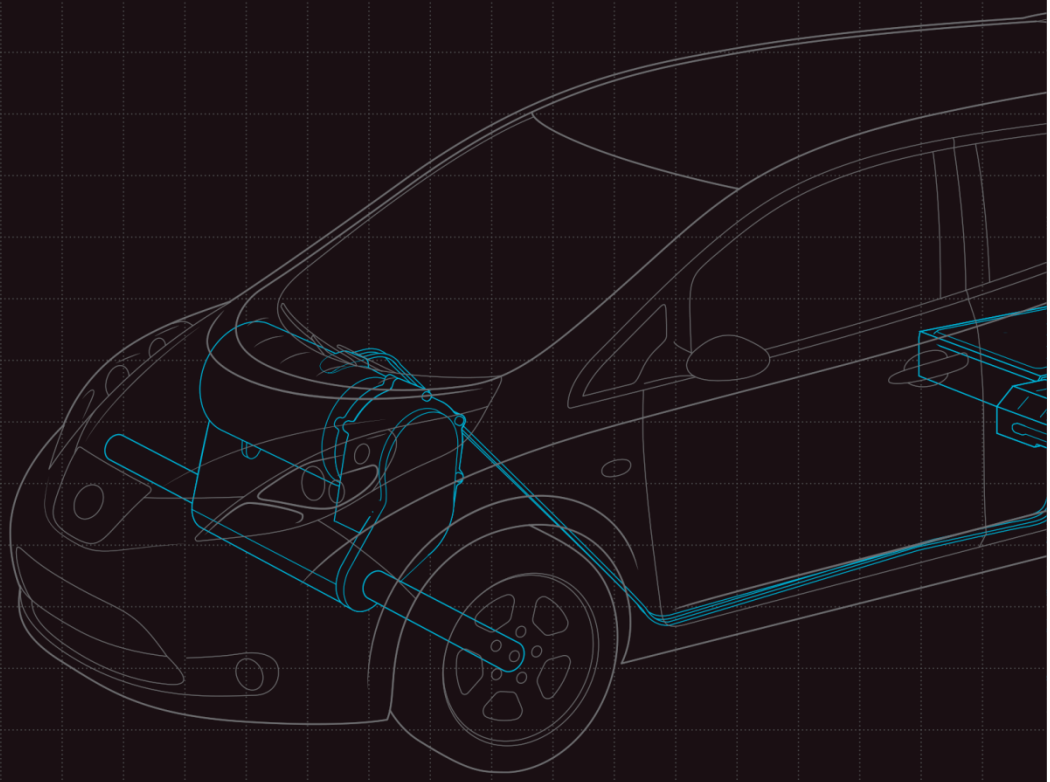
EV CASE STUDY

The City of Loveland

Marrying Functionality and Economics

The City of Loveland on Integrating Electric Vehicles into Fleet Operations



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In Partnership with Securing America's Future Energy

Introduction

Known as the "Sweetheart City" for re-sending stamped Valentine's Day cards for more than a half century, Loveland is a friendly, vibrant, and innovative community of approximately 70,000 people located in Northern Colorado. Like many other municipalities around the county, both large and small, the city has been confronted with a decade of high and volatile petroleum fuel prices, which have strained operations and budgets.

Between 2009 and 2011, fuel costs for the City of Loveland's vehicle fleet increased by 29 percent. This large and rapid upward shift in costs prompted the city to initiate an aggressive alternative-fuel vehicle purchasing strategy, focusing initially on battery electric vehicles (BEVs). Though not without early challenges—driver perceptions of the technology, for example—the vehicles have already proven to be a cost-effective addition to the municipal fleet for local service needs. The city has found that the BEVs will cost 41 percent less to own and operate than gasoline-powered vehicles.

Nissan was a key partner for Loveland. The city worked closely with the automaker and local dealership as it planned and executed the purchase of the vehicles and learned more about the technology. Loveland also benefited from Nissan's municipal lease program, which allows the federal tax credit of $7,500 per vehicle to be incorporated directly into the lease price (public agencies are not typically able to take advantage of the federal tax credit for purchase of an electric vehicle). Today, Loveland's two Nissan LEAF BEVs are used daily by city employees for a variety of local service activities.

With two BEVs already in the fleet, another three on order for 2013, and an additional four for 2014, the city is planning for a future when electric vehicles service the majority of its needs.The city ultimately aims to meet a goal of converting all fleet vehicles for which no heavy hauling is required and with operational ranges within a 35-mile radius of the city to plug-in electric vehicles.

