

August 11, 2009

TO: Members of the MAG Building Codes Committee

FROM: Michael Clack, Scottsdale, Chair

SUBJECT: MEETING NOTIFICATION AND TRANSMITTAL OF TENTATIVE AGENDA

Wednesday **August 19, 2009** - 2:00 pm
MAG Office, Suite 200, Cholla Room
302 North 1st Avenue, Phoenix

A meeting of the MAG Building Codes Committee (BCC) has been scheduled for the time and place noted above. Members of the MAG Building Codes Committee may attend in person, by videoconference or by telephone conference call. Those attending by videoconference or telephone conference call must make arrangements with Steve Gross at MAG and, for videoconferencing, your site coordinator by at least the Monday prior to the meeting.

If you drive to the meeting, please park in the garage under the building and bring your ticket to the meeting; parking will be validated. For those using transit, the Regional Public Transportation Authority will provide transit tickets for your trip. For those using bicycles, please lock your bicycle in the bike rack in the garage.

Pursuant to Title II of the Americans with Disabilities Act (ADA), MAG does not discriminate on the basis of disability in admissions to or participation in its public meetings. Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contacting Heidi Pahl at the MAG office. Requests should be made as early as possible to allow time to arrange for accommodation.

Please be advised that under procedures approved by the MAG Regional Council on June 26, 1996, all MAG committees must have a quorum to conduct business. A quorum is a simple majority of the membership, or 13 people for the MAG Building Codes Committee. If you are unable to attend the meeting, please send a proxy from your jurisdiction or agency to represent you.

If you have any questions or require additional information, please contact Heidi Pahl at (602) 254-6300 or hpahl@mag.maricopa.gov.

TENTATIVE AGENDA

- | | |
|--|--|
| 1. <u>Call to Order</u> | |
| 2. <u>Introductions</u> | 2. For information. |
| 3. <u>May 20, 2009 Meeting Minutes</u> | 3. Review and approve the minutes of the May 20, 2009 meeting. |
| 4. <u>Call to the Audience</u>

Members of the public may request to speak on items that fall under the jurisdiction of the MAG Building Codes Committee (BCC) and are not scheduled on the agenda; or, on items on the agenda for discussion but not for action. A total of 15 minutes will be provided for the Call to the Audience, with a limit of three minutes per speaker, unless the Chair requests an exception to this limit. Those requesting to comment on action agenda items may be provided an opportunity to do so at the time the agenda item is heard. | 4. For information and discussion. |
| 5. <u>Comments From the Committee</u>

An opportunity will be provided for Building Codes Committee members to present a brief summary of current events. The Building Codes Committee is not allowed to propose, discuss, deliberate or take action at the meeting on any matter in the summary, unless the specific matter is properly noticed in accordance with the Arizona Open Meeting Law. | 5. For information and discussion. |
| 6. <u>Drainage Requirements for One Coat Stucco</u>

Mark Wogan of Highland Products will discuss the drainage requirements found in International Code Council Evaluation Service reports and how jurisdictions will enforce them. | 6. For information and discussion. |
| 7. <u>Chair and Vice Chair Term Appointments</u>

On July 22, 2009, the MAG Regional Council approved the MAG Committee Operating Policies and Procedures. The document has clarified, and in some cases, modified, former MAG committee procedures. The policies and procedures note that Chairs and Vice Chairs of technical and policy committees, with the | 7. For information and discussion. |

exception of the Transportation Policy Committee, will be appointed by the MAG Executive Committee and are eligible for one-year terms, with possible reappointment to serve up to one additional term by consent of the committee. An update will be provided by MAG staff. Please see Attachment One.

8. MAG Building Inspectors/Plans Examiners (BI/PE) Forum Update

Discussion and possible action regarding a new chair person.

9. Electric Vehicle Infrastructure

On April 16, 2009, MAG, ECOtality and Nissan North America announced a zero emissions partnership that will help facilitate the introduction of electric vehicles (EVs) in the MAG region. The proposed infrastructure will utilize 220-volt charging stations at residential and commercial locations, as well as 440-volt fast-charge stations that could be strategically located to allow vehicles to fully charge in less than 26 minutes. The public and commercial charging systems will utilize the standardized plugs and connectors that have been adopted by major auto manufacturers and will be compatible with all plug-in vehicles. On May 20, 2009, MAG staff provided an update on the zero emission partnership initiative to the MAG Building Codes Committee. On August 5, 2009, Electric Transportation Engineering Corporation (eTec), a subsidiary of ECOtality, Inc., a leader in clean electric transportation and storage technologies, was selected by the U.S. Department of Energy for a grant of approximately \$99.8 million to undertake the largest deployment of EVs and charging infrastructure to date. The grant will be matched by the application's project participants to provide a total of approximately \$200 million to fund the initiative. eTec, as the lead applicant for the proposal, partnered with Nissan North America to deploy EVs and the charging infrastructure that will support them and all electric and plug-in hybrid electric vehicles. The project proposes to deploy charging infrastructure in major population areas that include Phoenix (AZ), Tucson (AZ), San Diego (CA), Portland (OR), Eugene (OR), Salem (OR),

8. For information, discussion and possible action.

9. For information and discussion.

Corvallis (OR), Seattle (WA), Nashville (TN), Knoxville (TN), and Chattanooga (TN). In addition to implementation of charging infrastructure in the Phoenix and Tucson regions, ECOtality plans to link the two metropolitan areas by implementing strategic fast-charge stations along Interstate-10 to create the first true implementation of an EV Corridor in North America. MAG will continue to work closely with ECOtality and its subsidiary, eTec, regarding the implementation of charging infrastructure in the region through the MAG committee process. Staff will provide an update on the zero emission partnership and discuss next steps in anticipation of beginning to address the development and establishment of building codes for the purpose of implementing electric vehicle charging infrastructure in the MAG region.. Please refer to Attachment Two and Attachment Three.

- | | |
|---|-------------------------------------|
| 10. <u>Updated MAG Building Codes Committee Membership</u>

We are requesting that Committee members review Attachment Four, Committee Roster, sent with this agenda. Please forward any changes to Heidi Pahl prior to the meeting or provide them at the meeting. | 10. For information and discussion. |
| 11. <u>Update Survey of Code Adoption</u>

Attachment Five identifies the codes that member agencies have adopted. Please review this information and provide any updates or corrections to Heidi Pahl. | 11. For information and discussion. |
| 12. <u>Topics for Future Agendas</u>

Potential topics for the next meeting will be discussed. The next meeting of the MAG Building Codes Committee is scheduled for Wednesday September 16, 2009 at 2:00 p.m. in the Cholla Room of the MAG offices. | 12. For information and discussion. |
| 13. <u>Adjournment</u> | |

MINUTES OF THE
MARICOPA ASSOCIATION OF GOVERNMENTS
BUILDING CODES COMMITTEE

May 20, 2009

Maricopa Association of Governments Office
Cholla Room
Phoenix, Arizona

COMMITTEE MEMBERS

Michael Clack, Scottsdale, Chair
Ken Sowers, Avondale
Phil Marcotte, Buckeye
*Mike Tibbett, Carefree
Mike Baxley, Cave Creek
*Alex Banachowski, Chandler
*Mary Dickson, El Mirage
*Peter Johnson, Fountain Hills
*John Smith, Gila Bend
*Jo Rene DeVeau, Gila River Indian
Community
A- Ben Cox for Ray Patten, Gilbert
Bryan Woodcox for Deborah Mazoyer,
Glendale
Bill King for Ed Kulik, Goodyear

John Rae for Chuck Ransom, Litchfield
Park
Tom Ewers, Maricopa County
A-Steven Hether, Mesa
Bob Lee, Paradise Valley
*Dennis Marks, Peoria
Jason Blakely for Tom Wandrie, Phoenix
*Dean Wise, Queen Creek
Forrest Fielder, Surprise
A-Michael Williams, Tempe
*Mario Rochin, Tolleson
John Stigsell, Youngtown
Rick DeStefano, Wickenburg
Rus Brock, Home Builders Association

V-Those members participating via
videoconference

OTHERS IN ATTENDANCE

Steve Gross, MAG
Heidi Pahl, MAG
Mark Skidmore, American Solar Electric
Lisa Prichard, Arizona Masonry Guild
William Criager, CBH Consulting Engineers
Ed Freyermuth, Arizona Masonry Guild
Steve Ast, Shasta Pools
Paul Mason, Shasta Pools
Rick Campbell, Roy Co.
Ed Peaser, Scottsdale
Dave Endres, Superlite Block
Mike Summers, Top Quality Masonry
Steve Le Claire, AZ Block 2000

*Those members neither present nor
represented by proxy.

A-Those members participating via
audioconference

1. Call to Order

Michael Clack, Chair, called to order the May 20, 2009 meeting of the MAG Building Codes Committee (BCC) at 2:00 p.m.

2. Introductions

Voting members Steven Hether, Michael Williams, and proxy Ben Cox attended via telephone conference call. All members introduced themselves.

3. April 15, 2009 Meeting Minutes

It was moved by Ken Sowers, seconded by Bryan Woodcox and unanimously recommended to approve the April 15, 2009 meeting minutes.

4. Call to the Audience

There were no comments from audience.

5. Comments From the Committee

Bob Lee mentioned that he gave a presentation to the ASU Sustainable Cities Network (SCN) about the MAG BCC effort to create a region-wide uniform permitting process and standard for solar photovoltaic structures and service. Mr. Lee said the goal is to have the structural engineers, electrical contractors, and solar industry professionals work together to create this uniform standard.

Michael Clack said that Cheryl Mullis could not attend the meeting today but provided him a brief update to share with the committee. Mr. Clack said the solar providers are meeting and research is still under way with regards to installation of solar/photovoltaic (PV) systems on roofs. He reported that Ryan Dexter with Structural Building Components Association (SBCA) has spoken with Michael Neary. He said that Michael Neary is going to provide Ryan Dexter with a list of solar companies so that a telephone conference can be arranged to begin discussing some of the concerns with solar PV systems on existing roofs and how roof load is going to carry them.

Jason Blakely announced that the City of Phoenix is offering Technical Code Training sponsored by Central Arizona Chapter International Code Council (ICC). He distributed a handout. He said training is free and there are several classes offered. Bob Lee asked how many people per class. Jason Blakely responded that Phoenix will accommodate the number of people registered for each class.

5. Arizona Masonry

Lisa Prichard and members of the Arizona Masonry Guild (AMG) gave a presentation on details for a six inch thick masonry fence. She said that the Arizona Masonry Guild will be meeting individually with representatives from each MAG member agency. She said that the AMG is asking for feedback from the MAG BCC with a goal to ensure quality masonry construction and a consistent set of details.

Bob Lee asked if the fence that runs between the house and side property line is an interior fence. Ed Freyermuth replied yes, this applies to interior fences only.

John Stigsell asked if the Arizona Masonry Guild is requiring a special certified masonry inspector. Ed Freyermuth replied yes, but a third party inspector can also do the inspection if a small town does not have a masonry inspector.

Bob Lee said that the 6 inch CMU Standard Fence Wall handout says per City of Phoenix amendments. Mr. Lee asked what the cities and towns that did not amend that section of the 2006 IBC are supposed to do. Bill Krieger replied that question has been discussed and they decided to use ASCE code 02. An update to ASCE code 2 will come out in 2010.

Bob Lee pointed out that ASCE 7 was written by peers of the AMG not city/town officials. Bill Krieger agreed and added that academia has a large influence into the new codes. He said there is a difference between theory and practice so it is critical to be rational, realistic and provide an economically competitive design that works safely.

Bob Lee said that the AMG is encouraging member agencies to adopt the Phoenix amendments. Bill Krieger replied yes, or have a variance per job.

Forrest Fielder said they are asking for 60 for reinforcement standard. It used to be 40 for the standard for masonry design. Bill Krieger said most rebar comes in 60.

Forrest Fielder said there were some alternate footing sections that could be used between pilasters. Bill said they are using trenching. Previous designs have shown a small drill pier and those are still legitimate designs.

Bob Lee noticed another change on standard bucket from 16 inches wide to 2 feet wide, so more passes, more time, more money. Special inspection is going to add to expense of contractor. Bill Krieger agreed, it is going to add cost, but there will be assurance that walls will be built correctly. Rus Brock said he met with the AMG and they are aware of the Home Builders Association (HBA) concerns in terms of increased cost and HBA is willing to let AMG move forward with their document. Rus Brock noted that a jurisdiction does not have to require a special inspection.

Ben Cox asked about soil values. Bill Krieger gave an example with the 1000 PSF soil bearing.

Rick Campbell said as an AMG member, he encourages the special inspection by a municipality or third party inspector.

Michael Clack asked if a new fence or replacement fence on the property of an existing home requires a special inspection. Bill Krieger replied that it is the decision of the building inspector.

Bob Lee said he will provide this handout to contractors and homeowners as it is a valuable resource.

Tom Ewers asked the impact of turning every grade level block on its side for drainage. Bill Krieger responded that as long as blocks are between graded cells with rebar it would not be a problem.

Michael Clack asked if there were any consideration to head waters that may be impacting it. Bill Krieger replied that these walls cannot be used as dams and no consideration was given to withstand flowing water.

Ben Cox asked if there was any discussion for a design opportunity for an 8 foot fence. He noted that the Town of Gilbert allows 8 foot fences. Bill Krieger replied that these walls have been designed for 6 feet fences and sometimes wind storms knock over fences that are taller than 6 feet. Forrest Fielder asked how tall to build a fence for homes that share a common rear line and are at different grades, putting the wall in a parcel retaining situation. Bill Krieger replied that these walls are not retaining walls and should not be considered retaining walls. He said the 6 foot fence is built on top of a 2 foot retaining wall. Michael Clack said how to measure the wall and the height of the wall is determined by zoning regulation.

Lisa Prichard said they have an ADOT Task Force for developing sound proofing walls.

Bill King asked if sound wall comparison to ICC will be done. Bill Krieger said AASHTO has a special publication addressing sound walls along freeways and roadways. He said the intent is that it will work with ICC and AASHTO. Goodyear had instance recently where ADOT standards were not in compliance with ICC so were not accepted by Goodyear.

7. Shasta Pools Geothermal Heat Pump

Steve Ast gave a presentation on Shasta Pools and Spas use of ground-source or geothermal heat pumps with a pool to replace a home HVAC unit to heat and cool the home. He said this is viewed as a more sustainable and energy-efficient way of heating and cooling a home.

Steve Ast distributed a BLU eQ brochure which markets Shasta Pools and Spas most efficient heating and cooling system. He said geothermal needs moisture in the ground and this is hard to find in Arizona soils. He said this system has a 20 year life span and rated 30 EER. It is safe, clean, quiet, reliable and flexible. He said a home in the Town of Buckeye Watson Estates has a geothermal heat pump installation. He said essentially this technology heats and cools the home with the swimming pool. He mentioned that one concern in Arizona is that the pool does not get too warm otherwise geothermal may not work. He said there is usually a separate body of water next to pool that takes the excess heat (e.g. hot tub or fountain).

Bob Lee asked if they are operating continuously. Steve Ast replied that it is same installation as a regular heat pump, the duct work is different, and it has a computerized thermostat showing stage 1 and stage 2. He said geothermal heat pumps run a little longer than traditional HVAC systems, and they run in low speed (stage 1) mostly. He said APS gives a 50 percent rebate on the system. He said the Federal government enacted a 30 percent tax credit for home systems. He said a typical new home cost for this geothermal installation is about \$25,000. Steve Ast said that one problem in Arizona is that appraisers do not know how to value geothermal heat pumps used for cooling and heating.

Steve Ast mentioned that for new builds, the pool has to have water in it for geothermal to start working.

Forrest Fielder asked if there were any conclusions on evaporation rates of swimming pools. Steve Ast replied no, but in hot summer days a pool typically loses a quarter to half inch of water per day. He said Shasta is researching ways to make a swimming pool more sustainable and more energy efficient.

Kevin Morrow asked if full load in terms of kilowatt demand is the same as a heat pump. Steve Ast replied yes, stage 2 uses similar loads as a heat pump.

Michael Clack asked what additional costs are required for a new home and new pool that has the geothermal heat pump installed. Steve Ast replied that all costs are figured into the rebate program. Mr. Ast responded that for an average home, there is \$11,000 to 13,000 of underground work. He said home square footage is matched to size of the pool.

Michael Clack asked what kinds of challenges are faced with existing homes. Steve Ast replied that the only challenge is running existing refrigerant and heat lines to possibly a different place, such as the garage. Steve Ast said Shasta has partnered with leading air conditioning manufacturers to retrofit existing homes with a Shasta geothermal install.

8. Electric Car Infrastructure

Nissan North America, ECotality, and MAG have agreed to develop electrical charging stations in anticipation of Nissan's commercial all Electric Vehicle (EV) release in the U.S. in 2010. The Nissan EV is expected to have a range of 100 miles on a single charge and be able to be charged within four to eight hours via a 220-volt outlet. Kevin Morrow of eTec discussed the infrastructure needed in residences and commercial areas for the EV to be a success.

Tom Ewers asked for the difference between an EV parking space and a normal parking space. Kevin Morrow said size of a parking space is bigger for EV.

Bill King asked if Ecotality plans to pre-qualify owners to ensure house has the load necessary to support the EV. Kevin Morrow replied that a flow chart has been created and car companies are working on it.

Michael Clack asked if the cost of the EV charger is included in the car purchase. Kevin Morrow replied no, but there are credits available when an EV is purchased. Michael Clack asked if any consideration been given to working with NFPA and ICC to create electric charge station codes. Kevin Morrow said the NEC already has language to accommodate the EV. He said this code was created in 1996. Michael Clack said this sounds similar to when homes were retrofitted with clothes dryers. Mr. Clack said demand should drive the EV electric charge install into homes. Mr. Morrow said it is a cost saver if you can do it ahead of time.

Tom Ewers asked if intervals between charging are based on distance or time. Kevin Morrow replied distance. He said the EV can sit for several weeks unused and not lose any energy.

Michael Clack said one challenge might be capacity of older homes to accept the extra load needed by the EV. Rus Brock said one of the other challenges is that the utility provider will ask that all transformers and service feeds be upgraded to handle wiring for EV in a new build. The advent of plug-in vehicles is really pushing the smart meter. Michael Clack said he likes the concept but the details may cause problems in getting a streamlined permitting process. Mr. Clack emphasized that his main concern is safety, to ensure a qualified electrician understands how to upgrade a house for an EV.

