Electric Vehicle Strategy
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Introduction

The City of Mountlake Terrace has been working for a more sustainable city – better economics, environment, and quality of life – through measures such as high quality zoning and alternative transportation planning. When compared to today’s internal combustion engine vehicles, and even hybrid vehicles, electric vehicles significantly reduce air pollution, have lower fuel costs, and reduce our dependence on foreign energy.

Electric vehicles are expected to play a vital role in reducing air pollution, particularly here in the central Puget Sound region where power sources like hydroelectric dams generate no pollution. Internal combustion engines vehicles emit 250% more carbon than electric vehicles charging from traditional power sources, and electric vehicles charged from green power produce no carbon emissions. Reducing carbon emissions is important for two reasons: 1) reduction in carbon emissions largely corresponds to reduction in all air pollutants, and 2) 50% of local carbon emissions are generated by transportation (PSRC Vision 2040, 40) compared to 33% nationally. One of the most effective ways to reduce effects of climate change, improve overall air quality, and maintain or improve the views that make the Northwest so special is to switch to electric vehicles.

Reducing local air pollution is also important for our economy. The Environmental Protection Agency (EPA) is considering reducing certain allowable air pollutant concentrations, which would likely put large areas of the central Puget Sound region into a federal category called non-attainment – making our area ineligible for federal dollars until a plan is adopted to meet the EPA standard. We can get ahead of the tightening standard and avoid or reduce penalties by working to improve air quality now, with electric vehicles one of the most cost effective solutions.

The cost of electricity is also less than for gasoline. Especially in Washington, where our main power source is hydroelectricity, electricity prices are both low and stable – unlike gasoline’s high prices and increasing volatility. Stable transportation fuel costs are important for a successful economy. In addition, electric vehicles are quieter than conventional vehicles and have better acceleration—a benefit to consumers and neighborhoods.

Finally, our electricity is generated from local sources, while gasoline is largely imported – sometimes from countries that have negative relations with the United States. Our energy dependence can be reduced if we switch from gasoline to locally based electricity.

Clearly, electric vehicles provide numerous benefits to the City and region. With the first generation of modern electric vehicles just coming on the market and significant federal and private investment to provide electric vehicle charging infrastructure on our highways and in our homes, now is the time to act. Mountlake Terrace can seize the moment and provide for a more successful and sustainable future by supporting electric vehicles.
Vision and Goals

Given their benefits, the City anticipates that more people will want to use electric vehicles. The ultimate vision is that electric vehicles are so efficient that they replace many conventional vehicle trips. In part, whether this vision comes true depends on the manufactured products (especially, vehicles and batteries) that become available; they must be efficient, reliable, and affordable. At the same time, electric vehicles require unique electric infrastructure; this is where local governments have a role.

How can the City encourage or accommodate electric vehicle use? The answer is to focus on practical ways to ensure EVI for potential user groups, including residents, employees, and visitors, and to add electric vehicles to the City’s fleet, over time. This approach is reflected by the following goals:

1. *Encourage electric vehicle infrastructure to be located so that charging is convenient for users within Mountlake Terrace.*

2. *Include electric vehicles in the City’s fleet as suitable models and resources become available.*

Background

Market Adoption of Electric Vehicles – Necessary Infrastructure

The greatest barrier to market adoption of electric vehicles (EVs) is the unique infrastructure needed to refuel – called electric vehicle infrastructure (EVI). It can take a long time to fully charge a vehicle – between thirty minutes and a full day depending on the size of the battery and the type of charging infrastructure. However, drivers will rarely need a full charge and will likely recharge daily when parking at home or at work. Therefore the challenge is both to provide the necessary infrastructure and to educate consumers about how to recharge.

EVs recharge at EV charging stations, a parking space equipped with an electric vehicle battery charging station, or at battery exchange stations. The term EVI includes the three general categories of EV charging stations – levels 1, 2, and 3 – or a battery exchange station—and all the electrical appurtenances to make them operational. The slowest but also least expensive method to recharge is with a level 1 charging station, with up to 120 volts and only requiring a standard three pronged wall socket (with a special charging cord provided by the vehicle manufacturer). Generally, if an EV owner plugs a vehicle into a level 1 battery charging station when they arrive home after work, by the next morning, the car will have plenty of power for daily commuting and errands. Level 2 charging stations range up to 240 volts using a standardized plug unique to EVs. This higher voltage power needs to first go through a unit designed to handle the power safely (a number of companies now offer UL listed charging stations) that may have sophisticated software to enable wireless payment and to determine how to charge when electricity prices are lowest. The fastest way to recharge is with level 3. At over
440 volts and similar to a gas station pump, this equipment provides a full charge in around 30 minutes. Lastly, a there is a prototype called a battery exchange station which swaps out an undercharged battery for a fully charged battery (though it remains unclear as to whether or not these will become operational for cost and legal reasons).