Loveland is also a principal partner in *Drive Electric Northern Colorado*—a first-of-its-kind, community-wide initiative designed to achieve widespread deployment of electric vehicles in the Northern Colorado region. Working closely with the neighboring City of Fort Collins, Colorado State University, and the Electrification Coalition, the city is playing a central role in engaging the entire community to make the region a leader in electric vehicle deployment.

The Electrification Coalition recently sat down with Steve Kibler, Fleet Manager for the City of Loveland, to learn more about the municipality's efforts to address escalating fuel costs through the deployment of BEVs. The data, analysis, and explanations below are based on this discussion.

PURCHASE

PUBLIC-PRIVATE PARTNERSHIP MAKES VISION A REALITY: The City of Loveland operates a fleet of approximately 600 vehicles that run the gamut of classes and functions. The period of high and volatile oil prices that began in 2007 had a direct, significant impact on the city budget. Between 2009 and 2011 alone, the cost of fuel required to operate the Loveland municipal fleet increased by 29 percent. The surge prompted a focus on limiting the city's exposure to high and volatile oil prices and ultimately reducing its fuel costs over the long term.

The city's passenger cars, of which there are almost 100, have historically traveled approximately 6,000 miles and consumed approximately 500 gallons of unleaded gasoline on an annual basis—for an average of 12 miles per gallon (mpg). This very poor average fuel economy is a result of cold starts and short trip distances (typically no more than two miles). These vehicles also rarely drive much further than 20 miles on any given day. For the city's purposes, both BEVs and plug-in hybrid electric vehicles (PHEVs)—which use a downsized internal combustion engine to extend driving range—were viable options.

Given that range requirements effectively provided an equalizer between BEVs and PHEVs, Loveland's purchase decision was based primarily on three other factors. The first factor was the lower retail prices of available market BEV offerings versus PHEV offerings. (The Nissan LEAF currently carries an MSRP of $28,800 before applying the $7,500 federal tax credit). The second was the strong support of a local automobile dealership, Tynan's Nissan. The third was the desire to fully address the fuel consumption challenge by decoupling vehicle operation from gasoline prices. After purchasing two Nissan LEAFs, the city unveiled the vehicles publicly in September 2012. The vehicles are graphic-wrapped, highlighting the plug-in electric technology and zero-emissions benefit of the LEAF in addition to the partnership with Tynan's. Notably, the vehicles are not equipped with fast charge capability. While cost was an important decision factor, value was a greater one, and the city believed that the fast charge upgrade would not be used sufficiently to justify the expense given the vehicle's planned travel patterns.

Although the city itself is unable to claim federal or state tax credits, it took advantage of a municipal lease program offered by Nissan's commercial lending arm—Nissan Motor Acceptance Corporation (NMAC). These lease programs offer a selection of advantages in comparison to standard lease programs—which municipalities are often also ineligible for, because they cannot have debt commitments beyond a given fiscal budgeting period. The benefits include no restrictions on mileage. Most importantly, given the currently higher incremental cost of plug-in electric vehicles, the arrangement allows for the pass-through of the federal tax credit of $7,500 per vehicle that the lender (in this case NMAC) claims against its own federal tax liability (similar municipal lease programs are also offered by other automakers).

The city's lease contracts are structured as full payout (amortization to $1) over a period of three years. They hope that at the end of this period, after approximately 20,000 miles of driving each, the vehicles can either be sold (for as much as 60 percent of retail) or kept in the fleet. Spreading the expense over time has already proven beneficial, as the city was able to order three rather than two new LEAFs for 2013. As the first public agency (tax exempt) to use Nissan's municipal lease purchasing plan, the city did endure a wait of almost four months as the legal departments of the city and NMAC worked through the details. Today, however, the city can order vehicles and then sign the municipal lease papers upon delivery (a process that takes about 30 minutes).

MUNICIPAL LEASE PURCHASING PLANS

Leasing vehicles is a popular option for individuals, but many public entities, such as cities, states, and universities, cannot take advantage of an operating lease, because local or state regulations prevent them from taking on fiscal obligations that exceed their annual budget window. Moreover, operating leases can be most simply conceptualized as long-term vehicle rentals, which often have a variety of constraints, such as mileage limits. Even if a public entity were able to use an operating lease, they may find that this would affect the functionality and the total cost of ownership of the vehicle.