Bob Lee said in the early stages the few companies that will install equipment for the EV in homes will be reputable and knowledgeable but just like solar PV, as the EV becomes more popular, more companies will be creating and these new companies may not have the expertise and knowledge to properly retrofit a home for the EV. Kevin Morrow said that eTec is working closely with all parties.

Forrest Fielder said as streamlined as cities might get, utility companies also need to get on board.

Bill King asked if there are any hydrogen emission problems with Level 2 chargers in the garage. He asked if anyone going to make them with the gassing battery. Kevin Morrow responded no, the wall box needs to talk to the car and it is an integrated system. Mr. Morrow said that mistake was made in the 1990s and the Original Equipment Manufacturers (OEMs) will not go down that path again.

9. MAG Building Inspectors/Plans Examiners (BI/PE) Forum Update

Michael Clack explained that Cheryl Mullis was not in attendance, therefore there was no update on this item.

10. Updated MAG Building Codes Committee Membership

Chairman Michael Clack reminded members to keep their membership information current and to report any changes to Heidi Pahl.

11. Update Survey of Code Adoption

Ken Sowers suggested a new topic on who is going to be adopting the new set of I-codes. Bob Lee suggested that MAG add a column to the survey of code adoption spreadsheet with proposed month and year of anticipated effective date for ICC effective date. Heidi Pahl said if that would be helpful to committee members then MAG staff could add the column to the table. Tom Ewers said Maricopa County will be adopting the 2009 codes at the end of 2009 or beginning of 2010. Bob Lee said he heard that the City of Phoenix wants a high ISO rating which means they will want to adopt the 2009 codes early 2010 with an effective date of July 1, 2010.

Ken Sowers asked to receive more information on legislative bills impacting the MAG BCC.

12. Topics for Future Agendas

Forrest Fielder said the Arizona Corporation Commission (ACC) is currently considering a rate case for major utilities and new energy standards.

Ken Sowers suggested limiting the number of guest speakers to two per meeting to allow each guest speaker adequate time for presentation with questions and answers.

13. Adjournment

The meeting adjourned at 4:10 p.m.

MAG COMMITTEE OPERATING POLICIES AND PROCEDURES



Table of Contents (continued)

CHAPTER IV. TRANSPORTATION POLICY COMMITTEE	Section 4.01	Responsibilities	18
	Section 4.02	Composition	18-19
	Section 4.03	Duties of the Chair & Vice Chair	19
	Section 4.04	Nomination Process & Election of Chair & Vice Chair	19
	Section 4.05	Terms of Officers	19
	Section 4.06	Vacancies	20
	Section 4.07	Meetings	20
	Section 4.08	Agenda Development	20
	Section 4.09	Conflict of Interest	20
	Section 4.10	Quorum	20
	Section 4.11	Proxies	20
	Section 4.12	Weighted Voting Procedure	20
	Section 4.13	Public Comment	20
	Section 4.14	Minutes	21
	Section 4.15	Administrative Support	21
	Section 4.16	Rules of Order & Motion Procedures	21-23
CHAPTER V. TECHNICAL & POLICY COMMITTEES	Section 5.01	Responsibilities	24
	Section 5.02	Composition	24
	Section 5.03	Duties of the Chair	24
	Section 5.04	Appointment of Chair & Vice Chair	24
	Section 5.05	Terms of Officers	24
	Section 5.06	Vacancies	24
	Section 5.07	Meetings	24
	Section 5.08	Agenda Development	24
	Section 5.09	Conflict of Interest	25
	Section 5.10	Quorum	25
	Section 5.11	Proxies	25
	Section 5.12	Weighted Voting Procedure	25
	Section 5.13	Public Comment	25
	Section 5.14	Minutes	25
	Section 5.15	Administrative Support	25
	Section 5.16	Rules of Order & Motion Procedures	25-26

CHAPTER V: TECHNICAL & POLICY COMMITTEES

5.01 - Responsibilities:	As approved by the Regional Council or Management Committee.
5.02 - Composition:	Members are professionals usually from city, town, and county staffs, as well as local, state, and federal agencies, tribal organizations and, in some cases, the private sector.
Section 5.03 - Duties of the Chair:	<ol style="list-style-type: none"> 1) Presides over the meetings of the Technical & Policy Committees. 2) Calls meetings of Technical & Policy Committees, except as otherwise specifically provided in these Procedures. 3) In the absence of the Chair, the Vice Chair will assume duties of the Chair. 4) Approves agendas for Technical & Policy Committees, except as otherwise specifically provided in Section 5.08 "Agenda Development."
Section 5.04 - Appointment of Chair & Vice Chair:	<ol style="list-style-type: none"> 1) A Chair and Vice Chair will be appointed by the Executive Committee. 2) Individuals interested in being Chair or Vice Chair, pursuant to the provisions of Section 5.05 "Terms" and Section 5.06 "Vacancies," provide letters of interest submitted to the Chair of the Regional Council for appointment by the Regional Council Executive Committee. 3) The Executive Committee shall appoint the Chair and Vice Chair of the Technical and Policy Committees, with the exception of the Transportation Policy Committee. These appointments will be staggered to assist continuity, appointing approximately half of the committee officers in June each year and the remainder in January, unless a vacancy occurs.
Section 5.05 - Terms of Officers:	One-year terms with possible reappointment to serve up to one additional term by consent of the respective committee.
Section 5.06 - Vacancies:	In the event of a vacancy in the Chair position, the Vice Chair becomes Chair for the unexpired term of the previous Chair and a Vice Chair is elected to complete the remainder of the Vice Chair's term. An individual who succeeds to an unexpired term of six months or less will serve for the remainder of the term, and is eligible to serve one additional full-year term. An individual who succeeds to an unexpired term of more than six months serves for the remainder of the unexpired term, is not then eligible to serve one additional full-year term, unless the committee consents to an additional one full-year term as provided for in Section 5.05 "Terms."
Section 5.07 - Meetings:	Technical & Policy Committees shall meet at the call of the Chair.
Section 5.08 - Agenda Development:	<ol style="list-style-type: none"> 1) The agenda is prepared by staff under the direction of the Executive Director with approval by the Chair. 2) The Chair does not have the unilateral power to remove an item from an agenda that has proceeded through the MAG committee process. 3) Request for future agenda items will be placed on all agendas. 4) Items in a MAG appeal process may be appealed to the next committee level and placed on the agenda.

Chapter V: Technical & Policy Committees (continued)

Section 5.09 - Conflict of Interest:	As is done in MAG member agencies, members confer with the MAG General Counsel regarding conflict of interest, as set forth in state law.
Section 5.10 - Quorum:	According to the By-laws, a quorum is a simple majority of the members of a committee, participating in person or by teleconference and videoconference, shall constitute a quorum for the transaction of business. In the absence of a quorum, no committee shall conduct business without a quorum. The Chair of the meeting shall adjourn the meeting from time to time, as provided in the Open Meeting Law, to attempt to garner quorum, either in person, or by proxy. If a quorum is achieved following a temporary adjourned meeting, business may be transacted which might have been transacted at the meeting as originally notified.
Section 5.11 - Proxies:	Use of proxies at Technical & Policy Committees is permitted in person (including by teleconference or videoconference), using a “like for like” policy.
Section 5.12 - Weighted Voting Procedure:	Use of weighted vote at Technical & Policy Committees is not permitted.
Section 5.13 - Public Comment:	Public involvement will be encouraged at all committee meetings. All public comment will be in accordance with the MAG public input policy.
Section 5.14 - Minutes:	Detailed minutes for all committee meetings will be taken, posted on the MAG Web site, and distributed to all committee members and interested stakeholders.
Section 5.15 - Administrative Support:	MAG staff shall provide administrative support to Technical & Policy Committees.
Section 5.16 - Rules of Order and Motion Procedures:	<p>Current informal practice encourages regional discussion. The following motion procedures are utilized to provide guidance in the conduct of meetings at MAG:</p> <ol style="list-style-type: none"> 1) Motion Procedure <ol style="list-style-type: none"> a. When a motion is made and seconded, it shall be stated by the Presiding Officer before debate. b. The maker of the motion has the right to modify his or her motion or to withdraw it entirely. If the motion is modified, the Member who has seconded it has the right to withdraw his or her second. c. If a modification to a motion made by another Member is accepted by the maker of the motion, the Member who seconded the original motion shall be requested to reaffirm his or her second after modification. If the Member declines to reaffirm the second, the second is presumed made by the Member suggesting the modification. d. In the case of a tie in votes on any motion, the motion shall be considered defeated.

Chapter V: Technical & Policy Committees (continued)

Section 5.16 - Rules of Order and Motion Procedures (continued):

- 2) Motion to Recommend Approval
 - a. A motion to recommend approval shall be to recommend the agenda item as proposed or as proposed with an amendment(s) or stipulation(s). After the motion is made and seconded, it shall require an affirmative majority vote to pass.
- 3) Motion to Deny or Disapprove a Recommendation
 - a. A motion to deny or to disapprove a recommendation shall be to reject the agenda item as proposed. After the motion is made and seconded, it shall require an affirmative majority vote to defeat the item. If the motion fails, the agenda item will not be deemed recommended, unless a separate motion to recommend approval is made and seconded and passed by the requisite majority vote.
- 4) Motion to Postpone
 - a. A motion to postpone is used to dismiss an item on the agenda. This motion is debatable, and because it can be applied only to the main question, it can, therefore, only be made while the main question is immediately pending (a motion and second is on the floor). This motion is commonly used to postpone an item until a more appropriate time.
- 5) Motion to Table
 - a. Motions to table shall be to a definite time. Such motions shall be amendable and debatable only as to the propriety of postponement and the time set.
- 6) Motion to Close, Limit, or to Extend Discussion
 - a. Commonly referred to as "Calling the Question," this motion is used to limit or close debate on, or further amend, the main motion. This motion cuts off debate. The Presiding Officer may either immediately call for a vote on the main motion or ask the Members to vote on whether to call for a vote on the main motion.
- 7) Motion to Amend
 - a. A motion to amend shall be debatable only as to the amendment. A motion to amend an amendment shall be in order, but a motion to amend an amendment to the amendment shall not be in order.
 - b. A substitute motion on the same subject shall be acceptable and shall be voted on before a vote on the amendment.
 - c. Amendments shall be voted on first, then the main motion as amended.
- 8) Motion to Continue
 - a. Motions to continue shall be to a definite time. Such motions shall be amendable and debatable only as to the propriety of postponement and the time set.
- 9) Division of Question
 - a. If the question or motion contains two or more propositions that could be divided, the Presiding Officer may, upon his or her own initiative or upon the request of a Member, divide the question or motion into multiple questions or motions for separate consideration and action.
- 10) Motion to Adjourn
 - a. A motion to adjourn may be made at any time during the meeting for the purpose of immediately closing the meeting. It requires a second, is not debatable and cannot be amended. The motion requires a majority vote for passage and, if it passes, the meeting is closed.

NOTES:



Maricopa Association of Governments, 302 North 1st Avenue, Suite 300, Phoenix, Arizona 85003

Phone: (602) 254-6300, Fax: (602) 254-6490

Web Site Address: www.mag.maricopa.gov; e-mail: mag@mag.maricopa.gov

FAQs

Q1: What is ECOtality?

A: ECOtality, Inc. (OTCBB: ETLY), headquartered in Scottsdale, Arizona, is a leader in clean electric transportation and storage technologies. Through innovation, acquisitions, and strategic partnerships, ECOtality accelerates the market applicability of advanced electric technologies to replace carbon-based fuels.

Colin Read
cread@ecotality.com
T: (480) 219-5005

www.ecotality.com
www.mini-charge.com
www.etecevs.com
www.innerypower.com

Q2: What is eTec?

A: eTec (Electric Transportation Engineering Corporation) is a subsidiary of ECOtality and is a recognized leader in the research, development and testing of advanced transportation and energy systems. With a history in electric transportation that dates back to 1989, eTec has worked on every EV initiative in North America since the 1990's.

Utilizing its patented charging algorithm, eTec manufactures the Minit-Charger line of fast-charge systems for airport ground support equipment, material handling equipment, transit vehicles (buses) and light duty passenger cars. ***The Minit-Charge technology can provide a safe and meaningful charge for an EV in approximately 15 minutes.***

Q3: What is the overview of the proposal?

A: eTec was the lead applicant on a proposal in response to a Funding Opportunity Announcement from the U.S. Department of Energy to "accelerate the development and production of various electric drive vehicle systems to substantially reduce petroleum consumption," and support the President's goals for job creation and electric drive vehicle deployment.

This will be the largest deployment of electric drive vehicles and the largest deployment of electric vehicle infrastructure ever undertaken. It will include:

- A total of 5,000 Nissan electric vehicles. Up to 1,000 will be deployed in each of five markets: Washington State, Oregon, California, Arizona and Tennessee.
- ***This project will deploy real consumer-ready vehicles, offered for sale at real prices, in real time.***

In the proposed Project, a mature charging infrastructure will be established in each of the five pilot markets, investing up to \$20 million for charging infrastructure in each.

- 5,000 Level 2 chargers installed in owner's homes
- 6,000 Level 2 chargers installed in commercial locations
- 2,000 Level 2 chargers installed in public locations
- 250 Level 3 (fast-charging) chargers installed

Data will be collected and analyzed from both vehicles and charging systems to characterize vehicle performance and the effectiveness of local charging infrastructure under various use patterns and climate conditions. The program will also conduct trials of various revenue systems for commercial and public charge infrastructure. By studying vehicle operations and the infrastructure for these first 5,000 vehicles, the proposed Project enables deployment of the next 5,000,000 vehicles.

Q4: How many jobs will be created through the pilot program?

A: It is anticipated that more than 750 new employment positions will be generated by the proposed Project by 2012. In supporting the market launch of the Nissan EV, it is expected that over 5,500 new positions will be in place by 2017 as a direct result of the proposed Project.

Q5: What will be the environmental impact of this program?

A: Each Nissan EV will save as much as 436 gallons of gasoline per year compared to a comparable internal-combustion engine sedan (assuming 12,000 miles per vehicle per year). For the entire fleet of 5,000 demonstration Nissan EVs, the fuel saving would be as high as 2,180,000 gallons of gasoline (519,000 barrels) per year. During the two year demonstration period, 4,360,000 total gallons of gasoline (103,800 barrels) would be saved.

Q6: What will be the role of fast-charging?

A: The Nissan EVs included in the program will be fast-charge capable. Pending final approval of charger connection and communication standards, fast-charge stations will be deployed in high-traffic areas and other strategic locations to reduce consumer “range anxiety” and to provide a rapid-charging solution for extending daily driving range. Fast-charging may also be strategically implemented along transportation corridors (interstate highways and major roads) to connect population areas. ECOtality has previously announced plans to deploy fast-charge systems along Interstate-10 between Phoenix and Tucson to create the Nation’s first EV Corridor and to allow EV users to commute between two major cities.

Q7: Who will be able to purchase the vehicle?

A: Consumers and fleets in each market are eligible. There are some requirements; for example, project participants will need to have an Internet connection at home to transmit usage data and to receive information from the program.

Q8: Where will the infrastructure and vehicles be deployed in the Project?

A: The five markets proposed for the program are Arizona, California, Oregon, Washington, and Tennessee. With the goal of developing mature charging environments, the Project proposes to deploy charging infrastructure in major population areas that include Phoenix (AZ), Tucson (AZ), San Diego (CA), Portland (OR), Eugene (OR), Salem (OR), Corvallis (OR), Seattle (WA), Nashville (TN), Knoxville (TN) and Chattanooga (TN). To support the Nissan EV, the Project will install approximately 12,500 Level 2 (220V) charging systems and 250 Level 3 (fast-charge) systems.

Q9: How do you sign up to be in the program?

A: To be eligible for the program, you must purchase the Nissan LEAF. Individuals and fleets interested in the Nissan LEAF can visit <http://www.nissan-zeroemission.com>.

Q10: What are the advantages to participating in the program?

A: In exchange for providing usage data for the program, participants will be provided with residential charging hardware and installation at no charge. Monthly user reports and recommendations will be provided to users in the program.

Q11: Will the project provide charging systems for purchasers of the Nissan EV?

A: Yes, a residential charging system that utilizes 220V power and related residential installation costs will be provided to all project participants. These residential charging systems will be used solely to support the operation of the Nissan EV during the duration of the program. After the program ends, project participants may retain possession of the residential charging system.

Q12: Are there financial incentives for consumers to purchase the EV?

A: The Federal government is currently offering a \$7,500 tax credit for customers of the first 200,000 electric vehicles sold by any manufacturer until 2014. Additionally, a variety of state and local incentives are either in place or currently being legislated – from greatly reduced vehicle registration charges, to up to \$5,000 state tax credits. Check with your tax preparer to determine what incentives may be available to you.

Q13: What is the total amount of the Project?

A: The Project is valued at approximately \$199.6 million. It is a 50/50 cost match; the U.S. Department of Energy will invest approximately \$99.8 million and project participants will match that amount.

Q14: Will the infrastructure be compatible with other EVs?

A: The Level 2 (220V) residential infrastructure will be provided specifically for the Nissan EV, but will meet the Society of Automotive Engineers (SAE) J1772 connection standard that will be used by all major automotive manufacturers. All public charge infrastructure will also use this standard and other applicable standards devised by the SAE.

What organizations have supported this project?

The Project enjoys support from a wide range of stakeholders.

- **Government/state level:** the states of Washington, Oregon and Tennessee have all pledged their support for this Project.
- **Government/county level:** Hamilton County (TN), King County (WA), Maricopa Association of Governments (AZ), Pima Association of Governments (AZ), and San Diego Association of Governments (CA).
- **Government/city level:** Tucson (AZ), Phoenix (AZ), Chattanooga (TN), Knoxville (TN), and Seattle (WA) have also pledged their specific support.
- **Utilities:** Supporting utilities include the Tennessee Valley Authority (TN), Knoxville Utilities Board (TN), Portland General Electric (OR), Puget Sound Energy (WA), Seattle City Light (WA), Snohomish County Public Utilities District (WA), San Diego Gas & Electric (CA), Salt River Project (AZ) and Tucson Electric Power (AZ). These utilities collectively serve over 35 million customers.
- **Other strategic industry partners:** 350 Green, ATX/Cross-Country Automotive, Bovis Lend Lease, British Petroleum (BP) America, CB Richard Ellis, Coulomb Technologies, GridPoint, Eaton Corporation, Nissan North America, Yazaki North America and Zipcar.
- **Education/research partners:** Ohio State University Center for Automotive Research, University of California-Davis Vehicle Institute of Transportation Studies, Idaho National Laboratory and Oak Ridge National Laboratory are also Project participants.