Refueling EVs is different than fueling a gasoline vehicle, and EVs are different by coming in two general categories – Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs). BEVs operate exclusively from a battery and have no tailpipe emissions; in fact no tailpipe at all. The Nissan Leaf is a BEV, with a full range of 100 miles – plenty for daily commuting and errands. PHEVs on the other hand have both a battery and a gas tank, running first on the electric battery and then generating electricity for the battery with a small gas engine – enabling driving on electricity for most days and easy extended trips with quick refueling gasoline. The main PHEV on the market is the Chevrolet Volt, which runs exclusively on electricity for the first 40 miles.

As these innovative vehicles are coming on the market, now is the time to take action to help encourage their market adoption. Our City can do this by ensuring there is EVI where necessary, and educating the public about the benefits and ease of use of EVs.

State Requirements and Guidance

The Electric Vehicle Strategy was catalyzed by the Washington State legislature, when it passed Second Substitute House Bill 1481 in 2009. This requires cities and counties to permit certain types of EVI based on the size of the city and proximity to major freeways. Mountlake Terrace was required to meet the most stringent requirements – allowing EVI in all zones other than residential and resource zones by June 2010.

The bill required the Puget Sound Regional Council (PSRC) and the Washington State Department of Commerce (Commerce) to create guidance to help local governments meet the new requirements, other applicable laws, and gain an in-depth understanding of EVs. The result was the publishing of Electric Vehicle Infrastructure: A Guide for Local Governments in Washington State in July 2010. The City used the guidance and met all state EV requirements by November, 2010.

Electric Highway

I-5 is proposed to be the nation’s first “electric highway.” With help from a $1.32 million federal grant, the State plans to turn Interstate 5 into the nation’s first “electric highway” with enough charging stations so electric vehicles can make the entire 276-mile trip from the Canadian border to the Oregon state line. In fact, the Washington section of I-5 will be part of a larger “West Coast Highway,” stretching from southern California to Vancouver, B.C. Other highways may be added to the EV network as electric vehicle use increases.

To begin this effort, WSDOT plans to create a network of seven to 10 Level 3 fast-charging stations along Washington’s part of the I-5 corridor. These stations are the type that can recharge
an electric vehicle’s battery within 15 to 30 minutes. Other I-5 sites will be equipped with Level 2 charging stations, which take 2 to 8 hours to fully recharge a battery. Funding for Washington’s part of the project is coming from a federal grant. The intent is to create a major corridor for electric vehicle usage where people can travel from city to city without needing to worry about where to charge their vehicles.

City Strategies

A. Private Electric Vehicle Infrastructure

Market adoption of EVs requires places for resident, employee, and fleet vehicles to charge. Barriers are a lack of charging infrastructure and the potential for non-EVs to block access to public charging stations by parking in EV charging station parking stalls. These barriers can be addressed by: (1) preparing for and requiring charging stations in new development; (2) requiring, where appropriate, towing-enforceable signage to keep these parking stalls available for EVs; and (3) working with other government agencies to get funding for EVI and to coordinate with other public investments (for instance on Interstate-5).

To ensure access to EVI, the City adopted Ordinance 2553 (with phased requirements), now codified as Chapter 19.126 MTMC. This not only brought the City into compliance with House Bill 1481 and built on PSRC and state guidance, but also provides for a certain percentage of parking stalls to be equipped as EV charging stations in all new development other than single family, and requires all new development to “rough in” (provide electrical capacity necessary to accommodate future) electric charging stations at some parking stalls. There are also signage requirements to ensure the spaces are used for EVs. This approach begins to provide EVI for new development as the first vehicles are being sold, and allows for more EV charging stations in the future as demand increases – without costly or cost-prohibitive retrofits.

EVI requirements under the City’s existing code relate to different land uses, as follows:

New single family homes are required to provide the electrical capacity (i.e., at least a “rough-in”) for a level 2 charging station in the garage in a safe location.

