Electric Vehicles

Purchasing Green

In 2015, Portland City Council adopted a policy to replace City vehicles with electric vehicles (EVs) when feasible, with a goal of having 20 percent of the City's sedan class fleet be electrically powered by the end of FY15-16. CityFleet started piloting electric vehicles in 2011, well before the policy was enacted, and as of April 2016 they have 50 electric vehicles in their sedan fleet – already exceeding the City's goal.

As defined by the City, EVs are at least partially powered by electricity. The City's fleet contains all-electric Nissan Leafs as well as plug-in hybrid Chevy Volts, and Ford C-Max and Fusion Energis. All-electric vehicles operate exclusively on a rechargeable electric battery while plug-in hybrids have both a rechargeable electric battery and an internal combustion engine and motor. Although City Fleet also has conventional hybrid vehicles in their fleet, they are not considered EVs because they do not plug in to an external power source like all-electric and plug-in hybrid vehicles.

Benefits

EVs are more efficient than their conventional counterparts, significantly reducing air pollution and greenhouse gas emissions. All-electric vehicles, as well as plug-in hybrids when in all-electric mode, produce no tailpipe emissions. And even when plug-in hybrids are operating in gas mode, they still have very high fuel economy ratings. The Leaf has a combined city/highway miles per gallon equivalent (MPGe) of 112-114 depending on the model, while the Volt gets 106 MPGe and the C-Max and Fusion Energis get 88 MPGe in electric mode. In gas mode, the Volt gets 42 MPG, the C-Max Energi gets 40 MPG, and the Fusion Energi gets 38 MPG.

Lifecycle emissions of EVs are also dependent on the electricity source used to recharge them when plugged in. Oregon's largest electricity source is renewable hydropower, comprising 43 percent of the state's electricity mix. With other sources of renewable energy on the rise, Portland experiences greater environmental benefits from the switch to EVs than regions that are more dependent on fossil fuels.

Additionally, EVs require less maintenance than gasoline powered vehicles. All-electric vehicles do not require engine or transmission oil changes, resulting in less waste. For both all-electric and plug-in hybrids, the electric motors, batteries, and components require little-to-no upkeep and regenerative braking causes less

CityFleet's Nissan Leafs have an 114 miles per gallon equivalent (MPGe) rating.

At a glance –

Who –

- **CityFleet**

Product –

- **Nissan Leafs, Chevy Volts, and Ford C-Max and Fusion Energis**

Cost –

- **$36,000 purchase price; $0.06/mile to operate**

Benefits –

- **Zero or low GHG emissions (varies by vehicle type/ model)**
- **Less maintenance requirements**
- **Less air pollution**

"The electric vehicles have proven to be a great addition to the Fleet and we look forward to expanding their use in the City."

Don DePiero,
Vehicle Maintenance Superintendent,
CityFleet

wear and tear than conventional braking systems. The batteries are recyclable at the end of their useful lives, and all three EVs used by the City have an 8-year/100,000 mile battery warranty. However, in the City's experience with other hybrid electric vehicles, these kinds of batteries tend to outlast the manufacturer's suggested life span.

Cost

Traditional gasoline sedans used in the City's fleet have an average purchase price of around $14,000. Electric vehicles are considerably more expensive, running upwards of $36,000 including the costs of decals and charging stations. Federal grants covered up to $1,500 per charging station; actual costs to install charging stations varied between $1,000 and $2,500 depending on the location of the stations and nearby power supplies.

Costs to operate and maintain EVs, however, are much less when compared to gasoline sedans. The City estimates that EVs cost about $0.26/mile less to operate than conventional vehicles, a savings of about $26,000 over the life of the vehicle. With these reduced operation and maintenance costs, in addition to government incentives and tax reductions, EVs now cost the City about the same as a gas-powered equivalent.

CityFleet used fueleconomy.gov to calculate return on investment (ROI), a valuable tool that was instrumental in determining whether purchasing EVs made economic sense for the City. On average, the City expects to see an eight-year ROI on EVs and anticipates keeping EVs in the City's fleet upwards of 10 years.

Performance

CityFleet reports that EVs are reliable and perform well. The only complaint they've had is "range anxiety" from first time users, especially with the all-electric Nissan Leafs. Because the Leafs are all-electric, drivers were concerned that they would run out of "juice" before they were able to reach their destination and not be able to find a charging station if necessary. Despite these concerns, drivers have not reported any issues with going out of range.

Initially there were some issues with the software programming in the charging stations, which was quickly rectified by the City's charging station vendor.

Overall, CityFleet has been very pleased with EVs and plans to purchase more as older sedans are retired.

Lessons Learned

CityFleet recommends that other communities considering making the move to EVs ensure that the charging station infrastructure is in place before EVs are added to their fleets. The City was able to build EV infrastructure through a combination of City support and external initiatives. The City's Climate Action

Plan helped to accelerate the transition to EVs by supporting the installation of a network of EV charging stations. Additionally, the City is able to add EV charging stations at existing City-owned fueling locations at low cost because it is already replacing its aged underground fueling structure. The City also benefited from Nissan identifying the Portland metro area as one of five target markets in the U.S. to test the implementation of EVs and EV charging stations in 2011. Federal grants covered the costs to install EV charging stations throughout the metro area, so the City (as well as residents) could charge their EVs on the go.

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About CityFleet

CityFleet's seven repair facilities maintain Portland's 3,150 vehicles and equipment. This includes parking patrol vehicles, sedans, pick-ups, vans, police sedans, dump trucks, back hoes, and heavy construction equipment. They perform oil, lube, and filter changes; DEQ emission inspections; and engine, transmission, drive train, electrical, suspension, heating, cooling, and air conditioning diagnoses and repairs. CityFleet garages are also certified Eco-Biz Automotive Shops, a designation that recognizes their commitment to minimizing their environmental impacts. CityFleet was also named one of the Top Elite Fleets by Government Fleet Magazine from 2011-2016, after being named the number one fleet in 2010. In 2015 CityFleet became a GFMA Certified Management Operation and Clean Fleet Certified. As a result, CityFleet was the first government fleet in North America to obtain a Master Certification.

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