Q15: Why was Nissan selected?

A: Nissan is the only automotive manufacturer with a mass-market battery electric vehicle that is prepared for launch in 2010. As the Nissan Leaf is a market ready EV, NO Federal funds are going to Nissan and no Federal funds will be used for vehicle development.

More detailed information about this announcement, including FAQs, is available at www.ecotality.com.
Broadcasters: video and audio interviews are available for download at www.ecotality.com.

Media Relations:

Colin Read
ECotality
cread@ecotality.com
(480) 219-5005

Investor Relations:

Alliance Advisors for ECotality
Thomas Walsh
twalsh@allianceadvisors.net
(212) 398-3486

ECotality's eTec Awarded \$100 Million for Transportation Electrification

*ECotality's eTec partners with Nissan for the largest deployment
of electric vehicles and electric vehicle infrastructure ever undertaken*

PHOENIX / SCOTTSDALE, Ariz. – August 5, 2009 – Electric Transportation Engineering Corporation (eTec), a subsidiary of ECotality, Inc. (OTCBB: ETLTY), a leader in clean electric transportation and storage technologies, has been selected by U.S. Department of Energy for a grant of approximately \$99.8 million to undertake the largest deployment of electric vehicles (EVs) and charging infrastructure in U.S. history.



eTec, as the lead applicant for the proposal, partnered with Nissan North America to deploy EVs and the charging infrastructure to support them. The Project takes advantage of the early availability of the Nissan LEAF, a zero-emission electric vehicle, to develop, implement and study techniques for optimizing the effectiveness of charging infrastructure that will support widespread EV deployment. The Project will install electric vehicle charging infrastructure and deploy up to 1,000 Nissan battery electric vehicles in strategic markets in five states: Arizona, California, Oregon, Tennessee, and Washington.

"By studying lessons learned from electric vehicle operations and the infrastructure supporting these first 5,000 vehicles, the Project enables the streamlined deployment of the next 5,000,000 electric vehicles," said Don Karner, President of eTec. "Nissan's market leadership in electric vehicles affords us the unique opportunity to develop and study the charge infrastructure necessary to support the widespread deployment of EVs. eTec's extensive experience in battery electric drive systems and electric vehicle charging infrastructure, combined with the support of Nissan and over 40 government and industry partners, will enable this Project to successfully pave the way for electric transportation nationwide."

The Project will collect and analyze data to characterize vehicle use in diverse topographic and climatic conditions, evaluate the effectiveness of charge infrastructure, and conduct trials of various revenue systems for commercial and public charge infrastructure. With the goal of developing mature charging environments, the Project proposes to deploy charging infrastructure in major population areas that include Phoenix (AZ), Tucson (AZ), San Diego (CA), Portland (OR), Eugene (OR), Salem (OR), Corvallis (OR), Seattle (WA), Nashville (TN), Knoxville (TN) and Chattanooga (TN). To support the Nissan EV, the Project will install approximately 12,500 Level 2 (220V) charging systems and 250 Level 3 (fast-charge) systems.

"ECotality is committed to enhancing America's energy independence, accelerating the market acceptance of electric transportation and supporting President Obama's goals for job creation and advanced electric drive vehicle deployment," stated Jonathan Read, President and CEO, ECotality. "This Project underscores America's leadership role in clean electric transportation and exemplifies the Department of Energy's strategic foresight and commitment to improving our environment and economy. By developing a rich charge infrastructure in each market, this Project

will enable a successful consumer experience amongst early EV adopters and increase market demand for electric transportation.”

It is anticipated that more than 750 new employment positions will be generated by the proposed Project by 2012. In supporting the market launch of the Nissan EV, it is expected that over 5,500 new positions will be in place by 2017 as a direct result of the proposed Project.

On August 2, Nissan introduced the LEAF, an electric vehicle and the world’s first affordable, zero-emission car. Designed specifically for a lithium-ion battery-powered chassis, Nissan LEAF is a medium-size hatchback that comfortably seats five adults and has a range of 100 miles to satisfy real-world consumer requirements. The Nissan LEAF will launch in the United States in late 2010. U.S. production will begin in 2012, at Nissan’s manufacturing facility in Smyrna, Tennessee.

“Nissan appreciates the support of the Department of Energy in helping jumpstart the electrification of the transportation sector,” said Scott Becker vice president, legal and general counsel, Nissan North America. “This is a major step in promoting zero-emission mobility in the United States. Nissan is looking forward to partnering with eTec to help make electric cars a reality and to help establish the charging networks in key markets.”

The U.S. Department of Energy will provide funding of up to \$99.8 million that will be matched by Project participants. Federal matching funds will be used to design, deploy, and operate a mature charging infrastructure in support of future wide-scale deployment of EVs, and to evaluate the means to improve the effectiveness of this charging infrastructure.

More detailed information about this announcement, including FAQs, is available at www.ecotality.com. Broadcasters: interviews and b-roll are available for download at www.ecotality.com.

About eTec

Electric Transportation Engineering Corporation (eTec), a subsidiary of ECOtality, is a recognized leader in the research, development and testing of advanced transportation and energy systems. With over two decades of electric transportation experience, eTec has been involved in every electric vehicle initiative in North America since the 1990’s. Utilizing its patented industry-leading charging algorithm, eTec operates the Minit-Charger line of battery fast-charge systems for on-road electric vehicle, transit, material handling and airport ground support applications. For more information, please visit www.etecevs.com or www.minit-charger.com.

About ECOtality, Inc.

ECOtality, Inc. (OTCBB: ETLY), headquartered in Scottsdale, Arizona, is a leader in clean electric transportation and storage technologies. Through innovation, acquisitions, and strategic partnerships, ECOtality accelerates the market applicability of advanced electric technologies to replace carbon-based fuels. For more information about ECOtality, Inc., please visit www.ecotality.com.

Nissan North America

In North America, Nissan’s operations include automotive styling, engineering, consumer and corporate financing, sales and marketing, distribution and manufacturing. Nissan is dedicated to improving the environment under the Nissan Green Program 2010, whose key priorities are reducing CO2 emissions, cutting other emissions and increasing recycling. More information on Nissan in North America and the complete line of Nissan and Infiniti vehicles can be found online at www.NissanUSA.com and www.infiniti.com. For media needs and b-roll, please see www.nissannews.com.

###

Forward-Looking Statements

This release contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. All forward-looking statements are inherently uncertain as they are based on current expectations and assumptions concerning future events or future performance of the company. Readers are cautioned not to place undue reliance on these forward-looking statements, which are only predictions and speak only as of the date hereof. In evaluating such statements, prospective investors should review carefully various risks and uncertainties identified in this release and matters set in the company's SEC filings. These risks and uncertainties could cause the Company's actual results to differ materially from those indicated in the forward-looking statements.

MAG BUILDING CODES COMMITTEE MEMBERSHIP AS OF
8/7/2009

ATTACHMENT FOUR

Name	Representing	Telephone #	Fax #	E-mail Address
Michael Clack (Chair)	Scottsdale	480-312-7629	480-312-9029	mclack@scottsdaleaz.gov
Dennis Dixon (T)	Apache Junction	480-671-5156	480-982-7010	dennisdixon@ajcity.net
Ken Sowers	Avondale	623-333-4025	623-333-0401	ksowers@avondale.org
Phil Marcotte	Buckeye	623-349-6200	623-349-6222	pmarcotte@buckeyeaz.gov
Mike Tibbett	Carefree	480-488-1471	480 488-3845	mike@carefree.org
Mike Baxley	Cave Creek	480-488-6637	480-488-2263	mbaxley@cavecreek.org
Alex Banachowski	Chandler	480-782-3109	480-782-3110	alex.banachowski@ci.chandler.az.us
Mary Dickson	El Mirage	623-876-2932	623-876-4607	mdickson@cityofelmirage.org
Peter Johnson	Fountain Hills	480-816-5110	480-837-3145	pjohnson@fh.az.gov
John Smith	Gila Bend	1-928-683-2255	928-683-6430	jsmith@gilabendaz.org
JoRene DeVeau	Gila River IC	520-562-3583	520-562-1033	jorene.deveau@gric.nsn.us
Ray Patten	Gilbert	480-503-6820	480-497-4923	rayp@ci.gilbert.az.us
Deborah Mazoyer	Glendale	623-930-3120	623-915-2695	DMazoyer@glendaleaz.com
Ed Kulik	Goodyear	623-932-3910	623-932-1177	ekulik@goodyearaz.gov
Chuck Ransom	Litchfield Park	623-935-1066	623-935-5427	building@litchfield-park.org
Tom Ewers	Maricopa County	602-506-7145	602-506-3282	tomewers@mail.maricopa.gov
Steven Hether	Mesa	480-644-2039	480-644-4900	steve.hether@cityofmesa.org
Bob Lee	Paradise Valley	480-348-3631	480-951-3751	rlee@paradisevalleyaz.gov
Dennis Marks	Peoria	623-773-7232	623-773-7233	dennis.marks@peoriaaz.gov
Tom Wandrie	Phoenix	602-534-9480	602-495-5430	tom.wandrie@phoenix.gov
Dean Wise	Queen Creek	480-358-3009	480-358-3002	dean.wise@queencreek.org
Forrest Fielder	Surprise	623-222-3040	623-222-3001	forrestf@surpriseaz.com
Michael Williams	Tempe	480 350-8670	480 350-8677	michael_williams@tempe.gov
Mario Rochin	Tolleson	623-936-7111	623-936-7117	mrochin@tollesonaz.org
Rick Destefano	Wickenburg	928-684-5451 x513	602-506-1580	rdestefano@ci.wickenburg.az.us
John Stigsell	Youngtown	623-933-8286	623-933-5951	jstigsell@youngtownaz.org
Rus Brock	Home Builders Assn.	602-274-6545	480-556-5478	brockr@hbaca.org
Heidi Pahl	MAG	602-254-6300	602-452-5098	hpahl@mag.maricopa.gov

(T) Temporary

(P) Proxy

Survey of Code Adoption

Jurisdiction	Building	Mechanical	Plumbing	Electric	Residential	Fire	Energy	Existing Building Code	Fuel	Performance	Notes	Anticipated Adopted Date by Council	Anticipated Effective Date for 2009 ICC Codes (Month and Year)
Avondale	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2003 IFC	2006 IECC		2006 IFGC		2006 Fuel Gas Code. Codes adopted 2/20/07, effective 7/1/07	January/February 2010	July 2010
Buckeye	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2006 IFC	2006 IECC				2006 Fuel Gas Code. Codes adopted 2/20/07, effective 7/1/07		No plans to adopt 2009 codes.
Carefree	2003 IBC	2003 IMC	1994 UPC	2002 NEC	2003 IRC	2003 IFC					Codes became effective July 1, 2006		Not going to adopt, staying with 2003.
Cave Creek	2003 IBC	2003 IMC	1994 UPC	2002 NEC	2003 IRC	2003 IFC	2003 IECC					January/February 2010	July 2010
Chandler	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2006 IFC	2006 IECC		2006 IFGC		Effective September 28, 2008	January/February 2011	Early 2011
El Mirage	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2006 IFC	2006 IECC	2006 IEBC	2006 IFGC		1997 ICC/ANSI Accessibility Code with Arizonans with Disabilities Act. New codes will go into effect Jan. 1, 2008 with city amendments.	January/February 2010	July 2010
Fountain Hills	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2006 IFC	2006 IECC				Codes adopted April 17, 2008 with town amendments available on Web site.		No plans to adopt 2009 codes.
Gila Bend	1997 UBC	1997 UMC	1997 UPC	1999 NEC	1997 UBC	1997 UFC							Just adopted 2006 IBC.
Gila River	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2003 IFC	None						
Gilbert	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2006 IFC	2006 IECC		2006 IFGC		ADAAG per state requirements	January/February 2010	July 2010
Glendale	2006 IBC	2006 IMC	2006 UPC	2005 NEC	2006 IRC	2003 IFC		2006 IEBC			With city amendments. Effective Sept. 1, 2007	January/February 2010	July 2010
Goodyear	2006 IBC	2006 IMC	1994 UPC	2005 NEC	2006 IRC	2006 IFC	2006 Residential				Adopted 5-14-2007.		
Guadalupe	1997 UBC	1997 UMC	1994 UPC	1999 NEC	1997 UBC	1997 UFC							Need phone #
Litchfield Park	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2003 IFC (waiting on Avondale)	2006 IECC		2006 IFGC		Codes effective July 1, 2008		
Maricopa County	2006 IBC	2006 IMC	2006 IPC (effective Jan. 19, 2008)	2005 NEC	2006 IRC						WITH MAG/AZBO AMENDMENTS adopted September 5, 2007.	January 2010	2009 I codes (and 2008 NEC) effective date of 1-1-10, but with a grace period to 4-1-10.
Mesa	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2006 IFC		2006 IEBC	2006 IFGC		2006 IBC, IMC, IPC, IRC and 2005 NEC will be effective 2/4/07. Did not adopt the energy code.		
Paradise Valley	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2006 IFC	2006 IECC		2006 IFGC		Effective July 1, 2007	January/February 2010	July 2010

Survey of Code Adoption

Jurisdiction	Building	Mechanical	Plumbing	Electric	Residential	Fire	Energy	Existing Building Code	Fuel	Performance	Notes	Anticipated Adopted Date by Council	Anticipated Effective Date for 2009 ICC Codes (Month and Year)
Peoria	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2006 IFC			2006 IFGC			January/February 2010	July 2010
Phoenix	2006 IBC	2006 IMC	2006 UPC	2005 NEC	2006 IRC	2006 IFC w/ Amendments	2006 IECC	2006 IEBC	2006 IFGC	2006 ICCP for Buildings and Facilities	Effective July 2, 2008	January 2010	July 2010
Queen Creek	2006 IBC	2006 IMC	2006 UPC	2005 NEC	2006 IRC	2006 IFC	2006 IECC	2006 IEBC			Effective Aug. 7, 2008		No plans to adopt 2009 codes.
Salt River	2003 IBC	2003 IMC	2003 UPC	2002 NEC	2003 IRC	2003 IFC	None						Need phone #
Scottsdale	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2006 IFC	2006 IECC				Effective Sep. 1, 2007, except IPC June 30, 2008	January/February 2010	July 2010
Surprise	2006 IBC	2006 IMC	2006 IPC	2006 IEC w/ 2005 NEC	2006 IRC	2006 IFC	2006 IECC	2006 IEBC	2006 IFGC		Adopted June 28, 2007	January 2010	July 2010
Tempe	2006 IBC	2006 IMC	2006 IPC	2008 NEC	2006 IRC	2006 IFC	2006 IECC	2006 IEBC	2006 IFGC		Effective 1/12/2009		
Tolleson	2006 IBC	2006 IMC	2006 IPC	2005 NEC w/ 2006 IEC	2006 IRC	2006 IFC	2006 IECC				2006 Fuel Gas Code, 2006 IPMC, 2006 NEAC. Codes adopted 2/20/07, effective 7/1/07.	January/February 2010	July 2010
Wickenburg	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2003 IFC	2006 IECC	2006 IEBC	2006 IFGC				No plans to adopt 2009 codes.
Youngtown	2006 IBC	2006 IMC	2006 IPC	2005 NEC	2006 IRC	2006 IFC			2006 IFGC			January 2010	July 2010

THEODORE R. KULONGOSKI
Governor



ANSWERING THE OREGON CHALLENGE

CLIMATE CHANGE

Problem: The effects of global warming have serious implications for Oregon's economy and environment. Because of increased carbon emissions, temperatures are rising, snow packs are shrinking, storms and forest fires are becoming more severe, water for agriculture is becoming more scarce, while the risk of coastal flooding increases. Annual emissions of carbon dioxide have increased by almost 80% between 1970 and 2004, and experts predict a faster rate of global warming in the next 100 years than experienced in the last 10,000 years. At the same time, Oregon's population will continue to grow, increasing demands for efficient transportation and reliable energy.

Solution: Governor Kulongoski proposes a comprehensive legislative package that aggressively mitigates the impacts of global warming and puts Oregon on track to achieve our goal of reducing greenhouse gas levels to 10% less than 1990 levels by the year 2020. This package will make key investments in greenhouse gas reduction, energy efficiency and conservation, renewable energy, and sustainable transportation.

- **Greenhouse Gas Reduction:** The Governor will introduce legislation to advance Oregon's reduction of greenhouse gas emissions, including a bill authorizing the design of a regional cap and trade market system to cap carbon emissions from the state's largest sources, establishing greenhouse gas performance standards for all new electricity generation sources and strengthening state tools to regulate the emissions of greenhouse gases.
- **Energy Efficiency:** The Governor will build on Oregon's strong energy efficiency and conservation programs including a program for net zero emission buildings in the commercial and residential sectors, energy performance certificates for new buildings, broad-based energy efficiency financing tools for families and businesses, and new funding for energy efficiency for low income families.
- **Renewable Energy:** The Governor will advance Oregon's position as a national leader in renewable energy manufacturing and energy production by focusing on expanding solar energy projects, further progress on meeting the goal of 100% renewable energy for state government, and strengthening the Business Energy Tax Credit to increase investment in renewable energy projects statewide.
- **Sustainable Transportation:** In collaboration with his transportation initiative, the Governor will focus on encouraging low carbon fuels, establishing vehicle mile reduction goals and strategies to achieve those goals, and coordinating with utilities, automakers and developers to commercialize new technologies like plug-in electric vehicles.

Greenhouse Gas Reductions

As part of his comprehensive climate change legislation, the Governor will propose major new greenhouse gas emission reduction strategies. These strategies will put Oregon on a course to achieve its greenhouse gas reduction goals, strengthen Oregon's opportunity to become an economic center for clean technology businesses and services, and reduce the long-term threats to our economy and community posed by global warming.