New multi-family uses have the highest requirements, since charging at home is likely to be the best option given the amount of time charging requires and the ease of simply plugging the car in when arriving home and taking the plug out in the morning. The code requires that 10% of the parking stalls provide EVI. Additionally, provisions must be made to allow for an additional 10% of parking stalls to be converted to EV charging stations in the future without a costly retrofit.

Office, Medical, Lodging, Institutional, Municipal, and Other uses, as defined in City code, are uses where EV users may want infrastructure because they will be parked there for long enough periods of time to charge. The requirements are similar to those for multi-family, except requiring 3% of parking stalls to provide EVI and another 3% to have the capacity built in for adding future EV stations.
Retail, Industrial, eating and drinking establishments, and Recreation/Entertainment/Cultural uses require the least amount of EVI because typical EV owners are unlikely to desire to charge at these locations for reasons such as not spending enough time at the location to achieve a reasonable charge. The ordinance requires EV charging stations at only 1% of such parking stalls and electrical capacity to be provided for an additional 1% of stalls without an expensive retrofit.

Level 3 EVI (powerful commercially-sized stations) are only allowed in commercial or industrial-type zones. This ensures that the residential character of residential neighborhoods can be maintained.

Table 1, below, notes what types of EVI are permitted in what zone.

Table 1

<table>
<thead>
<tr>
<th>Zone</th>
<th>Charging Level 1 and Level 2 Station</th>
<th>Charging Level 3 Station</th>
<th>Battery Exchange Station</th>
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<tbody>
<tr>
<td>RS</td>
<td>P</td>
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<tr>
<td>RM</td>
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<tr>
<td>BC</td>
<td>P</td>
<td>P</td>
<td>P</td>
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<tr>
<td>BC/D</td>
<td>P</td>
<td>P&lt;sup&gt;1&lt;/sup&gt;</td>
<td>P&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>CG</td>
<td>P</td>
<td>P</td>
<td>P</td>
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<tr>
<td>F/T</td>
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<td>P</td>
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<td>LI/OP</td>
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<td>REC</td>
<td>P</td>
<td>C</td>
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<tr>
<td>SSD/R</td>
<td>P</td>
<td>P&lt;sup&gt;2&lt;/sup&gt;</td>
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<tr>
<td>SSD C/R</td>
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<td>PFS</td>
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<sup>1</sup> Permitted for all building types except Type 7.
<sup>2</sup> Not permitted in residential uses

Generally, all charging station stalls (except single-family) are required to have signage that prohibits any vehicle not charging from parking in an EV charging station stall. In addition, the City’s Ordinance references national and state standards for electrical safety, accessibility, etc.

Unlike the many cities that do not have any EVI requirements, citizens and employees in Mountlake Terrace increasingly will be able to refuel conveniently throughout the City.

B. Public Electric Vehicle Infrastructure

Most of today’s electric vehicles can go no more than 100 miles without a charge. (Some go more; others much less. For example, the current Ford Escape, which is a small sports utility vehicle goes only 35 miles on a charge.) To help ensure that people in Mountlake Terrace can conveniently recharge electric vehicles, the City should consider installing EVI in key public locations—either at certain public properties or at certain street right of way areas (or both), as
funds become available. Such installation would supplement the EVI at people’s private residences and businesses. In the case of the City’s own future fleet of electric vehicles, City-owned EVI (e.g., at the Public Works Shop) would be the primary source for charging City fleet vehicles.

The first aspect of accomplishing this strategy is to **install EVI in key public locations**, as funds become available. Preferred public locations include:

- Mountlake Terrace Transit Center
- Civic Campus
- Public Works Shop (for City fleet vehicles)
- Recreation Pavilion.

Of the above locations, Mountlake Terrace Transit Center is first on the list of priorities, particularly because: (a) it would serve future EV owners at a busy and visible public transit center and (b) the City has won a grant for up to ten charging stations at this location—thereby creating a cost-effective EVI opportunity. (See also section “D. Resources and Partnerships”.)

The second aspect of this strategy is to **install EVI at selected on-street parking locations**. This is recommended to be a future option (at least a few years away) and would only be considered when sufficient community demand arises. When—or if—EVI is installed in the City’s right-of-way, stations should be carefully sited so as not block pedestrians or interfere with vehicular traffic. Public policies would need to be in place about ownership, protection, and operation of the charging stations. Again, this strategy component is not one that needs to be undertaken until or unless community demand for it is much stronger than it is in 2011.

