Transportation Electrification Executive Council
Strategic Framework
January 26, 2011

Mission: Establish Oregon as a leader in transportation electrification by

- Maintaining Oregon's position as a premiere U.S. launch market,
- Demonstrating early adoption of electric vehicles, and
- Sharing early information and stories about electric vehicle usage.

Strategies

1. Strong public acceptance of transportation electrification
2. Necessary and appropriate charging infrastructure
3. Policy support for financial incentives and a streamlined regulatory process
4. Vehicle support infrastructure (maintenance, research, IT, etc)
5. Strong national and international partnerships

Annual Metrics

Metric	2011 Goal	2015 Goal**
Number of registered electric vehicles in Oregon*	1500 Total registered electric vehicles. Focus on urban transport: o >5 electric buses o >20 rental/zip cars o >10 taxis o >20 local delivery trucks	10,000 - 30,000** Total registered vehicles
Consumer Awareness and Education	• Survey results indicate >50% have seen electric vehicles in operation. • Survey results indicate that >XX% are interested in buying a PEV.	
Number of charging stations in Oregon*	• All planned EVSE from the EV Project and ODOT Tiger grant are installed.	• TBD
Use levels of charging stations in Oregon	• TBD	
Number of jobs in EV industry companies*		
GHG reduction levels related to electrification		
Oregon's net import/export of fuel dollars		
Oregon is a premier launch site for plug-in electric vehicles in North America	• In top 5 in major published industry rankings • Commitments from 8 PEV manufacturers to use Oregon as early launch market	

** See Appendix A for supporting definitions*

***Updated based on President's goal from State of the Union. This is a key area for strategic discussion.*

2011 Action Plan

ACTION	GOAL	STATUS	FORECAST
1. Strong public acceptance of transportation electrification			
a. Make electric vehicles visible in the urban areas of the state.	o >5 electric buses o >20 rental/zip cars o >10 taxis o >20 local delivery trucks		
b. Develop and execute a Communication Plan	Finish plan		
c. Develop and execute a survey on interest in buying a PEV	• Survey results indicate >50% have seen electric vehicles in operation. • Survey results indicate that >XX% are interested in buying a PEV.		
2. Necessary and appropriate charging infrastructure			
a. Develop and implement an infrastructure strategy for Oregon	• Plan completed. • Successful and timely implementation of The EV Project and Green Highway.		
b. Execute a pilot project for charging in multi-family housing			
3. Policy support for streamlined regulatory process and financial incentives			
a. White paper to 2011 legislature	Report due February 1, 2011		
b. Identify opportunities and barriers to adoption and recommend policy and administrative initiatives to the Governor	Report due August 31, 2011		
4. Vehicle support infrastructure (maintenance, research, IT, etc)			
a. Create research agenda that documents actual performance of EVs inside the Portland built environment			
b. Academic relationships with "best practices" centers of excellence globally	PSU to lead. One each in China, Japan, US, Europe		
6. Strong national and international Partnerships			
a. Expand Oregon's OEM partnership	• Partner with Hyundai, VW, and Honda		
b. Maintain and enhance Oregon's position as a premier launch site for plug-in electric vehicles (PEV) in North America	• In top 5 in major published industry rankings. • Commitments from 8 PEV manufacturers to use Oregon as early launch market		
c. Solidify partnering relationship with Federal government	• USDOE - INL • Achieve "targeted community" designation		

Appendix A - Definitions

DRAFT Definition of the Electric Vehicles

Transportation electrification defines electric vehicles as any vehicle used to transport people and/or goods that is self-powered wholly or partially by electricity, including vehicles designed for on-road or off-road use. Examples of vehicles that could be considered as part of this definition include, but are not limited to, bicycles, scooters, motorcycles, all-terrain vehicles, three-wheeled vehicles, neighborhood electric vehicles, low-speed vehicles, medium-speed vehicles, other non-conventional passenger vehicles with one or more wheels, commercial loading vehicles, conventional light-duty vehicles, medium-duty vehicles, heavy-duty vehicles, buses and full or partial conversions of internal combustion engine vehicles to EVs.

Metrics:
# of Battery Electric Vehicles
# of Plug-in Hybrid Electric Vehicles
# of Low-speed/Medium-speed Electric Vehicles
# of Electric Motorcycles, Mopeds, and Scooters
# of Class 1-5 Trucks (Electric and Plug-in Electric)
# of Class 6-7 Trucks (Electric and Plug-in Electric)
# of Off-road Electric Vehicles (mini-motorcycle, pocket bike, go-kart, or all-terrain vehicle)
# of Personal Mobility Devices (non-registered devices including bicycles, scooters, segways)

DRAFT Definition of the Electric Vehicle Industry

In the contexts of business development and job creation, the electric vehicle (EV) industry is defined broadly. The industry includes any vehicle[1] used to transport people and/or goods that is powered wholly or partially by electricity. Furthermore, the industry includes EVs designed for either on-road or off-road use. In addition, the industry covers the entire value and supply chains beyond just the vehicles themselves to include the components (including energy storage devices), systems, software, telematics, infrastructure and support services relating to transportation electrification.