- ***Cap and Trade Program:*** As part of a regional effort, this legislation will authorize Oregon's participation in a regional cap and trade program and expand the state's existing greenhouse gas reporting system. A citizen led public process will be established to assist the Department of Environmental Quality in developing the detailed design recommendations needed to participate in the program. Those recommendations will be brought back to the 2011 Legislature for consideration and review, prior to the regional program going into effect in 2012.
- ***Emissions Performance Standard:*** As part of achieving Oregon's long-term reduction goals, the state must ensure that no new sources of high-emitting greenhouse gases (particularly conventional coal) are added to our existing electricity production. This legislation will authorize the Public Utility Commission and the Department of Energy to develop an emissions standard that will require new energy production sources to be at least as clean as natural gas.
- ***Strengthening State Tools to Reduce Greenhouse Gases:*** This legislation authorizes the Environmental Quality Commission (EQC) to develop and implement regulations as part of a comprehensive program to assist in achieving the state's greenhouse gas emission reduction goals. Options the EQC could consider include: 1) development of a low carbon fuel standard to ensure vehicles are burning the cleanest fuel available; 2) restrictions on the use of substances that emit greenhouse gases, if alternatives are available; and 3) restrictions on idling commercial vehicles to prevent unnecessary exhaust and greenhouse gas emissions.

[Back to Top](#)

Energy Efficiency and Conservation

Investing in energy efficiency is by far the most cost-effective way to meet our growing energy needs and reduce greenhouse gas emissions. It is more than four times cheaper than investing in new energy generation. Oregon already is ranked second in the nation for investing in energy efficiency, but much more can and must be done.

- ***Energy Performance Certificates:*** Energy performance certificates will serve a function similar to miles per gallon ratings for vehicles. With escalating energy prices, a homeowner or small business person has a right to know the energy performance of a home or building they invest in. These certificates will be generated at little cost and great benefit to potential building owners and tenants.
- ***Net-Zero Emissions Buildings:*** This legislation establishes a goal of net-zero emissions homes and buildings by 2030, with a first step of increasing energy efficiency in commercial and residential building codes by 30 percent and 15 percent respectively. The legislation creates a new concept called a “reach code.” When a new code is published, the “reach code” or the next code to come into effect is also made public. This process will provide predictability to new building code requirements by publishing the next code three years in advance.
- ***Financing:*** This legislation gives local governments, both municipal and county, bonding authority to finance energy efficiency projects. One goal is to make residential energy efficiency projects financially viable by allowing local governments to create one large-scale project. Participating homeowners will be able to pay for the energy efficiency upgrades over time.
- ***Energy Efficiency Tax Incentives:*** Oregon can build on the success of the Business Energy Tax Credit (BETC) program by expanding the incentive to apply to large-scale energy efficiency investments. This legislation will expand the tax credit from 35 percent to 50 percent of the total costs of the project, up to \$20 million - similar to what was done in the 2007 session for renewable energy.
- ***Electric Vehicle Tax Incentives:*** The BETC and Residential Energy Tax Credit programs also will be adjusted to eliminate the existing tax credit for hybrid vehicles (\$1500) due to the large market penetration of those vehicles in Oregon, and shift an expanded tax credit (\$5000) to the purchase of plug-in electric and all-electric vehicles. This adjustment will encourage the purchase of zero and low-emission vehicles. The legislation also authorizes the Department of Energy to make future adjustments to the program as technology changes and the alternative fuel vehicle market expands.
- ***Low-Income Support:*** A new “Energy Matchmakers” account in the Department of Housing will be created and funded to provide assistance to improve energy efficiency for low-income households. This fund will leverage federal and private sector investments. Because of this effort, 800 low-income homes in Oregon each year will become more energy efficiency, saving approximately \$316 per year, per home in energy costs.

[Back to Top](#)

Renewable Energy

The Governor will advance Oregon's position as a national leader on renewable energy production and manufacturing of renewable energy products by focusing on expanding solar energy projects, meeting the goal of 100% renewable energy for state government, and strengthening the Business Energy Tax Credit to increase investment in renewable energy projects statewide.

- ***Expand Solar Pilot Projects:*** To accelerate and expand the use of solar energy in Oregon, this legislation will create a production incentive pilot program that will pay for the electricity produced by a solar project, rather than for the capital investments. Known also as a feed-in tariff, this type of incentive program has led to the installation of more than 2,500 megawatts of solar electricity in Germany. The objective of Oregon's pilot program is to determine if production payments make it more affordable for individuals and communities to invest in solar energy, which could lead to the acceleration and installation of renewable projects.
- ***Strengthen Incentives:*** Oregon has been tremendously successful in incentivizing renewable energy through the Business Energy Tax Credit (BETC) program. The Governor is committed to making BETC even more effective by creating a BETC Energy Fund that would create up-front funding options under the BETC. Citizens would be able to donate money into the fund and take a tax credit on the donation, much like the Cultural Trust program.
- ***Lead by Example:*** The Governor established in 2006 a goal of 100% renewable electricity use for state government. Already, state agencies and universities are developing innovative and ambitious projects to further this objective, such as the ODOT solar highways initiative and a geothermal campus for the Oregon Institute of Technology. To help meet this goal and have the state lead by example, we need to increase our investment in state renewable energy projects and green power, as well as give the state clear authority to engage in those efforts.

[Back to Top](#)

Sustainable Transportation

The Governor recognizes the dual need to both invest in transportation while also advancing options that reduce greenhouse gas emissions. That's why the Governor's climate change and transportation packages must be complementary, addressing the state's growing transportation needs while also taking actions to reduce carbon. The Governor's package will put forward several sustainable transportation measures that focus on reducing vehicle miles traveled, expanding transportation options, and encouraging new vehicle technologies.

- ***Encouraging Alternative Vehicle Technologies:*** The Governor's transportation initiative will encourage the use of alternative technologies like plug-in hybrid and all-electric vehicles. The state will shift its business and residential energy tax credits from widely used hybrid vehicles to new vehicles that produce less carbon. As vehicle manufacturers introduce new technologies, the state will pursue public and private partnerships to ensure Oregon is the place to implement new vehicle technologies, such as charging stations for electric vehicles.
- ***Adopting Low Carbon Fuels:*** This will authorize the Environmental Quality Commission to develop a low-carbon fuel standard similar to standards in Washington and California. This standard will require fuel providers to reduce the average carbon intensity of fuels sold by 10% over time. A low-carbon fuel standard will help reduce greenhouse gas emissions but also provide companies with flexibility to meet the standard through innovation and new technology.
- ***Expanding Transportation Options:*** The Governor is committed to setting an overarching vehicle miles traveled (VMT) reduction goal for the state. Reducing discretionary trips in single occupancy vehicles will be a high priority, particularly in urban areas where more transportation choices exist. This will include an expanded Transportation Options program to help provide relief from high fuel prices and enhance community livability through expanded pedestrian and bicycle programs, increased numbers of carpools and vanpools, a statewide rideshare program, education and marketing, and incentive programs designed to reduce cars on our roadways.
- ***Developing a Least Carbon Model:*** This legislation directs the Oregon Department of Transportation (ODOT) to develop a least carbon planning model – similar to what utility companies currently use – that will be applied when solving transportation problems. This modeling directs ODOT to consider the least carbon option, such as increased investments in rail or transit, in order to relieve congestion, rather than just building additional capacity.

[Back to Top](#)

###

EVSE Manual for Commercial, Public, Fleet Use

Introduction

Oregon has positioned itself as a leader in adopting electric vehicles (EV) to reduce dependence on fossil fuels and the resulting greenhouse gas emissions. So far, the biggest limitation for motorists considering EVs has been the absence of a reliable network of charging facilities to increase the range of these vehicles. Another barrier has been confusion surrounding the nature of EV charging and the steps needed to acquire EV charging capability in a home, business or public location.

In response to these challenges, Oregon has already taken several steps to ease the transition to EVs and make electric vehicles convenient and affordable. The state of Oregon has negotiated with several auto manufacturers to introduce new EVs in Oregon, and the Oregon Department of Transportation has developed competitive price agreements for EV charging equipment to ensure that equipment installed in different locations and by different electric utility companies will provide a common charging experience for all EV users. The state has also applied to the U.S. Department of Energy's Clean Cities program to cover up to half the cost of deploying initial EV charging stations.

This manual is intended to be an easy-to-follow guide to help any public or private entity install Electric Vehicle Supply Equipment, or EVSE. We hope this guide will be a useful reference in accelerating the deployment of EV charging infrastructure throughout Oregon. An on-line version of this manual is also available at: [location@url](#)

What is an Electric Vehicle?

Insert photo
of electric
vehicle

An electric vehicle (EV) is a vehicle that uses an electric motor for propulsion and is powered by a battery located on-board the vehicle. Section _____ of this manual describes the kinds of EVs on the market today, as well as upcoming technologies in the world of EVs.

EV batteries are fully rechargeable, although the time it takes to recharge an EV depends both on the type of vehicle and the type of power supply equipment used. Below is a brief description of the power supply equipment used with today's EVs.

Electric Vehicle Supply Equipment and Wiring

There are three main components to Electric Vehicle Charging Infrastructure: electric vehicle supply equipment (EVSE), premises wiring, and electrical service and electrical panel capacity:

Insert photo or graphic of
car plugged into EVSE

1) The Electric Vehicle Supply Equipment (EVSE). This consists of a supply device, power cord, and connector.

- **Supply Device:** This device is the main component of the electric vehicle charging station. Typically it supplies electrical power, provides shock protection, and may also contain information systems for measuring the amount of energy delivered while an EV is charging. For Level 1 and 2 charging (see below), the actual charger is located on-board the EV.
- **Power cord:** This is a cable that carries electrical current and communication signals from the supply device to the connector. For Level 1 and 2 charging, this cord conducts alternating current from the EVSE to the on-board charger.
- **Connector:** This is a plug on the power cord that connects the EVSE to charging sockets on the EV. In the fall of 2009 the Society of Automotive Engineers is expected to approve the SAE J1772 "SAE Electrical Vehicle Conductive Charge Coupler" as the national standard for EVSE connectors which will be used in virtually all electric vehicles in the U.S.

Insert photos
or graphics of
all three
components

2) Premises wiring. This is the wiring that runs from the electric panel to the EVSE.

3) Electrical service and electric panel capacity to charge an EV. Electrical service includes the utility lines and electric meter, both of which are owned and controlled

by the local electric utility. Installation of EVSE may require new or upgraded electrical service. A local electrical contractor can determine if the existing service can support the additional load of EVSE and coordinate with the local utility if an upgrade is needed.

*INSERT "EV Charge Residential Install"
Drawing*

Accessing Statewide Purchasing Agreement for EVSE

In order to promote the use of EVs and ensure a uniform charging experience the Oregon Department of Transportation (ODOT) has entered into a purchasing agreement with a reputable EVSE vendor. You can purchase EVSE equipment under this purchasing agreement; doing so will ensure that you receive high quality equipment that is standardized across the state of Oregon and available at a reasonable price.

In order to take advantage of this purchasing agreement, you will need to fill out an EVSE Authorized Purchaser Participation Agreement. Forms are available at the ODOT website at [location@url](#).

Electric Vehicle Charging Levels

EV charging can be performed at three different voltage and current levels. Each level has advantages and disadvantages and the EVSE installation requirements will differ depending upon the desired charging level.

Level 1 Charging

Level 1 Charging is done with a standard outlet and voltage level that is present in all homes and businesses. Using this level of charging rarely requires an upgrade to an existing electrical service. This level of charging can take between 8-14 hours to fully charge an EV and for this reason Level 1 charging may not be the preferred method of charging for most circumstances.

Level 1 Charging specifications:

- 120-volt ac single-phase nominal electric supply
- 12 to 16 amp maximum continuous current with 15 amps minimum branch circuit protection

Level 2 Charging

Level 2 charging is faster and more convenient than Level 1 charging and is expected to be the primary option for home, public, and fleet charging stations. This level of

charging may require an upgrade to existing electrical service and will require a permanently wired and fixed charging station location. Level 2 charging can fully recharge an electrical vehicle in 3 to 6 hours.

Level 2 Charging Specifications:

- 240-volt ac single-phase nominal electric supply
- 32 -70 amp maximum continuous current with 40 amps minimum branch circuit protection
- Safety features: grounding, ground fault protection, no-load make/break interlock, cable/connector safety breakaway

Insert photo of chosen vendor's EVSE

EVSE available for purchase under the statewide procurement and purchase agreement are compatible with both Level 1 and 2 charging.

Level 3 Charging

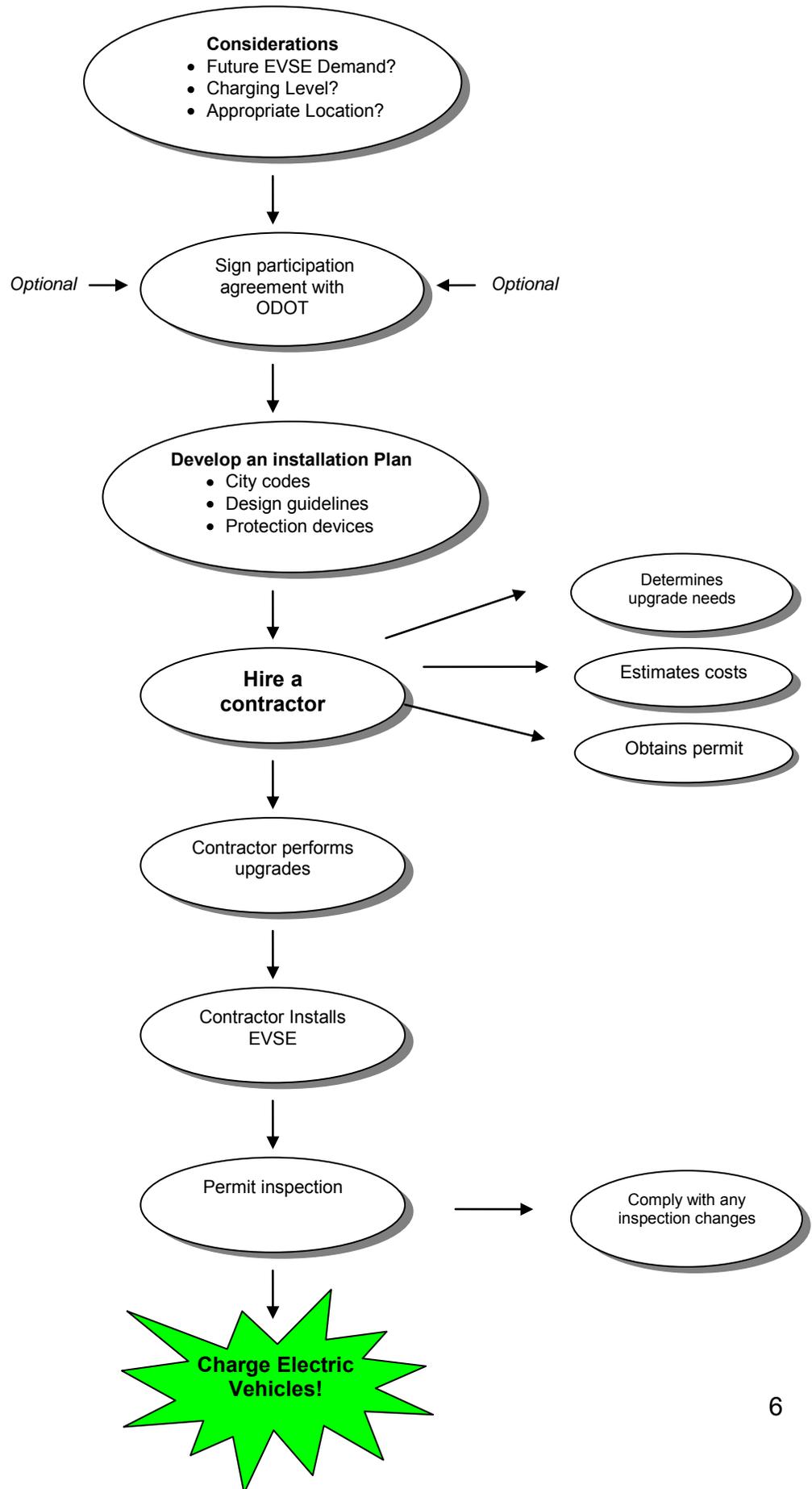
Level 3 Charging, also known as fast charging, involves high-powered technology that can fully charge a vehicle in 20 to 30 minutes. The amount of power required for Level 3 charging is beyond the capacity of most utility transformers. For this reason, along with the expectation that most EV charging will take place overnight when Level 2 charging would be sufficient, Level 3 charging will usually not be the preferred charging method. However in some situations such as large fleets of vehicles Level 3 charging may be appropriate. See section _____ for a discussion of fleets and Level 3 charging. A standard for level 3 charging systems is in development.

Insert photo of Level 3 Charging station

The Installation Process

Installing EVSE for a fleet of vehicles or in a public or commercial location is not difficult, but there are important steps to follow and details to consider. Following is a flowchart showing the process of installing an EVSE in a public, commercial, or fleet location.

Figure 1: EVSE Installation in Commercial, Public, or Fleet Locations



Designing an Installation Plan

Before installing EVSE in a public location or commercial fleet it is important to coordinate the design of the installation with an electrical contractor and the site manager. The design should consider:

- Code requirements
- Electrical capacity
- Estimated demand for EVSE
- Location and local siting requirements

*Insert "EV Charge
Commercial Install"
Drawing*

Oregon Electrical Code Requirements

Installation and placement of EVSE is regulated by the National Electric Code (NEC) as adopted by the Oregon Electrical Specialty Code (OESC). NEC Article 625 addresses requirements for Electric Vehicle Supply Equipment. If the EVSE is purchased under the ODOT purchase agreement the property owner can be confident that the EVSE equipment meets all NEC and OESC requirements.

Only a licensed electrician or electrical contractor should install EVSE in a public or fleet location. An electrician can acquire the necessary permit, perform the installation and obtain an inspection. Hiring an electrical contractor will help streamline the process while ensuring that the installation adheres to all relevant electrical and building codes. See Appendix 1 for a helpful resource on finding an Oregon licensed electrical contractor.