In a traditional operating lease, mileage limits on plug-in electric and other alternative fuel vehicles, for example, can impact the municipality's ability to take advantage of their lower fuel costs versus gasoline or diesel.

MUNICIPAL LEASE PURCHASING PLANS (CONTINUED)

The City of Loveland purchased its Nissan LEAFs using a different kind of lease, called a municipal lease purchase, which was offered by Nissan Motor Acceptance Corporation (NMAC) through Tynan's Nissan, a local dealership. Municipal lease purchases are useful to municipalities both for conventional and plug-in electric vehicle purchasing.

Municipal leases are different from operating leases in that they operate more like loans for purchase. Over the lease term, the lessee pays the full price of the vehicle, completing the purchase with a $1 residual payment at the end of the lease. Payments are made in equal increments, thereby lowering the up-front cost of the vehicle. There are no mileage restrictions on the vehicles, and they can be operated as if the vehicles are owned by the municipality. The leases also include a non-appropriations clause which enables municipalities to enter into the contract, thereby making payments subject to budget appropriations. Of particular importance to plug-in electric vehicles is that municipal lease purchases can be compatible with available federal tax credits and rebates.

The principal financial objective of municipal lease purchases is to enable the purchaser to obtain use of the vehicle at the lowest possible cost. Plans are offered by all the major automakers and almost any new vehicle considered "essential use" is eligible (vehicles that operate irregularly such as shuttles or loaners are not eligible). Plans available through different automakers have different term length options and different payment frequency options. Many public entities are eligible for such plans including states, counties, cities, school districts, state universities, political subdivisions, water departments, and emergency services (fire, police, etc.)

The municipal lease purchase plan was recently modified, so that the federal tax credit is absorbed by the dealership and then passed through to the municipal purchaser.

INTEGRATION

SLOW START OUTWEIGHED BY STRONG UNDERLYING RATIONALE AND ECONOMICS: Today, the City of Loveland's BEVs are used almost daily by employees of the municipality. For city employees, access to the vehicles is as simple as booking a time slot on a shared Microsoft Outlook calendar and obtaining the keys.

Through seven months of operation, the two vehicles have traveled just 4,000 and 2,000 miles respectively. Despite this low total mileage, the city estimates that if the vehicles travel 6,000 miles per year, the total costs of owning and operating equate to just 17 cents per mile in comparison to 29 cents per mile for the fleet passenger cars fueled by gasoline—a 41 percent reduction in cost. This is a result not only of the higher efficiency of electric drivetrains versus conventional internal combustion engines, but also the large divergence between the price of gasoline and the price of electricity. For example, gasoline prices in Colorado averaged just below $3.50 per gallon in 2012 (and fluctuated from a low of just under $2.00 per gallon and a high of $3.90 per gallon.

DEPLOYMENT PROFILE

The City of Loveland deployed two all-electric Nissan LEAFs into its municipal fleet in September 2011. The vehicles are part of a pilot program to examine how electric vehicles can be integrated into the usage patterns of city employees. They are part of a public-private partnership with local automobile dealer Tynan's Nissan and wrapped with a graphic promoting clean energy transportation. The two vehicles are located at different city facilities; the Water and Power Service Center parking lot on Wilson Avenue and the Civic Center parking lot on 1st Street. Each location also has a charging station manufactured by Eaton Corporation that is available for public use.

CHARGER PROFILE	Level 1	Level 2	DC Fast Charge
Number of Chargers Installed for this Phase	-	3	-
Vehicle-to-Charger Ratio	-	5:3	-
Charger Manufacturers	-	Eaton and Schneider	-

VEHICLE PROFILE	
PEV Deployment Details	Class 1 Autos
Total Number of PEVs Purchased	5
Battery Electric Vehicles (EVs)	5
Plug-in Hybrid Electric Vehicles (PHEVs)	-
Vehicle Manufacturer	Nissan
Vehicle Model	LEAF S

In contrast to gasoline prices, electricity costs in the Loveland area are 6 cents per kWh between October and June, and 7 cents per kWh between July and September. Therefore, even at the higher electricity price, the cost of driving can be estimated at just 2.4 cents per mile for a BEV versus 14.6 cents per mile for a gasoline-powered vehicle that achieves fuel economy of 24 miles per gallon (at $3.50 per gallon). To improve the value proposition of its BEVs further, the city is aiming to use them for 8,000 to 10,000 miles of driving each per year.