DRAFT Mechanism to track EV industry development

There are unfortunately no obvious, direct sources of data on jobs and/or economic contribution from EV industry companies. This is a common problem for newer and/or smaller industries that are captured under much bigger categories when government agencies collect data. For example, the Oregon Employment Department (OED) uses a coding system that only includes “Transportation Equipment” as the likely classification under which EV-related companies would be found. There is no particular code solely for the EV industry so OED’s data will not be a perfect fit for this metric. In addition, the data OED collects can only be made public under certain circumstances.

One way to do it would be for a state agency could ask OED for all companies that identify themselves as being involved with Transportation Equipment. That list could then be narrowed down to only the companies we

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know are involved with EVs. An agency could then put in a confidential request to OED for the number of employees at these companies. It would be difficult to use much, if any, of this information publicly, though.

Given the constraints identified above, a more practical (although likely less accurate) way to measure jobs and/or economic contribution from EV-related companies is to work closely with Drive Oregon as well as its government business development partners; e.g., Business Oregon and Portland Development Commission. Drive Oregon should have significant knowledge of the companies involved in the industry, and this knowledge could be supplemented with what business development partners see as well. Drive Oregon could potentially conduct a survey of its members to track employment and/or economic contribution. Of course, these surveys sometimes get poor response rates and the data may not be entirely accurate, but it might be the best option.

DRAFT Electric Vehicle Infrastructure Deployment

To realize the potential of all of the State's efforts, Oregon must have a sufficient network of EV support equipment (EVSE) to support vehicles and achieve its leadership goals. By developing a comprehensive statewide strategy, Oregon can create a tipping point for EVs, which would help resolve the "chicken-or-the-egg problem" and providing assurances to the public that diminishes range anxiety.

In the current role out of EV infrastructure in the U.S., there are three levels of EV charging:

- **Level 1 (AC):** A standard 3-prong, 120 Volts/15 Amp outlet/plug combo and generate about 1 kilowatt of electricity. A 24 kWh 100-mile range battery would take a full day to charge up from a standard wall outlet.
- **Level 2 (AC):** A much quicker charge than Level 1, rated up to 208-240 Volts/30 Amp single phase outlet using a specially designed outlet/plug combo. Most vehicles will charge between 3.3 and 6.6 kWh. A 24 kWh 100 mile range battery could be charged from empty to full in approximately 6-8 hours; depending on the on-board charging system.
- **DC Fast Charge: ("Fast", "Rapid", or "Quick" Charging):** Fast charge is a 3 phase, DC system that can have an output between 10 and 100 kWh of power per hour, but should average about 50 kWh. Typically, fast charging would provide up to 80% recharge in 20 to 30 minutes. DC Fast Charging has practical uses for commercial and public applications and is intended to perform in a manner similar to a commercial gasoline service station.

<u>Guiding Objectives for EVSE Deployment</u>

The initial phase of deployment will attempt to focus limited resources in the places where they will do the most good in the fastest manner. To that end, several key principles will guide where resources are expended on EVSE deployment. Specifically, EVSE deployment will:

- Create a scalable network and hubs of charging stations which ensures flexibility and appropriate regional distribution.
- Balance of cost-effectiveness versus convenience/saturation.
- Follow vehicle availability and product rollout plans; that is, put the EVSE where the vehicles are going to be sold and used.
- Key in on population centers with commute patterns that fit with early EV ranges.
- Follow major travel corridors, including popular destinations (e.g., coast, mountains, attractions, towns, etc.) that may not necessarily themselves be early markets for EVs.
- Look to support long-distance travel with DC fast charging; this will connect "islands" of EVs that are likely to develop around the state in population centers.
- Assist sites that will likely be the toughest spots to establish EVSE, such as multi-family housing.
- Connect into mass transit systems as much as possible, especially at park-and-ride facilities.

- Prioritize sites that have high-concentrations of parked vehicles (entertainment venues, schools, meeting sites, etc.).
- Plan for future phases of deployment with a short, mid and long term vision (to 2012, to 2020, beyond 2020). The plan should be continuously evaluated to ensure the most efficient deployment.

Strategy for Deployment

Oregon is choosing to strategically develop the Interstate 5 corridor. The EVSE deployment will focus initially on the Portland-metro area and the I-5 corridor, but will expand to other areas in Oregon. The approximately 120 mile by 40 mile corridor with potential extensions in Bend and Medford, in addition to possible recreational locations along the coast and I-84.

Table 1: Location of charging stations by type

	Charging Station Type		
	Level 1	**Level 2**	**DC Fast**
Residential			
Single family houses	X	X	
Multi-family units	X	X	
Commercial/Employment Centers			
Private Work base (Office complexes, business campuses)	X	X	
Commercial/Retail (fleet and delivery services)	X	X	
Public access (airports, hotels, grocery stores, hospitals, shopping malls and entertainment)	X	X	X
Governmental, universities, and municipality facilities	X	X	
Transit hubs		X	X
Gas/fueling stations		X	X
Public			
Parking structures/lots	X	X	X
Street	X	X	X
Interstate and highways (commercial/retail)			X
Truck stops	X	X	X

Metrics:
% of EV Owners with dedicated home-based EVSE
# of Publicly Accessible L1/L2 Chargers
# of DC Fast Chargers
# of businesses providing EVSE
# of public EVSE (L1/L2/DC) with a 50% usage rate