Permits and Inspections

Oregon Revised Statute 479.550 requires that you acquire a permit before installing EVSE. You will also be required to have an inspection by the local jurisdiction prior to energizing the EVSE to ensure it is safely installed.

Inspections are limited to examining the feeder for compliance with the following OESC provisions:

- a) Overcurrent protection, per articles 225 and 240;
- b) Physical protection of conductors, per article 300;
- c) Separation and sizing of the grounding and neutral conductors, per article 250.20; and
- d) Provisions for locking out the breaker for maintenance, per chapter 4.

You may also choose to install a grounding electrode system for supplemental lightning protection, but this is not required by the OESC.

Ventilation

Electric vehicles that use lead-acid batteries may require ventilation when charging to prevent the build-up of hydrogen emitted from the charging battery. When deciding upon the type of EV to purchase and the location for EVSE, you should consider possible ventilation needs. If ventilation is required, EVSE chargers must be linked up to a mechanical ventilation system as described in NEC article 625. An electrical contractor will help ensure you have proper ventilation for the number and type of vehicles that will be charging at a given location.

In all charging locations, EVSE should clearly state if the EVSE is appropriate for vehicles requiring ventilation.

Insert photo or graphic of an EVSE that is linked up with a ventilation system.

Electrical Capacity Considerations

Installing EVSE in fleet or public locations may require upgraded electrical service including new feeder lines, panels, and possibly even new transformers. Several factors determine the need for electrical service upgrades, including:

- Number and type of charging units;
- Pre-existing electrical capacity; and
- Load management considerations

Insert photo of large bank of EVSE in fleet or public location

Number and Type of Charging Units: The number of EVSE and the level of charging will drastically impact electrical service demands, particularly in fleet locations with large numbers of EVSE charging stations. Due to the high electrical demands of

Level 3 charging and the slow charging times of Level 1 charging, Level 2 will likely be the preferred level of charging for both public and most fleet locations.

When deciding upon the number of EVSE to install, both public and fleet sites should estimate future increases in EV use. Public fleet managers should include consideration of alternative fuel mandates when estimating future EV demand.

Pre-existing Electrical Capacity: When considering where to install EVSE equipment for a fleet or public access, it is important to work closely with an electrical contractor who can assess current electrical capacity and the electrical demands of the EVSE.

Some locations may have existing electrical capacity for one or two EVSE stations, but installing several EVSE units may require upgraded electrical service. The electrical contractor can help determine possible upgrade needs and ensure that all electrical upgrades are done safely, within electrical code guidelines, and according to permit and inspection protocol. If upgrading electrical capacity or increasing a building's electrical load it is the building owner's responsibility to alert the utility company.

Load Management Considerations: Management of charging times can help control both demand on electrical service and the cost of recharging EVs.

Public and commercial fleet managers should consider timing the charging of their fleet vehicles to correspond with times of low electricity demand. If time-of-use rates are available then fleet managers could use these rates both to lessen the burden on the electric grid and lower the cost of recharging fleet vehicles. See section _____ for an explanation of time-of-use rates.

Public EVSE stations should have an adequate number of chargers to meet charging needs during times of peak demand. If a location is expected to experience a high volume of use, then additional electrical capacity should be considered so that charging capacity does not diminish when several EVs are charging simultaneously. Most public charging will occur during the day when demand for electricity is relatively high.

Signs and Visibility

National Electric Codes require that all EVSE sites be identified by signs stating "For Use with Electric Vehicles." Signs may also indicate when parking spaces are for EV-charging only.

Insert photo of "EV
Parking Only" sign

ODOT has developed a standing "Electric Vehicle Parking Only" sign but they are currently working through trademark issues that may require a new design. Several variations of the sign are currently under consideration.

Specific Considerations for Public Locations

Metering and billing Entities that provide public access to charging stations will need to decide if and how they will charge users of the EVSE. Some options include:

- The EVSE owner may choose to provide charging for free to encourage EV owners to come to their business location and to show their support of a greener transportation system.
- Employers with EVSE may charge their employees a premium for an electrified parking spot or provide them for free as an employee benefit.

Insert photo of EVSE point-of-sale machine (if this exists)

Currently, collecting payment for electricity at public charging stations is problematic because the transaction costs far outweigh the small cost of the electricity used. Also, only utilities can sell electricity in Oregon. Until there are significant numbers of EVs on the road the cost at any public station will be minimal because most of the charging will take place at home and at work. In time, standards and business models for charging users of public EVSE will likely emerge.

Accessibility Requirements: EVSE in public locations need to comply with the federal Americans with Disabilities Act and Chapter 11 of the Oregon Structural Specialty code (OSSC). Some aspects of EVSE installation to consider include disabled parking access, special curbing and the height of the EVSE equipment.

Though no current state guidelines exist, general recommendations are that there be at least one ADA accessible EVSE for every 25 EVSE charging spaces.

Insert "EV Charge Disabilities Act Compliant" drawing

Guidelines for Physical Layout of Public EVSE

To help motorists recognize and become comfortable with public EVSE stations, the state of Oregon is encouraging uniformity and standards in design of public EVSE. It is important that the public recognize and develop confidence with EVSE stations across the state. This will raise EV awareness and provide a common user charging experience regardless of location.

It's important to follow local zoning codes when installing public EVSE stations. For example, some cities may require a certain amount of landscape buffering or setbacks from sidewalks. Following is a list of suggested recommendations for EVSE placement, keeping in mind that local zoning requirements may impact your final EVSE setup.

a. Sidewalk Placement of EVSE: If EVSE is installed on a sidewalk adjoining a roadway the EVSE should be placed within the "furnishing zone" of the sidewalk,

Insert photo of EVSE sidewalk placement

similarly to parking meters, sign poles, and traffic signals. For a 9 foot sidewalk the “furnishing zone” is 36 inches from the edge of the curb; width of the furnishing zone will vary depending upon sidewalk width.

To minimize vehicle contact the EVSE should be placed farther from the curb towards the end of the furnishing zone. This will avoid foot traffic while shielding the EVSE from the street and from any damage that could occur as a vehicle parks. When placing the EVSE within the furnishing zone ensure that the sidewalk remains accessible according to ADA and OSSC Chapter 11 rules.

b. Cords and Walkways: EVSE cables should not cross walkways or vehicle access areas.

c. Hazardous Locations: EVSE should not be placed near hazardous materials; if this is unavoidable, check with the electrical contractor to ensure placement meets articles 500-516 of the NEC.

d. Protective Barriers: We recommended that EVSE be protected by bollards, curbs or other barriers to prevent accidental damage to the EVSE.

Bollards or other appropriate protective devices should be placed with at least 36 inches of clearance between the EVSE and the barrier so the EVSE can still be accessed when a vehicle is parked near the barrier. Bollards and other protective devices should be placed so they allow a direct connection with the EVSE. The preferred standard design incorporates two bollards off-set from the center of the EVSE station (see photo).

Bollards and protective barriers should conform to the standards in Sections 815-820.90 of the Oregon Standard Specifications for Construction.

In a situation where EVSE is placed in a sidewalk furnishing zone and protective barriers such as bollards are not feasible, the curb can be considered an adequate protective device.

Insert photo of EVSE space with protective barriers (preferably two bollards, slightly off-center)

e. Outdoor EVSE: Where an EVSE is placed in an outdoor location, consider providing an overhang to protect it from the elements and alleviate customer concern over the risk of electric shock in inclement weather. EVSE obtained through the ODOT statewide procurement and purchase agreement is designed to operate safely even in wet areas, but providing a protective overhang may increase public acceptance.

EVSE placed in indoor locations, such as covered parking structures, do not require an overhang.

Insert photo of EVSE with desired overhang design.

f. Lighting In public areas, proper lighting of the EVSE station is important to ensure security and prevent vandalism or misuse. However, lighting should be designed to minimize distraction to traffic, disturbance to surrounding buildings and excessive light pollution. We recommended using motion-sensor lights.

Insert photo or graphic of EVSE with desired lighting scheme.

Specific Considerations for Fleet Locations

EV Fleets and Level 3 Charging

Before deciding on the appropriate level of charging for a fleet of vehicles, you will need to consider the needs of the fleet and potential recharging schedules. If you have a large fleet of EVs that will need frequent recharging on overlapping schedules, it may be appropriate to install Level 3 charging stations. However, with the extra expense of installing Level 3 charging, you should be certain that the use of Level 3 charging is justified.

If you are considering Level 3 charging, you should talk to an electrical contractor as soon as possible to determine if the amount of electricity required for Level 3 charging is feasible in the fleet location.

Expected Costs

Installation Costs

It is difficult to estimate costs for the installation of EVSE since cost depends on specific circumstances such as pre-existing electrical capacity, distance from the electrical panel to the desired EVSE location, the amount of construction that needs to be done to accommodate the EVSE, and number of chargers in an installation. The estimated average cost for an installation of a single EVSE in a public or fleet location is \$10,000. This is a very rough estimate, as individual circumstances will vary, particularly in retrofit situations where extensive concrete cutting, trenching, conduit and panel upgrades may be required.

See Appendix 2, 'Other Resources,' for a link to an estimated installation cost breakdown from the U. S. Department of Energy's Vehicle Technology program.

Estimated Charging Costs

The cost to recharge an EV will vary depending upon the type of EV and the electricity rate. Electricity rates vary by utility company; in 2008 the average cost of electricity to a commercial consumer in the state of Oregon was around 8 cents per kilowatt-hour (kWh). The number of miles per kWh varies by EV but many average around 4 miles per kWh. With these numbers, cost would be approximately 2 cents per mile. In comparison, a gas vehicle that gets 20 miles per gallon and pays \$3.00 for a gallon of gas pays 15 cents a mile. This is just an estimate; the exact cost could be more or less depending upon your utility rate and the range of the EV per charge.

Time-of-Use Rates

Some utility companies may offer different utility rates depending upon the time of use, with lower rates offered during times of low electricity demand. If time-of-use rates are offered fleets could save money by charging EVs during times of low demand, such as overnight.

Controlling use of EVSE for different times of day will be more difficult at public EVSE locations, but entities that are paying for public access should be aware of the potential impact that time-of-use rates will have upon the cost of EV charging for their EVSE location.

Check with your local utility provider to see if they offer time-of-use rates before deciding upon a charging plan for your EV. If your utility offers time-of-use rates you will need to have a special time-of-use meter installed. Some vehicles may come with the option of setting a delay for charging similar to the delayed start of a washing machine, dryer or dishwasher. If this feature is not available, property owners may also have an external timer installed in the electric panel that will control when the EVSE can charge the vehicles. If you are considering using time-of-use rates and want to have a timer installed, consult with your electrical contractor before EVSE installation begins.

State and Federal Tax Credits for Electric Vehicles

There are various state and federal tax credits for consumers installing EVSE or purchasing one or more electric vehicles.

Oregon State Tax Credits

1) Oregon Business Energy Tax Credit: Transportation.

The Oregon Business Energy Tax Credit is available to businesses to help pay for projects that reduce miles driven or promote alternative fuels and more sustainable vehicles. The purchase of EVs and installation of EVSE are eligible for this credit. The tax credit is equal to 35 percent of eligible project costs and can be taken over five

years at the rate of 10 percent in the first and second years and 5 percent each year thereafter. Projects with eligible costs less than \$20,000 would take the entire tax credit in one year.

Federal Tax Credits for Purchasing an Electric Vehicle

1) Energy Improvement and Extension Act of 2008

New Electric Vehicles: Currently, there is a federal tax credit for new plug-in electric vehicles, ranging from \$2,500 to \$7,500 for cars and trucks, and from \$10,000 to \$15,000 for larger commercial vehicles. For each make and model of EV this tax-credit will begin to phase out after 200,000 EVs have been sold. See the adjacent table for phase-out periods and amounts. This tax credit applies to vehicles acquired after December 31, 2009, and expires December 31, 2014.

Vehicle Size (lbs)	Maximum credit	Phase-out level	50 percent credit Qtrs 1 & 2 post phase -out	25 percent credit Qtrs 3 & 4 post phase-out
< 10,000	\$7,500	200,000 sold	\$3,750	\$1,875
10,000-14,000	\$10,000	200,000 sold	\$5,000	\$2,500
14,000-26,000	\$12,500	200,000 sold	\$6,250	\$3,125
> 26,000	\$15,000	200,000 sold	\$7,500	\$3,750

Electric Vehicle Conversions: Through December 31, 2011, qualified plug-in electric vehicle conversions are also eligible for a tax credit of 10 percent of the conversion cost up to \$4,000.

Low-Speed Electric Vehicles: A second tax credit of up to 10 percent of the cost of qualified low-speed electric vehicles, electric motorcycles, and three-wheeled electric vehicles, not to exceed \$2,500, is available through December 31, 2011.

2) Alternative Fuel Infrastructure Tax Credit

The federal government is offering a tax credit for the cost of installing alternative fueling equipment, including electric vehicle charging stations. Individual consumers may receive a tax credit of up to \$2,000 for equipment that was placed into service after December 31, 2008.

For large commercial or public installations the credit amount is equal to 50 percent of the installation costs, not to exceed \$50,000, for all equipment placed into service on or

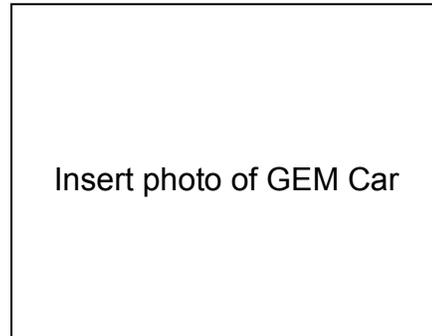
after January 1, 2009. There is a 30 percent credit amount, not to exceed \$30,000, for equipment placed into service before January 1, 2009.

The Alternative Fuel Infrastructure Tax Credit expires December 31, 2010 for electric vehicle supply equipment. Form 8911([PDF 247 KB](#)) provides additional information and must be used to claim the tax credit.

Electric Vehicles Today

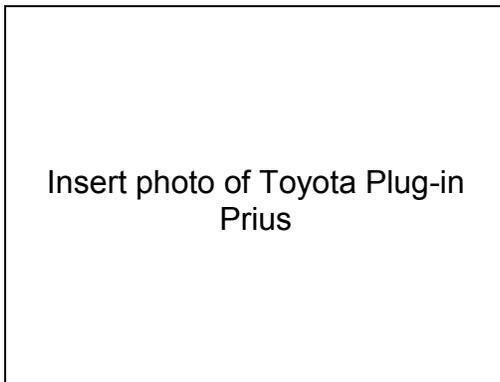
NEV (neighborhood EV) or LSV (low-speed EV)

Most of the EVs currently on the road are known as NEVs or LSVs that have a maximum speed of 25 mph in Oregon. These vehicles are not crash tested or safety certified and in Oregon many are registered with the Driver and Motor Vehicles as motorcycles. An example includes the GEM car:



PHEV (Plug-in Hybrid Vehicle)

Another type of EV is the plug-in hybrid. This vehicle includes the standard hybrid gasoline/electric engine but is augmented with additional battery cells and a charging mechanism. Example includes Toyota's plug-in Prius, scheduled for release in the US in 2010:



Some hybrids can also be converted to a PHEV with a conversion kit that adds an additional battery pack.

BEV (Battery Electric Vehicle) or EV (Electric Vehicle)

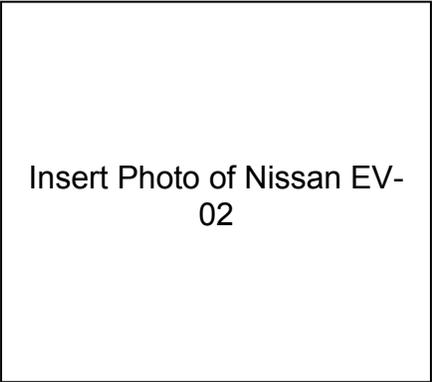
Almost every major car manufacturer has announced plans to introduce all-electric vehicles in the next couple of years. Examples include:

Smart Electric Vehicle This is an electric version of the existing Smart Car, which continues to grow in popularity in the United States. Electric Smart Cars will be available to select customers in the U.S. in June 2010, with greater availability by 2011.



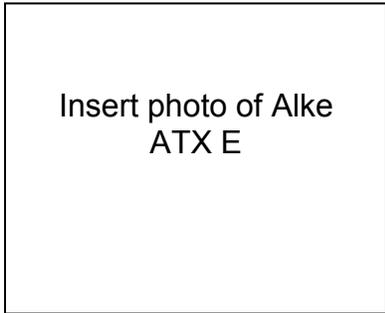
The Mitsubishi Innovative Electric Vehicle (MIEV). This car is currently in production in Japan and should be available worldwide in 2010.

Nissan EV-02. This car should be released in Oregon for fleet use in 2010, with planned expansion to the consumer market in 2012. The Nissan EV-02 is capable of highway speeds and should have a 100 mile battery range.



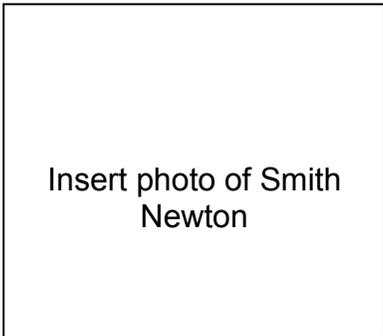
Highway Speed Commercial Electric Vehicles

There are already many commercial electric vehicles in use in a variety of different commercial and governmental settings, such as:



The Alke ATX E Series of commercial vehicles. Built in Italy, these vehicles have load capacity up to 2200 pounds and towing capacity up to 6600 pounds.

Smith Edison Minibus. This is available in three different body styles and two different lengths.



Smith Newton A 12-ton truck with a 7.4 ton payload, it also has a range of over 150 miles and a maximum speed of 50 mph.

The Future of Electric Vehicles

Many new and exciting technologies are currently being developed in the world of electric vehicles. Below is a list of cars that will be available in the near future, along with brief highlights of some of the EV technology being developed. See Appendix 2 for a link to an updated list of new EVs and EV technology

Future EVs



Insert photo of Phoenix Motorcar SUT

Phoenix Motorcars SUT. This is a four passenger sport utility truck that can go highway speed and travel over 100 miles on a single charge.