C. City Fleet

The City currently has a fleet of vehicles that include hybrid (combined gasoline-and-electric powered) vehicles. The hybrid vehicles have proven to be reliable, to perform well, and to save considerably on fuel costs. As electric vehicle technology improves, some all-electric models may become a good choice for replacements or additions to the City’s fleet. The related strategy to this has two parts: (1) continue researching the market; and (2) **acquire electric vehicles for the City’s fleet** when such purchases would fit the City’s needs and budget.

D. Resources and Partnerships

With scarce funds for adding new EVI in public locations, the City should take advantage of opportunities for grants and partnerships. For example, Community Transit would be an excellent partner for locating EVI at the Transit Center. EVI at the Transit Center would allow commuters to get on the bus and leave behind their electric cars for recharging.

In late 2010, the City of Mountlake Terrace won a grant for up to ten electric vehicle stations that would be located at the Transit Center; the City’s “match” for the grant was to provide for installing the stations. Electricity at the charging stations would be paid by the users through a
credit card system. Installation of the charging stations requires an interlocal agreement with Community Transit, the agency that built the Transit Center.

The strategy reflected by this effort has two components: (1) seek grants and other innovative resources to help fund EVI; and (2) partner with public agencies and other entities to install EVI at feasible public locations.

E. Public Information

The City can also provide information to the public about electric vehicles as an environmentally-friendly transportation option. In addition, the City should provide information about how and where electric vehicles can be charged within Mountlake Terrace. Finally, the City can market itself as an innovative leader in encouraging electric vehicle use, an approach that will help attract clean technology businesses to locate in Mountlake Terrace. Reports on electric vehicle information should be brought to the Planning Commission and City Council from time to time.

The general strategy for this effort is to provide public information about electric vehicle opportunities in Mountlake Terrace.

Conclusion

The City of Mountlake Terrace has already implemented its first key strategy for electric vehicles by adopting a code for EVI. Other strategies to begin implementing in the near future are:

- Install EVI in key public locations (such as the Transit Center)
- Acquire EVs for the City’s fleet when such purchases would fit the City’s needs and budget
- Seek grants and partnerships
- Provide public information about electric vehicle opportunities.

Next Steps

Next steps for the City are as follows:

1. Continue implementing the EVI code for new development.
2. Work with public or private partners to locate charging stations at key public locations (such as the Transit Center).
3. Provide public information on electric vehicles and charging station locations.
4. During the next Comprehensive Plan amendment process, consider adding the Electric Vehicle Strategy as an appendix to the Comprehensive Plan.
Glossary

**Battery charging station, charging station** – an electrical component assembly or cluster of component assemblies designed specifically to charge batteries within electric vehicles, which meet or exceed any standards, codes, and regulations set forth by chapter 19.28 RCW and consistent with rules adopted under RCW 19.27.540.

**Battery electric vehicle (BEV)** – any vehicle that operates exclusively on electrical energy from an off-board source that is stored in the vehicle’s batteries, and produces zero tailpipe emissions or pollution when stationary or operating.

**Battery exchange station** – a fully automated facility that will enable an electric vehicle with a swappable battery to enter a drive lane and exchange the depleted battery with a fully charged battery through a fully automated process.

Charging level means the standardized indicators of electrical force, or voltage, at which an electric vehicle’s battery is recharged. Levels 1, 2, and 3 are defined by the electrical output, per the following specifications:

1. **Level 1.** Voltage including the range from 0 through 120.
2. **Level 2.** Voltage is greater than 120 and includes 240.
3. **Level 3** is considered fast or rapid charging. Voltage is greater than 240.

**Electric vehicle (EV)** – any vehicle that operates, either partially or exclusively, on electrical energy from the grid, or an off-board source, that is stored on-board for motive purpose. “Electric vehicle” includes: (1) a battery electric vehicle; (2) a plug-in hybrid electric vehicle;

**Electric vehicle charging station** – a parking space that is served by charging station equipment that has as its primary purpose the transfer of electric energy (by conductive or inductive means) to a battery or other energy storage device in an electric vehicle.

**Electric vehicle infrastructure (EVI)** – structures, machinery, and equipment necessary and integral to support an electric vehicle, including charging stations, and battery exchange stations.

**Plug-in hybrid electric vehicle (PHEV)** – an electric vehicle that (1) contains an internal combustion engine and also allows power to be delivered to drive wheels by an electric motor; (2) charges its battery primarily by connecting to the grid or other off-board electrical source; (3) may additionally be able to sustain battery charge using an on-board internal-combustion-driven generator; and (4) has the ability to travel powered by electricity.