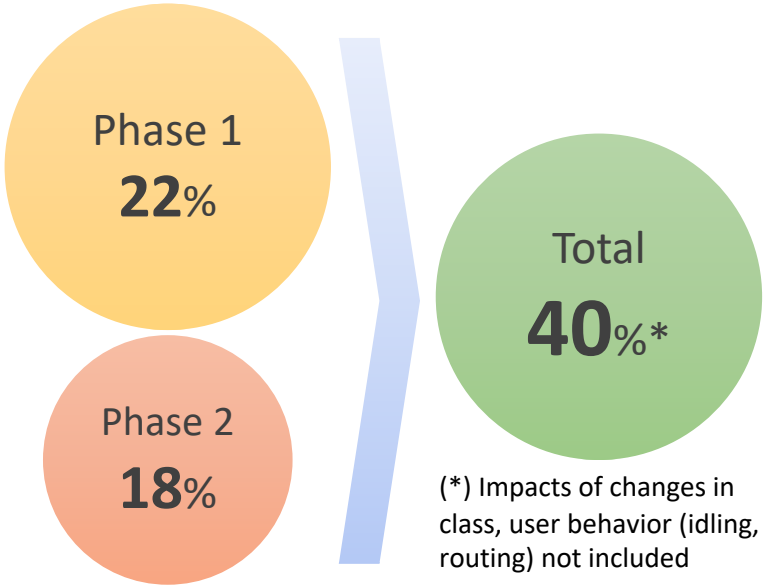
+

User Behavior
- Consider resistance to change

A multi-phased transformation program is essential for successful fleet sustainability.

Total CO2-Eq emissions can be reduced by **40%** via a phased transformation plan into selected AFV options.

Vehicle	AFV	CO2-Eq Red. Potential
Police Sedans & Other Sedans	BEV & PHEV	52%
Police SUVs	HEV	32%
Office & Site Ops SUVs	HEV	50%
Sanitation Heavy-Duty Diesel	CNG**	85%
Ford F-150/F-250 (Gas)	PHEV	33%
Other Heavy-Duty Gas	CNG	30%
Other Heavy-Duty Diesel	CNG	40%



(*) Impacts of changes in class, user behavior (idling, routing) not included

(**) Including privatization of Sanitation services that utilize CNG trucks

Installing EV charging infrastructures is required to overcome the range anxiety which is still a barrier for EV adoption.

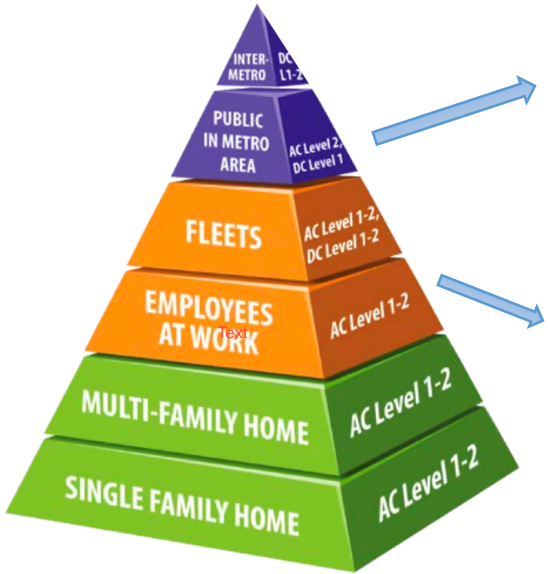
RANGE ANXIETY

Industry leaders believe most future EV charging will take place at home, but range anxiety is still a barrier for EV adoption.

City of Covington

Only **5** charging stations exist within **5** miles radius of Covington's city center.

0 of **5** are conveniently located for general public use.



For Public Use

Set up BEV chargers in common locations

- police stations
- city square and parks
- street parking, etc.