Think Ox vehicle. This is a small four-door sedan with a 124 mile range that is rechargeable either with a normal household outlet, Level 2 charging, or rapid-charging technology.



Insert photo of Think Ox

Future Commercial Vehicles

Insert photo of Nemo HD
2

Nemo Must HD 2. This commercial vehicle with rear cargo capacity of 300 pounds can be fitted with drop-down sides; it has a 115 mile range at a speed of 25 mph.

Future EV Technology

Smart Grid Technology and Vehicle to Grid Charging

Many new and exciting technologies are being developed to increase the convenience and affordability of EVs. Some developments that should be available in the near future include Smart Charging and Vehicle to Grid (V2G) charging.

Smart Charging

In very basic terms, “Smart Charging” refers to a variety of technologies that allow the EV to interact with the electrical grid beyond the simple charging of EV batteries, communicating with the grid in real time and charging exactly when the grid needs it to. Although still being developed, Smart Charging could simplify Time-of-Use charging, help consumers avoid charging vehicles during peak demand, and allow for point-of-sale charging at public EVSE locations.

Vehicle to Grid (V2G) and Vehicle to Building (V2B)

Both V2G and V2B charging would allow two-way energy flow between the EV and the power grid or building. This would allow the EV to act as an energy storage system and provide power either to the electrical grid in the case of V2G charging or directly to a building’s energy management system with V2B charging.

Smart Grid

The use of Smart Charging and V2G technologies is contingent upon the upgrade of the nation’s electric grid to what is being called a new “Smart Grid” that would allow

communication between the electric grid and home appliances such as EVs. This technology could potentially expand the economic and environmental benefits of EVs by allowing the consumer to save money and by decreasing utility companies' reliance upon more polluting energy sources when demand for electricity is high. Smart Grid and V2G and V2B technologies are still being developed and many questions, such as who will control the flow of electricity, are still being debated. Once implemented, V2G or V2B capabilities on a Smart Grid could significantly increase the convenience and affordability of EVs.

In the meantime, using EVs today is a smart choice for many people, and Oregonians are, once again, leading the way to a smarter, more sustainable future for everyone.

See the following appendices for resources, contractor information, and more.

Appendix 1: Hiring a Licensed Electrical Contractor

The state of Oregon has resources available to help ensure that the contractor you hire to install EVSE will be licensed and reputable. Before hiring a contractor you should consult the Construction Contractors Board's office or website where you can find a licensed contractor, check a known contractor's license, or register a complaint about a contractor.

The Construction Contractors Board also features information on "Best Practices" when hiring a contractor, and can help you mediate any conflicts that may arise during or after your installation.

You can access the Construction Contractors Board online at

<http://www.oregon.gov/CCB/index.shtml>

In addition to the Construction Contractors Board, you can find referrals for qualified electrical contractors through the following organizations:

The National Electrical Contractors Association (NECA) at 503-233-5787
Or 541-736-1443

Independent Electrical Contractors of Oregon (IEC) at 503-598-7789

You can also learn more about permitting in Oregon at the "Permits Protect" website:

<http://www.permitsprotect.info/>

Appendix 2: Other Resources

Utility Companies in Oregon, by region:

- <http://www.oregon.gov/ENERGY/Power.shtml>

Cost-estimates for EVSE installations in residences and commercial facilities:

- U.S. Department of Energy Vehicle Technologies Program: *“Plug-in Hybrid Electric Vehicle Charging Infrastructure Review.”*
<http://avt.inel.gov/pdf/phev/phevInfrastructureReport08.pdf>

Updates on EVs entering the market

- Plug-In America’s *“Plug-in Vehicle Tracker”*
<http://www.pluginamerica.org/plug-in-vehicle-tracker.html>

Oregon Electric Vehicle Association: www.oeva.org

Appendix 3: Glossary of Acronyms

ADA: Americans with Disabilities Act

BEV: Battery Electric Vehicle (see also EV)

EV: Electric Vehicle

EVSE: Electric Vehicle Supply Equipment

KWh: Kilowatt-hour

LSV: Low-speed Electric Vehicle

NEV: Neighborhood Electric Vehicle

NEC: National Electric Code

ODOT: Oregon Department of Transportation

OESC: Oregon Electric Specialty Code

OSSC: Oregon Structural Specialty Code

Appendix 4: Glossary of Terms

Ampere (amp): A unit of measurement for current, or the amount of electricity flowing through a circuit.

Battery: A vessel made up of a number of battery cells which produce and store an electric charge. It can also be used to refer to an individual battery cell.

Battery Electric Vehicle (BEV) : An automotive-type vehicle for highway use, such as passenger automobiles, buses, trucks, and vans, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. (EV definition from 2008 National Electric Code 625.2).
See also: Electric Vehicle

Capacity: The total number of ampere hours (Ah) that can be withdrawn from a fully charged cell of battery for a specific set of operating conditions.

Charge: (*verb*) Conversion of electrical energy into chemical potential energy within a cell by the passage of a direct current. (*noun*) Coulombs or ampere-hours of energy available in a cell or battery.

EV Connector: An off-board component that, by insertion into an inlet on the electric vehicle, establishes connection to the EV for the purpose of energy transfer and information exchange.

Coupler: The device connected to the electric vehicle supply equipment that transfers power to the electric vehicle for charging the energy storage system and permits the exchange of information between the EV and the EVSE. The coupler contains the primary coil of the take-apart transformer, an antenna for communications, a magnet for connection check, and provisions for locking the coupler in the vehicle to prevent tampering.

Electric Vehicle (EV): An automotive-type vehicle for highway use, such as passenger automobiles, buses, trucks, and vans, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. *See also: Battery Electric Vehicle (EV definition from 2008 National Electric Code 625.2).*

Electric Vehicle Supply Equipment (EVSE): The conductors, including the ungrounded, grounded, and equipment grounding conductors, the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of delivering energy from the premises wiring to the electric vehicle. (*EVSE definition from 2008 National Electric Code 625.2).*

Power Cord: The off-board cable that connects the EV plug with the EV power controller to provide power and communications for the vehicle during charge.

Range: The maximum distance that an electric vehicle can travel on a single battery charge over a specified driving cycle to the battery manufacturer's recommended maximum discharge level.

Time-of-Use rates: Discounted electricity rates established by utilities to encourage use of electricity during off-peak hours.

Volt: Basic unit of electrical potential. One volt is the force required to send one ampere of electrical current through a resistance of one ohm.

Introduction

Thinking about getting rid of your fossil-fuel powered car and going electric? If so, great! Electric vehicles, or EVs, are economical, fun, and easy on the environment. But first there are a few things you need to know before you are ready to own and operate your own electric vehicle – such as how to charge your new car.

This manual guides you through the process of installing an electric vehicle charging station so you can use your electric vehicle whenever you want. An online version is also available at: [location@url](#). We hope this guide proves to be a useful reference for you as you enter the brave new world of electric transportation.

What is an Electric Vehicle?

Insert photo
of electric
vehicle

An electric vehicle (EV) is a vehicle that uses an electric motor for propulsion and is powered by a battery located on-board the vehicle. Section _____ of this manual describes the kinds of EVs on the market today, as well as upcoming technologies in the world of EVs.

EV batteries are fully rechargeable, although the time it takes to recharge an EV depends both on the type of vehicle and type of power supply equipment used. Below is a brief description of the power supply equipment used with today's EVs.

Electric Vehicle Supply Equipment and Wiring

There are three main components to Electric Vehicle Charging Infrastructure: electric vehicle supply equipment (EVSE), premises wiring, and electrical service and electric panel capacity:

Insert photo or graphic of
car plugged into EVSE

1) The Electric Vehicle Supply Equipment (EVSE). This consists of a supply device, power cord and connector.

- **Supply Device:** This device is the main component of the electric vehicle charging station. Typically it supplies electrical power, provides shock protection, and may also contain information systems for measuring the amount of energy delivered while an EV is charging. For Level 1 and 2 charging (see below), the actual charger is located on board the EV.
- **Power cord:** This is a cable that carries electrical current and communication signals from the supply device to the connector. For Level 1 and 2 charging, this cord conducts alternating current from the EVSE to the on-board charger.
- **Connector:** This is a plug on the power cord that connects the EVSE to charging sockets on the electric vehicle. In fall of 2009 the Society of Automotive Engineers is expected to approve the SAE J1772 "SAE Electrical Vehicle Conductive Charge Coupler" as the national standard for EVSE connectors which will be used in virtually all Electric Vehicles in the U.S.

Insert photos or
graphics of all
three EVSE
components

2) Premises wiring. This is the wiring that runs from the electric panel to the EVSE.

3) Electrical service and electric panel capacity to charge an EV. Electrical service includes the utility lines and the electric meter, both of which are owned and controlled by the local electric utility. Installation of EVSE may require new or upgraded electrical service. A local electrical contractor can determine if the existing

service can support the additional load of EVSE and coordinate with the local utility if an upgrade is needed.

*Insert “EV Charge Residential Install”
Drawing*

EV charging can be performed at three different voltage and current levels. Each level has advantages and disadvantages, and the EVSE installation requirements will differ depending upon the desired charging level.

Level 1 Charging

Level 1 Charging is done with a standard outlet and voltage level that is present in all homes and businesses. Using this level of charging rarely requires an upgrade to existing electrical service. However, this level of charging can take between 8 to 14 hours to fully charge an EV and for this reason, Level 1 charging may not be your preferred method of charging.

Level 1 Charging specifications:

- 120-volt ac single-phase nominal electric supply
- 12 to 16 amp maximum continuous current with 15 to 20 amps minimum branch circuit protection

Level 2 Charging

Level 2 Charging is faster than Level 1 charging and is expected to be the primary option for home charging. This level of charging may require an upgrade to existing electrical service and will require a permanently wired and fixed charging station location. Level 2 charging can fully recharge an electrical vehicle in 3 to 6 hours.

Level 2 charging specifications:

- 240-volt ac single-phase nominal electric supply
- 32 to 70 amp maximum continuous current with 40 amps minimum branch circuit protection
- Safety features: grounding, ground fault protection, no-load make/break interlock, cable/connecter safety breakaway

Insert photo of
chosen vendor's
EVSE in a garage

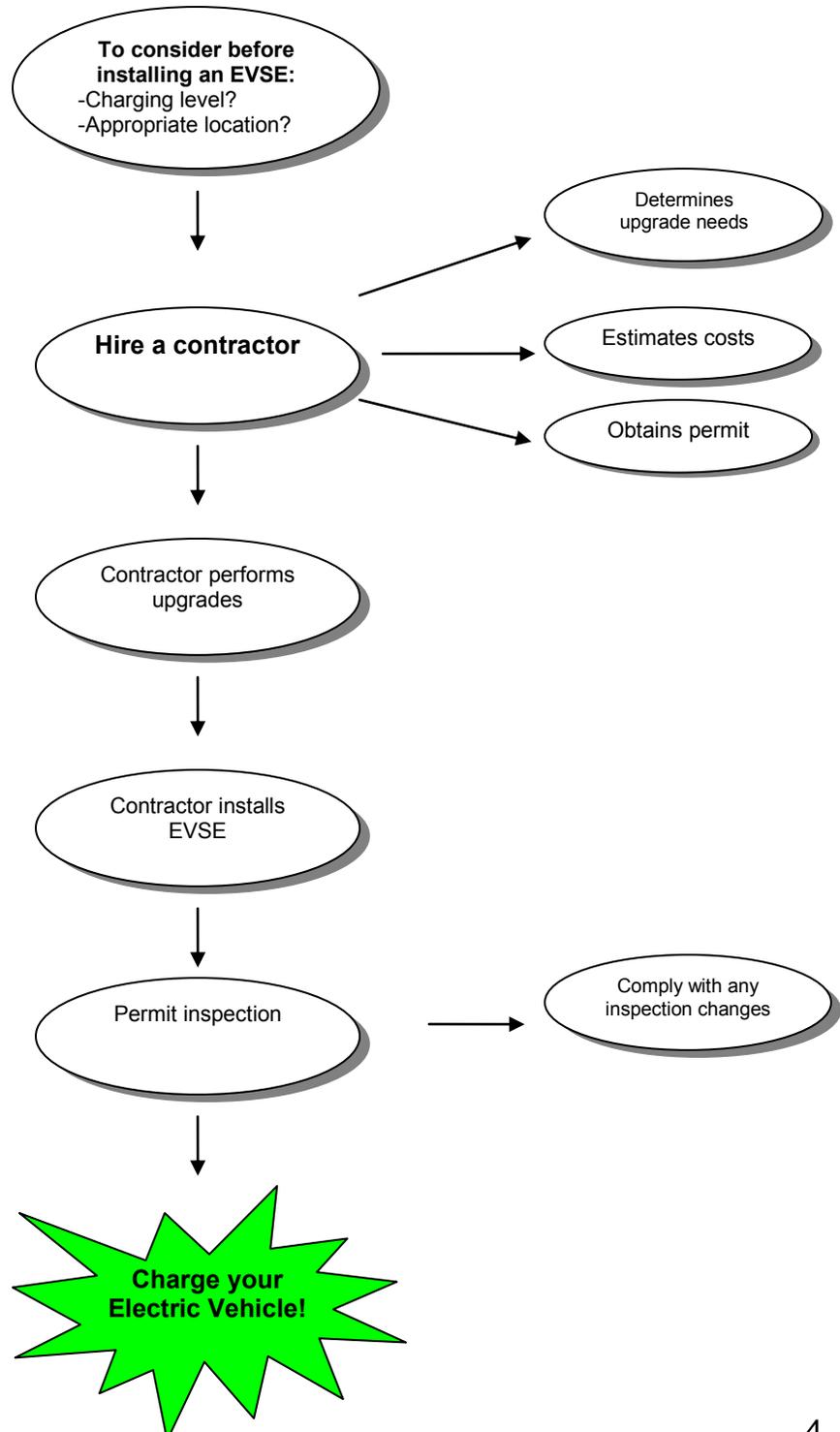
Level 3 Charging

Level 3 Charging, also known as fast charging, is a high-powered charging technology that can fully charge a vehicle in 20 to 30 minutes. However, the amount of power required for Level 3 charging is beyond the capacity of most residential electric service providers. For this reason, Level 3 charging is not recommended for most residential use.

Installing Electric Vehicle Supply Equipment at Your Residence

Installing Electric Vehicle Supply Equipment (EVSE) in a residence is not difficult, but there are important steps to follow and details to consider. Following is a flowchart showing the process of installing an EVSE in a residential setting.

Figure 1: Residential EVSE Installation Flowchart.



Is my Home Ready for EVSE?

When purchasing an electric vehicle, it is important to think about three things:

- 1) Your home's electrical capacity and the desired level of charging;
- 2) A good location for the EVSE station; and
- 3) Installation requirements.

Insert photo
or graphic
of EVSE in
garage

Electrical Capacity

Many homes already have sufficient electrical capacity for a Level 1 or 2 charging station. Level 1 charging uses a regular three-prong 120 volt outlet and most electric clothes dryers or stoves use the same voltage as Level 2 charging. However, the placement of outlets may be incompatible with EV charging, and placing new wiring may require some construction or improvements in your home or garage.

If your home does not have sufficient electrical capacity for your desired level of charging it will be necessary to make upgrades to your electrical service, such as installing a new service panel or placing new wiring in your home. If you are not sure if your electric service is adequate for electric vehicle charging, you should contact a qualified electrical contractor (see Appendix 1). If you increase your electricity load when installing EVSE it is your responsibility to alert your utility company. For a link to Oregon utility companies by region, see Appendix 2

Insert drawing of
electrical panel or
wall-mounted EVSE
unit

EVSE and On-Street parking

It is possible to install EVSE in an outdoor setting, such as a driveway or carport, but if your home does not have dedicated off-street parking this may not be an option. City codes may prevent obstacles such as power cords across sidewalks, which may mean you cannot install EVSE without a dedicated private parking spot. If your home does not have off-street parking you should speak with an electrical contractor and check with city officials, or ensure that you can charge your vehicle elsewhere.

EVSE Requirements

Once you determine that your home has electrical capacity to charge your vehicle, there are some additional things you will need to consider when installing EVSE. Some requirements of EVSE include:

- An electrical circuit that is used only for the EVSE;

- A location that allows direct connection to the vehicle from the EVSE within 25 feet; and/or
- Ventilation for indoor EVSE installations if your EV uses batteries that require ventilation.

These requirements, and others, are regulated by the National Electrical Code (NEC) as adopted by the Oregon Electrical Specialty Code (OESC). Speaking to an electrical contractor will help you to determine if your home is ready for EVSE installation.

Permits and Inspections

You will be required to obtain a permit before installing EVSE and a post-installation inspection is required before you can use the EVSE. It is important to hire an electrical contractor who employs licensed electricians to perform the installation; the contractor can acquire the necessary permit, perform the installation and obtain an inspection. This will streamline your installation experience and ensure that your EVSE is installed properly and safely.

You may decide to do the work yourself, which would require that you evaluate your existing electrical capacity, purchase the permit, coordinate with your utility and perform all upgrades. If you choose to install EVSE yourself, be sure to contact your local building department to obtain a permit and final inspection.

Although it is possible to perform EVSE installation yourself, we recommend you hire an electrical contractor.

For a guide on finding an Oregon licensed electrical contractor, see Appendix 1.

Expected Costs

Installation Costs

The total cost of installing EVSE in your garage or carport will vary greatly depending upon the type of upgrades needed, the placement of your electrical panel in relation to your desired EVSE station and the electrical contractor's fees. If the desired location of the EVSE is near the existing electrical panel and a new service panel is not needed, the installation could be fairly inexpensive. The price of installation rises if multiple upgrades are needed, particularly in situations where you need extensive concrete cutting, trenching, or wiring upgrades. Depending on the amount of upgrades needed, installing EVSE could cost as little as \$200 or as much as several thousand dollars; your electrical contractor should be able to give you an estimate of your expected installation costs. Appendix 2, 'Other Resources,' also features a link to an estimated EVSE installation cost breakdown from the United States Department of Energy's Vehicle Technology program.

There are multiple tax credits available to help you offset the cost of installing EVSE in your home; see Section _____ for a description of these and other benefits.