PURCHASING MOTIVATORS

Scale is 0 to 5, with 5 indicating a factor weighed heavily in the decision princess and 0 indicating that it did not factor at all.

Positive Factors		Negative Factors	
Fuel Savings	5	Vehicle Upfront Cost	5
Social Responsibility Desires	5	Total Cost of Ownership	4
Long-term Commitment to the Technology	4	Concerns about Battery/Vehicle Residual Value	3
Operational Benefit (e.g. on site power generation)	3	Operational Sacrifices (e.g. range, hauling capacity)	3
Vehicle Maintenance and Support Savings	3	Concerns about On-site Infrastructure (Cost, Complexity, Ability to Manage)	1
Research and Development	1	Concerns about Safety	0

EXPERIENCE

HIGH PERFORMANCE OVERCOMES NEGATIVE INITIAL PERCEPTIONS: Initially, many city employees (even those responsible for the purchase and integration of the vehicles) were concerned that the vehicles would not meet their needs, particularly in terms of driving performance and reliability. Range anxiety among employees was also discovered to be a substantial deterrent to vehicle use. These preconceived notions contributed to low rates of use early on and were highlighted as the most likely the largest initial obstacle to more widespread use of plug-in electric vehicles by other municipalities.

However, the vehicles have come to exceed the expectations of everyone involved and particularly of the city employees who have driven them. They have been praised especially for their instant torque, rapid acceleration, and strong handling. Reliability expectations have also been far exceeded for administrators concerned about the new technology. Through seven months of operation, the vehicles have required no maintenance at all.

Although the city has plenty of other vehicles to choose from for longer-distance travel needs, the limited range of the BEVs is their most obvious drawback. A roundtrip to Denver (approximately 50 miles south), for example, would require a charge before the return journey. Nevertheless, for more local activities, the vehicles have proven very successful and even surprised to the upside in terms of range in certain situations. For short drives around downtown (perhaps a six-mile roundtrip), for example, they can actually return to their respective bases with a higher estimated range on the battery than before they began due to the vehicle's regenerative braking system (which converts the kinetic energy back into electricity energy, recharging the vehicle's battery).

Such regenerative braking systems, also present in conventional hybrid vehicles, have the added benefit of somewhat negating the need for employee training programs that strive to promote more fuel-efficient driving behaviors—programs that have become popular with both governments and businesses facing high and volatile fuel prices alike.

Ultimately, vehicle reliability, performance, and range all exceeded initial expectations. These factors led to a very quick turnaround in preconceived notions—something which surprised city administrators. In most cases, the shift was facilitated by just a single use of the vehicle and repeat use among employees is today very high.

OUTLOOK

DEDICATED TO A SUSTAINABLE ALTERNATIVE FUEL STRATEGY: The City of Loveland's innovative and common-sense approach to addressing escalating vehicle fuel costs is undoubtedly being advanced through the success of its experience with plug-in electric vehicles. Nonetheless, the city aims to do more and its deployment plan reflects that.

Beyond plug-in electric vehicles the city is also investigating the possibility of using natural gas as a fuel for its waste trucks and transit buses, as part of its broad effort to diversify the fuel sources for different classes of vehicles.

Finally, the city remains focused on strengthening the value proposition for its residents not only through the provision of charging infrastructure and other supportive actions that make plug-in electric vehicles more affordable and convenient to drive, but also through its efforts to "green" local electricity generation by purchasing renewable electricity for its vehicle charging stations. It hopes that such efforts will make the vehicles a truly sustainable transportation option for both its own fleet and for its residents into the future.

EV PERFORMANCE SATISFACTION

EXPECTATION VS. REALITY	Much Worse	Worse	As Expected	Better	Much Better
Fuel Savings			√		
Maintenance Savings			√		
Vehicle Reliability					√
Vehicle Performance					√
Vehicle Range				√	
Driver Perception (initially)		√			
Driver Satisfaction (after use)				√	
Impact on Image/Branding				√	
On-site Charging Infrastructure				√	

LEARN MORE

Visit CityOfLoveland.org to learn more about the City of Loveland.

Visit ElectrificationCoalition.org to learn more about electric vehicles for fleet applications, download case studie, and more.

Visit DriveElectricNorthernColorado.org to learn about a first-of-its-kind, community initiative designed to achieve widespread deployment of plug-in electric vehicles in the Northern Colorado region.

Visit FleetAnswers.com to access a wide variety of fleet tools,