AC Level 2 EVSE

TIC: ~ $ 2,000 (6.6kW) **ROI** > 25%

NPV > $ 1,000 **Payback**: 3 yrs

For Government Use

DC Fast Chargers can be considered for strategic locations such as police stations.

DCFC EVSE*

TIC: ~ $ 15,000 (50kW)

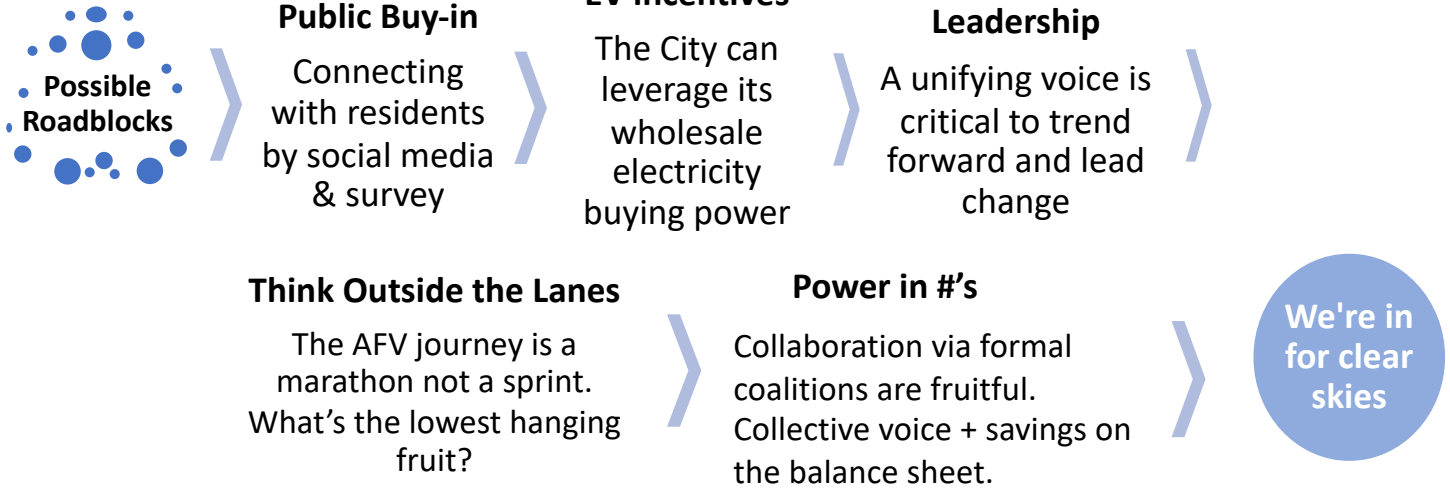
 # Cars served: > 30 per day

(*) Adds 50 miles range by 20mins charging

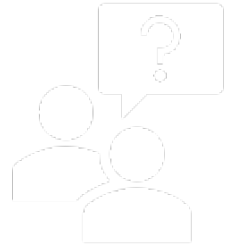
By joining national, regional, and state coalitions, Covington will obtain scaled savings, stay on top of AFV trends, and take advantage of grants.

	Climate Mayors	Southeast Sustainability Directors Network (SSDN)	Clean Cities Georgia
Organization Type	National Peer-to-Peer Coalition	Regional Peer-to-Peer Coalition	State Unit of US Dept of Energy Initiative
Website	http://climatemayors.org/	https://www.southeastsdn.org/	http://www.cleancitiesgeorgia.org/
Dues	Free + no binding agreements	$240	$250
Why Join	Enterprise Fleet Management Cooperative Leasing Exposure/Recognition	Collaboration & Education Grants	Grants Central coordinating org for AFV's in GA Fleet directed programs
Members Include	Clarkston, GA Anderson, SC	New Bern, NC Brookhaven, GA	Cobb County, GA Municipal Gas Authority of GA (MGAG)

To mitigate barriers to implementing the recommendations, let's keep these golden rules in mind.



Thank you!



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