Estimated Charging Costs

The cost to recharge your EV will vary depending upon the type of EV and your electricity rate. Electricity rates vary by utility company; in 2008 the average cost of electricity to a residential consumer in the state of Oregon was approximately 8 cents per kilowatt-hour (kWh). The number of miles per kWh varies by type of EV but many models average around 4 miles per kWh. Using these figures, operating cost would be approximately 2 cents per mile. In comparison, a gas vehicle that gets 20 miles per gallon and pays \$3.00 for a gallon of gas pays 15 cents a mile. This is just an estimate; the exact cost could be more or less depending upon your utility rate and the range of the EV per charge.

Time-of-Use Rates

Some utility companies offer different utility rates depending upon the time of use, with lower rates offered during times of low electricity demand. If time-of-use rates are available, you could save money by charging your vehicle during times of low demand (for example, overnight). Check with your local utility provider to see if they offer time-of-use rates before deciding upon a charging plan for your EV. If your utility offers time-of-use rates, you will need to have a special meter installed at your home.

Even if time-of-use rates are not in effect, we recommend you avoid charging your EV during times of peak demand, such as early evening. In order to simplify off-peak charging, you could have a timer installed that will control when the EVSE can charge your vehicle. Some vehicles may come with the option of setting a delay option for charging similar to the delayed start of a washing machine, dryer or dishwasher.

If you are considering using time-of-use rates and want to have a timer installed, tell your electrical contractor before the installation begins.

EVSE Installations in Multifamily Residences

Insert photo of EVSE installation in Apartment or Condo

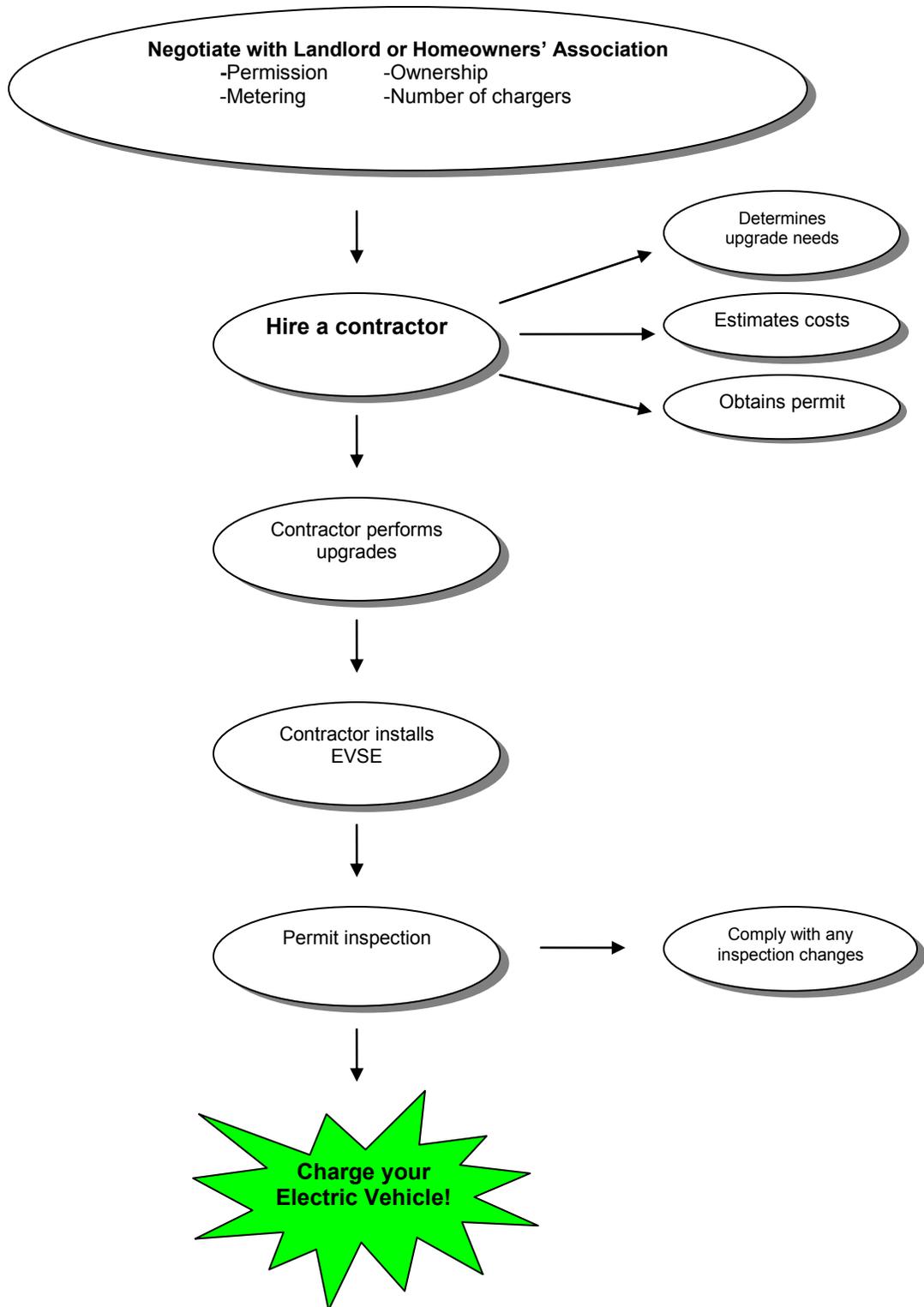
Installation of EVSE in a multifamily residence such as an apartment complex or condominium will resemble EVSE installation in a single-family home in many ways. However, if you are a multifamily property owner or resident, you have several issues specific to this type of installation to consider before you purchase an electric vehicle. Some of these issues include:

- **Permission to install the EVSE:** In an apartment or rental situation, the landlord will typically need to approve any EVSE installation, and in a condominium, it is likely that a homeowners' association would also need to give approval before EVSE can be installed.
- **Ownership of EVSE:** The EV buyer should settle the issue of EVSE ownership before any additional planning begins as this will affect who pays for the installation, who is responsible for permits, metering issues, and electricity payments, and whether or not the EV owner can take the EVSE when they leave the residence.
- **Metering arrangements:** The property owner, EV owner (if different people) and utility company must decide how metering and billing will be handled. In a situation with multiple EV parking spaces the property owner may want to meter each space separately and bill the EV owner directly, or they may choose to run all EVSE off one meter and charge EV users a base fee.
- **Electrical capacity:** When planning the installation of EV charging stations, the property owner must determine if there is adequate electrical capacity for the planned number of EVSE stations. It may be necessary to upgrade feeder lines and transformers. When considering the installation of EVSE, the property owner or EV owner should speak with an electrical contractor to determine capacity and the appropriate number of EVSE stations.

Insert "EV Charge Commercial Install" Drawing

Following is a flowchart of steps for installing EVSE in a multifamily residence.

Figure 2: Multifamily Residence Installation Flowchart



State and Federal Tax Credits for Electric Vehicles

There are various state and federal tax credits for residential consumers installing EVSE or purchasing one or more electric vehicles.

Oregon State Tax Credits

1) Oregon Residential Energy Tax Credit for Vehicles

Under this program, there are two tax credits for electric vehicles that can normally be combined for a total tax credit of \$1,500. The first tax credit is for the purchase of the electric vehicle itself. This tax credit only applies to new electric vehicles, meaning that the original use of the car must begin with the person applying for the tax credit. The tax credit is based on the incremental difference between the base price of the electric vehicle and the base price of the gasoline-only version of the same make and model of vehicle. The tax credit is 25 percent of the incremental difference or \$750, whichever is less.

A second tax credit is available for the purchase of Electric Vehicle Supply Equipment that will charge the EV. This tax credit is equal to 25 percent of the cost of installing the EVSE or \$750, whichever is less. Taken together, the total tax credit for purchasing an EV and corresponding EVSE is \$1,500.

It is also possible to get a state tax credit for converting an existing gasoline-only car into an EV. The tax credit for this is equal to 25 percent of the conversion cost up to \$750.

Federal Tax Credits for Purchasing an Electric Vehicle

1) Energy Improvement and Extension Act of 2008

New Electric Vehicles: Currently, there is a federal tax credit for new plug-in electric vehicles, ranging from \$2,500 to \$7,500 for cars and trucks, and from \$10,000 to \$15,000 for larger commercial vehicles. For each make and model of EV, this tax credit will begin to phase out after 200,000 EVs have been sold. See the adjacent table for phase-out periods and amounts. This tax credit applies to vehicles acquired after December 31, 2009, and expires December 31, 2014.

Vehicle Size (lbs)	Maximum credit	Phase-out level	50 Percent credit	25 Percent credit
			Qtrs 1 & 2 post phase -out	Qtrs 3 & 4 post phase-out
< 10,000	\$7,500	200,000 sold	\$3,750	\$1,875
10,000-14,000	\$10,000	200,000 sold	\$5,000	\$2,500
14,000-26,000	\$12,500	200,000 sold	\$6,250	\$3,125
> 26,000	\$15,000	200,000 sold	\$7,500	\$3,750

Low-Speed Electric Vehicles (LSV)

A tax credit of up to 10 percent of the cost of qualified low-speed electric vehicles, electric motorcycles, and three-wheeled electric vehicles, not to exceed \$2,500, is available through December 31, 2011.

Electric Vehicle Conversions: Through December 31, 2011, qualified plug-in electric vehicle conversions are also eligible for a tax credit of 10 percent of the conversion cost, up to \$4,000.

2) Alternative Fuel Infrastructure Tax Credit

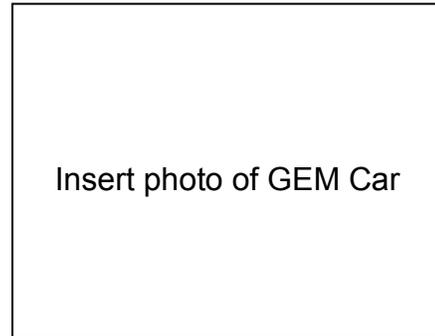
The federal government is offering a tax credit for the cost of installing alternative fueling equipment, including electric vehicle charging stations. Individual consumers may receive a tax credit of up to \$2,000 for equipment that was placed into service after December 31, 2008.

The Alternative Fuel Infrastructure Tax Credit expires December 31, 2010 for electric vehicle supply equipment. Form 8911([PDF 247 KB](#)) provides additional information and must be used to claim the tax credit.

Electric Vehicles Today

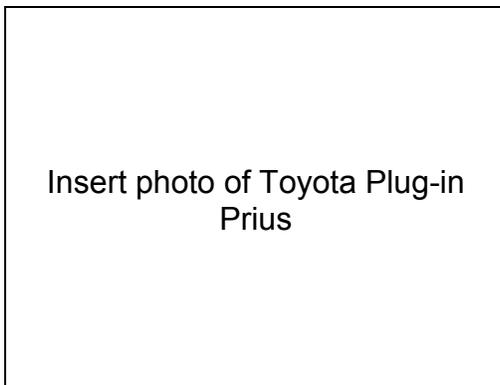
NEV (neighborhood EV) or LEV (low-speed EV)

Most of the EVs currently on the road are known as NEVs or LEVs that have a maximum speed of 35 mph in Oregon. These vehicles are not crash tested or safety certified and in Oregon, many are registered with Driver and Motor Vehicles as motorcycles. An example includes the GEM car:



PHEV (Plug-in Hybrid Vehicle)

Another type of EV is the plug-in hybrid. This vehicle includes the standard hybrid gasoline/electric engine but is augmented with additional battery cells and a charging mechanism. Example includes Toyota's plug-in Prius, scheduled for release in the U.S. in 2010:

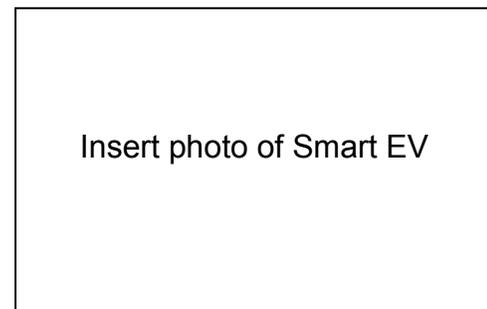


Some hybrids can also be converted to a PHEV with a conversion kit that adds an additional battery pack.

BEV (Battery Electric Vehicle) or PEV (Pure Electric Vehicle)

Almost every major car manufacturer has announced plans to introduce all-electric vehicles in the next couple of years. Examples include:

Smart Electric Vehicle. This is an electric version of the existing Smart Car, which continues to grow in popularity in the

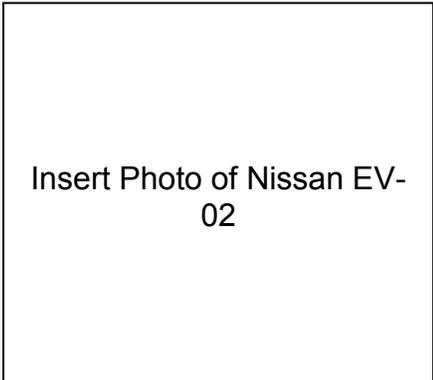


U.S. Electric Smart Cars will be available to select customers in the U.S. in June 2010, with greater availability by 2011.



The Mitsubishi Innovative Electric Vehicle (MIEV). This car is currently in production in Japan and should be available worldwide in 2010.

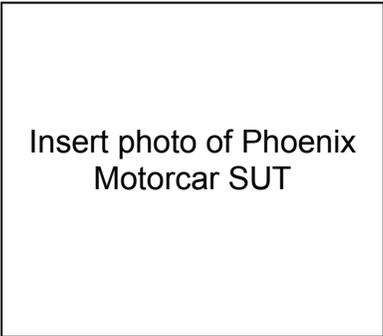
Nissan EV-02. This car should be released in Oregon for fleet use in 2010, with planned expansion to the consumer market in 2012. The Nissan EV-02 is capable of highway speeds and should have a 100 mile battery range.



The Future of Electric Vehicles

Many new and exciting technologies are being developed in the world of electric vehicles. Below is a list of cars that are scheduled for availability in the near future, along with brief highlights of some of the developing EV technology. For a link to an updated list of new EVs and EV technology, see Appendix 3.

Future EVs



Phoenix Motorcars SUT. This is a four passenger sport utility truck that can go highway speed and travel over 100 miles on a single charge.

Think “Ox” vehicle. This is a small four-door sedan with a 124 mile range that is rechargeable with a normal household outlet, Level 2 charging, or rapid-charging technology.

Insert photo of Think Ox

Future EV Technology

Smart Grid Technology and Vehicle to Grid Charging

Many new and exciting technologies are being developed to increase the convenience and affordability of EVs. Some developments that should be available in the near future include Smart Charging and Vehicle to Grid (V2G) charging.

Smart Charging

In very basic terms, “Smart Charging” refers to a variety of technologies that allow the EV to interact with the electrical grid beyond the simple charging of EV batteries, communicating with the grid in real time and charging exactly when the grid needs it to. Although still being developed, Smart Charging could simplify Time-of-Use charging, help consumers avoid charging vehicles during peak demand, and allow for point-of-sale charging at public EVSE locations.

Vehicle to Grid (V2G) and Vehicle to Building (V2B)

Both V2G and V2B charging would allow two-way energy flow between the EV and the power grid or building. This would allow the EV to act as an energy storage system and provide power either to the electrical grid in the case of V2G charging or directly to a building’s energy management system with V2B charging.

Smart Grid

The use of Smart Charging and V2G or V2B technologies is contingent upon the upgrade of the nation’s electric grid to what is being called a new “Smart Grid” that would allow communication between the electric grid and home appliances such as EVs. This technology could potentially expand the economic and environmental benefits of EVs by allowing the consumer to save money and by decreasing utility companies’ reliance upon more polluting energy sources when demand for electricity is high. Smart Grid and V2G technologies are still being developed and many questions, such as who will control the flow of electricity, are still being debated. Once implemented, V2G

capabilities on a Smart Grid could significantly increase the convenience and affordability of EVs.

In the meantime, using EVs today is a smart choice for many people, and Oregonians are, once again, leading the way to a smarter, more sustainable future for everyone.

See the following appendices for resources, utility information and more.

Appendix 1: Hiring a Licensed Electrical Contractor

The state of Oregon has resources available to help ensure that the contractor you hire to install EVSE will be licensed and reputable. Before hiring a contractor, you should consult the Construction Contractors Board's office or Web site, where you can find a licensed contractor, check a known contractor's license, or register a complaint about a contractor.

The Construction Contractors Board also features information on "Best Practices" when hiring a contractor and can help mediate any conflicts that may arise during or after your installation.

You can access the Construction Contractors Board online at:

<http://www.oregon.gov/CCB/index.shtml>

In addition to the Construction Contractors Board, you can find referrals for qualified electrical contractors through the following organizations:

The National Electrical Contractors Association (NECA) at 503-233-5787 or 541-736-1443

Independent Electrical Contractors of Oregon (IEC) at 503-598-7789.

You can also learn more about permitting in Oregon at the "Permits Protect" website:

<http://www.permitsprotect.info/>

Appendix 2: Other Resources

Utility Companies in Oregon, by region:

- <http://www.oregon.gov/ENERGY/Power.shtml>

Cost-estimates for EVSE installations in residences and commercial facilities:

- U.S. Department of Energy Vehicle Technologies Program: *“Plug-in Hybrid Electric Vehicle Charging Infrastructure Review”*
<http://avt.inel.gov/pdf/phev/phevInfrastructureReport08.pdf>

Updates on EVs entering the market:

- Plug-In America’s *“Plug-in Vehicle Tracker”*
<http://www.pluginamerica.org/plug-in-vehicle-tracker.html>

Oregon Electric Vehicle Association: www.oeva.org

Appendix Four: Glossary of Acronyms

Glossary of Acronyms

ADA: Americans with Disabilities Act

BEV: Battery Electric Vehicle (see also EV)

EV: Electric Vehicle

EVSE: Electric Vehicle Supply Equipment

KWh: Kilowatt-hour

LSV: Low-speed Electric Vehicle

NEV: Neighborhood Electric Vehicle

NEC: National Electric Code

ODOT: Oregon Department of Transportation

OESC: Oregon Electric Specialty Code

OSSC: Oregon Structural Specialty Code

Appendix Five: Glossary of Terms

Ampere (amp): A unit of measurement for current, or the amount of electricity flowing through a circuit.

Battery: A vessel made up of a number of battery cells which produces and stores an electric charge. It can also be used to refer to an individual battery cell.

Battery Electric Vehicle (BEV) : An automotive-type vehicle for highway use, such as passenger automobiles, buses, trucks, and vans, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. (EV definition from 2008 National Electric Code 625.2).
See also: Electric Vehicle

Capacity: The total number of ampere hours (Ah) that can be withdrawn from a fully charged cell of battery for a specific set of operating conditions.

Charge: (*verb*) Conversion of electrical energy into chemical potential energy within a cell by the passage of a direct current. (*noun*) Coulombs or ampere-hours of energy available in a cell or battery.

EV Connector: An off-board component that, by insertion into an inlet on the electric vehicle, establishes connection to the EV for the purpose of energy transfer and information exchange.

Coupler: The device connected to the electric vehicle supply equipment that transfers power to the electric vehicle for charging the energy storage system and permits the exchange of information between the EV and the EVSE. The coupler contains the primary coil of the take-apart transformer, an antenna for communications, a magnet for connection check, and provisions for locking the coupler in the vehicle to prevent tampering.

Electric Vehicle (EV): An automotive-type vehicle for highway use, such as passenger automobiles, buses, trucks, and vans, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. (EV definition from 2008 National Electric Code 625.2).

Electric Vehicle Supply Equipment (EVSE): The conductors, including the ungrounded, grounded, and equipment grounding conductors, the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of delivering energy from the premises wiring to the electric vehicle. (EVSE definition from 2008 National Electric Code 625.2).

Power Cord: The off-board cable that connects the EV plug with the EV power controller to provide power and communications for the vehicle during charge.

Range: The maximum distance that an electric vehicle can travel on a single battery charge over a specified driving cycle to the battery manufacturer's recommended maximum discharge level.

Time-of-Use rates: Discounted electricity rates established by utilities to encourage use of electricity during off-peak hours.

Volt: Basic unit of electrical potential. One volt is the force required to send one ampere of electrical current through a resistance of one ohm.

OREGON ELECTRIC VEHICLE CHARGING NETWORK

What is it?

Electric vehicle (EV) charging stations are locations where vehicles can plug in to an electrical source to re-charge batteries. EV charging stations are necessary to support what is expected to be a growing fleet of EVs throughout Oregon.

Why is this important?

The nation is poised for a sea change in the transportation sector. Petroleum-based transportation is not sustainable in the long run, either environmentally or economically. Our dependency on imported fossil fuels, impacts of global climate change and the introduction of new carbon emission standards have created an urgency to find alternative solutions.

Currently, the biggest limitation for drivers thinking about making the transition to EVs is the absence of a reliable network of charging facilities to increase the range of these vehicles and to alleviate any fear of "running out of juice." There are only about 400 all-electric vehicles registered in Oregon, but within a decade, plug-in cars could account for as much as 20 percent of new vehicles sold in Oregon.

Why is ODOT doing a statewide procurement?

Oregon is poised to lead the nation in the early adoption of plug-in electric vehicles and having one common, open system for charging all types of vehicles is an important factor in making the transition successful. This effort will help gain public recognition and consumer confidence in the EV charging infrastructure by providing uniform performance and safety features throughout Oregon.

ODOT's Office of Innovative Partnerships will negotiate purchase agreements with the top firms selected through a statewide procurement. These agreements will ensure that equipment installed in different locations and by different electric utility companies will provide a common charging experience for all EV users. Also, aggregating demand through the State contracts will reduce the cost and avoid separate procurements for each jurisdiction. The result will be centralized purchase agreements for EV charging equipment in place by the end of 2009, which will be accessible to local governments, utility companies and others.

ODOT applying for federal stimulus funds

ODOT applied to the U.S. Department of Energy for funding through its Clean Cities Program. Governor Kulongoski's [Oregon Way Advisory Group endorsed the application as its first signature project for American Recovery and Reinvestment Act funding](#). The grant could be up to \$15 million and will require 50 percent matching funds to be contributed by project partners. If successful, the project will increase the number of electric vehicles and charging stations throughout the state and provide public outreach and education on electric vehicles. ODOT will know in August of 2009 whether it will receive the grant funds.

Project Goals

The main goal is to incubate demand for EVs by providing financial incentives and establishing predictable availability of charging stations at convenient and easy-to-find locations. Other objectives will:

- allow access to centralized price agreements for EV charging equipment;
- bring local partners and private industry together to combine resources and develop an integrated EV charging network;
- establish uniform Oregon standards for EV charging stations, including signage, appearance, performance and safety;
- aggregate demand for EV charging equipment to reduce costs; and
- reduce dependence on foreign oil and reduce carbon emissions from transportation sources.

Development of Installation Manual

ODOT has begun the development of a simple, easy-to-follow installation guide for installing EV charging stations. The "EV Charging Station Installation Manual" will provide a step-by-step guide for preparing, purchasing, installing, and maintaining EV charging stations for the individual consumer, business owner, or government project manager. This guide will include, but will not be limited to, the following information:

- regulations governing EV Charging Station installation, including required permits and code considerations
- contact information for all relevant permitting and regulatory entities as well as participating Oregon utility companies
- upcoming changes in EV Charging technology and the impact upon current purchasing decisions

For more information: http://www.oregon.gov/ODOT/HWY/OIPP/inn_ev-charging.shtml

Enrolled House Bill 2186

Ordered printed by the Speaker pursuant to House Rule 12.00A (5). Pre-session filed (at the request of Governor Theodore R. Kulongoski for Department of Environmental Quality)

CHAPTER

AN ACT

Relating to greenhouse gas emissions; and declaring an emergency.

Be It Enacted by the People of the State of Oregon:

SECTION 1. (1) As used in this section:

- (a) "Greenhouse gas" has the meaning given that term in ORS 468A.210.
- (b) "Heavy-duty truck" has the meaning given that term in ORS 468A.795.
- (c) "Medium-duty truck" has the meaning given that term in ORS 468A.795.
- (d) "Return on investment" means:

(A) A net monthly savings gained through fuel efficiency that is equal to or greater than the net monthly payment obligation under a financing instrument; or

(B) The owner's or operator's initial capital costs, if self-funded, to comply with any potential requirements under this section are recouped in fuel savings within three years of the owner's or operator's expenditure of the initial capital costs.

(2)(a) The Department of Environmental Quality shall conduct a study of potential requirements regarding the maintenance or retrofitting of medium-duty trucks and heavy-duty trucks in order to reduce aerodynamic drag and otherwise reduce greenhouse gas emissions from those trucks. In conducting the study, the department shall evaluate:

(A) Comparable requirements of other states or the United States Environmental Protection Agency;

(B) The availability of financing programs to fund initial capital costs that are recouped in fuel savings over time;

(C) Differences among truck types, such as short-haul trucks and long-haul trucks;

(D) Implementation according to a phased-in schedule taking into account fleet size;

(E) The feasibility of requiring sellers of medium-duty trucks and heavy-duty trucks to disclose to buyers the existence of applicable greenhouse gas emissions reduction requirements; and

(F) The feasibility of providing economic hardship exemptions and deferrals for owners and operators of trucks, after considering the ability of owners and operators of trucks to attain a return on investment within the time period specified in any financing instrument available to fund initial capital costs associated with any potential requirements.

(b) As part of the study under this section, the department shall also study potential restrictions on engine use by parked commercial vehicles, including but not limited to medium-duty trucks and heavy-duty trucks.

(3) In conducting the study under this section, the department shall consult with relevant stakeholders.

(4) The department shall submit a report of its study, and shall include recommendations for legislation, to the interim legislative committees on environment and natural resources on or before October 1, 2010.

SECTION 2. Section 3 of this 2009 Act is added to and made a part of ORS chapter 468A.

SECTION 3. (1) As used in this section:

(a) "Greenhouse gas" has the meaning given that term in ORS 468A.210.

(b) "Motor vehicle" has the meaning given that term in ORS 801.360.

(2) The Environmental Quality Commission may adopt by rule standards and requirements described in this section to reduce greenhouse gas emissions.

(3)(a) The commission may adopt requirements to prevent the tampering, alteration and modification of the original design or performance of motor vehicle pollution control systems.

(b) Before adopting requirements under this section, the commission shall consider the antitampering requirements and exemptions of the State of California.

(4) The commission may adopt requirements for motor vehicle service providers to check and inflate tire pressure according to the tire manufacturer's or motor vehicle manufacturer's recommended specifications, provided that the requirements:

(a) Do not apply when the primary purpose of the motor vehicle service is fueling vehicles; and

(b) Do not require motor vehicle service providers to purchase equipment to check and inflate tire pressure.

(5) The commission may adopt restrictions on engine use by commercial ships while at port, and requirements that ports provide alternatives to engine use such as electric power, provided that:

(a) Engine use shall be allowed when necessary to power mechanical or electrical operations if alternatives are not reasonably available;

(b) Engine use shall be allowed when necessary for reasonable periods due to emergencies and other considerations as determined by the commission; and

(c) The requirements must be developed in consultation with representatives of Oregon ports and take into account operational considerations, operational agreements, international protocols and limitations, the ability to fund the purchase and use of electric power equipment and the potential effect of the requirements on competition with other ports.

(6) In adopting rules under this section, the commission shall evaluate:

(a) Safety, feasibility, net reduction of greenhouse gas emissions and cost-effectiveness;

(b) Potential adverse impacts to public health and the environment, including but not limited to air quality, water quality and the generation and disposal of waste in this state;

(c) Flexible implementation approaches to minimize compliance costs; and

(d) Technical and economic studies of comparable greenhouse gas emissions reduction measures implemented in other states and any other studies as determined by the commission.

(7) The provisions of this section do not apply to:

(a) Motor vehicles registered as farm vehicles under the provisions of ORS 805.300.

(b) Farm tractors, as defined in ORS 801.265.

(c) Implements of husbandry, as defined in ORS 801.310.

(d) Motor trucks, as defined in ORS 801.355, used primarily to transport logs.

SECTION 4. Except as provided in section 5 of this 2009 Act, section 3 of this 2009 Act becomes operative on January 1, 2011.

SECTION 5. The Environmental Quality Commission may adopt rules before the operative date specified in section 4 of this 2009 Act or take any action before the operative date specified in section 4 of this 2009 Act that is necessary to carry out the provisions of section

3 of this 2009 Act. Any rules adopted by the commission under this section do not become operative until on or after January 1, 2011.

SECTION 6. (1) As used in this section:

(a) "Greenhouse gas" has the meaning given that term in ORS 468A.210.

(b) "Low carbon fuel standards" means standards for the reduction of greenhouse gas emissions, on average, per unit of fuel energy.

(c) "Motor vehicle" has the meaning given that term in ORS 801.360.

(d) "PADD 5 region" means the Petroleum Administration for Defense District 5 states of Arizona, Nevada, Oregon and Washington.

(2)(a) The Environmental Quality Commission may adopt by rule low carbon fuel standards for gasoline, diesel and fuels used as substitutes for gasoline or diesel.

(b) The commission may adopt the following related to the standards, including but not limited to:

(A) A schedule to phase in implementation of the standards in a manner that reduces the average amount of greenhouse gas emissions per unit of fuel energy of the fuels by 10 percent below 2010 levels by the year 2020;

(B) Standards for greenhouse gas emissions attributable to the fuels throughout their lifecycles, including but not limited to emissions from the production, storage, transportation and combustion of the fuels and from changes in land use associated with the fuels;

(C) Provisions allowing the use of all types of low carbon fuels to meet the low carbon fuel standards, including but not limited to biofuels, biogas, compressed natural gas, gasoline, diesel, hydrogen and electricity;

(D) Standards for the issuance of deferrals, established with adequate lead time, as necessary to ensure adequate fuel supplies;

(E) Exemptions for liquefied petroleum gas and other alternative fuels that are used in volumes below thresholds established by the commission;

(F) Standards, specifications, testing requirements and other measures as needed to ensure the quality of fuels produced in accordance with the low carbon fuel standards, including but not limited to the requirements of ORS 646.910 to 646.923 and administrative rules adopted by the State Department of Agriculture for motor fuel quality; and

(G) Adjustments to the amounts of greenhouse gas emissions per unit of fuel energy assigned to fuels for combustion and drive train efficiency.

(c) Before adopting standards under this section, the commission shall consider the low carbon fuel standards of other states, including but not limited to Washington, for the purpose of determining schedules and goals for the reduction of the average amount of greenhouse gas emissions per unit of fuel energy and the default values for these reductions for applicable fuels.

(d) The commission shall provide exemptions and deferrals as necessary to mitigate the costs of complying with the low carbon fuel standards upon a finding by the commission that the 12-month rolling weighted average price of gasoline or diesel in Oregon is not competitive with the 12-month rolling weighted average price in the PADD 5 region.

(3) In adopting rules under this section, the Environmental Quality Commission shall evaluate:

(a) Safety, feasibility, net reduction of greenhouse gas emissions and cost-effectiveness;

(b) Potential adverse impacts to public health and the environment, including but not limited to air quality, water quality and the generation and disposal of waste in this state;

(c) Flexible implementation approaches to minimize compliance costs; and

(d) Technical and economic studies of comparable greenhouse gas emissions reduction measures implemented in other states and any other studies as determined by the commission.

(4) The provisions of this section do not apply to:

(a) Motor vehicles registered as farm vehicles under the provisions of ORS 805.300.

- (b) Farm tractors, as defined in ORS 801.265.
- (c) Implements of husbandry, as defined in ORS 801.310.
- (d) Motor trucks, as defined in ORS 801.355, used primarily to transport logs.

SECTION 7. (1) Except as provided in subsection (2) of this section, section 6 of this 2009 Act becomes operative on July 1, 2011.

(2) The Environmental Quality Commission may adopt rules before the operative date specified in subsection (1) of this section or take any action before the operative date specified in subsection (1) of this section that is necessary to carry out the provisions of section 6 of this 2009 Act. Any rules adopted by the commission under this section do not become operative until on or after July 1, 2011.

SECTION 8. Sections 6 and 7 of this 2009 Act are repealed on December 31, 2015.

SECTION 9. (1) The Department of Environmental Quality shall report on the implementation of sections 3 and 6 of this 2009 Act to:

(a) The interim legislative committees on environment and natural resources on or before December 31, 2010; and

(b) The Seventy-sixth, Seventy-seventh and Seventy-eighth Legislative Assemblies in the manner provided by ORS 192.245.

(2) The reports required under subsection (1) of this section must contain a description of:

(a) Rules adopted under sections 3 and 6 of this 2009 Act;

(b) The manner in which the Environmental Quality Commission complied with the requirements of sections 3 and 6 of this 2009 Act in adopting the rules;

(c) Significant policy decisions made by the commission in adopting rules under section 3 of this 2009 Act; and

(d) The anticipated effects of the December 31, 2015, repeal of sections 6 and 7 of this 2009 Act on the availability of low carbon fuels and the development of biofuels production facilities and electric vehicle infrastructure in Oregon.

SECTION 10. (1) There is created the Metropolitan Planning Organization Greenhouse Gas Emissions Task Force consisting of 16 members appointed as follows:

(a) The President of the Senate shall appoint two members from among members of the Senate.

(b) The Speaker of the House of Representatives shall appoint two members from among members of the House of Representatives.

(c) The Governor shall appoint the following members:

(A) One representative from each of the six metropolitan planning organizations in this state, at least three of whom must be elected local government officials.

(B) Four members who are representatives of transportation and land use stakeholders.

(C) The chairperson of the Oregon Transportation Commission.

(D) The chairperson of the Land Conservation and Development Commission.

(2) The task force shall:

(a) Study and evaluate the development of alternative land use and transportation scenarios that accommodate planned population and employment growth in those areas of the state that are served by metropolitan planning organizations while achieving a reduction in greenhouse gas emissions from motor vehicles with a gross vehicle weight rating of 10,000 pounds or less. The task force shall take into account the amount of greenhouse gas emissions caused by motor vehicles with a gross vehicle weight rating of 10,000 pounds or less that need to be reduced by 2035 in order to meet the goals stated in ORS 468A.205. The task force shall take into consideration the reductions in vehicle emissions that are likely to result by 2035 from the use of improved vehicle technologies and fuels.

(b) Evaluate potential fiscal and other resource needs to implement land use and transportation scenarios described in paragraph (a) of this subsection, including staffing and re-

sources needed by state agencies, local governments and each metropolitan planning organization.

(c) Evaluate impediments to implementing land use and transportation scenarios that reduce greenhouse gas emissions.

(d) Recommend legislation to the interim Legislative Assembly committees related to transportation and to the environment establishing a process for adoption and implementation of plans for reducing greenhouse gas emissions caused by motor vehicles with a gross vehicle weight rating of 10,000 pounds or less by 2035, in an amount sufficient to meet the goals stated in ORS 468A.205, in each area of this state served by a metropolitan planning organization, including a schedule for the planning process and an estimate of funding required to complete the planning process.

(3) A majority of the members of the task force constitutes a quorum for the transaction of business.

(4) Official action by the task force requires the approval of a majority of the members of the task force.

(5)(a) The President of the Senate and the Speaker of the House of Representatives shall serve as cochairpersons of the task force.

(b) The chairperson of the Oregon Transportation Commission and the chairperson of the Land Conservation and Development Commission shall serve as vice chairpersons of the task force.

(6) If there is a vacancy for any cause, the appointing authority shall make an appointment to become immediately effective.

(7) The task force shall meet at times and places specified by the call of the chairpersons.

(8) The task force may adopt rules necessary for the operation of the task force.

(9) The task force shall submit a report with recommendations for legislation to the interim legislative committees related to transportation and to the environment and natural resources prior to January 1, 2010.

(10) The Department of Transportation and the Department of Land Conservation and Development shall provide staff support to the task force. The Department of Transportation shall use available federal flexible funds for the staffing and support of the task force.

(11) Members of the task force who are not members of the Legislative Assembly are not entitled to compensation, but may be reimbursed for actual and necessary travel and other expenses incurred by them in the performance of their official duties in the manner and amounts provided for in ORS 292.495. Claims for expenses incurred in performing functions of the task force shall be paid out of funds appropriated to the Department of Transportation for purposes of the task force.

(12) All agencies of state government, as defined in ORS 174.111, are directed to assist the task force in the performance of its duties and, to the extent permitted by laws relating to confidentiality, to furnish such information and advice as the members of the task force consider necessary to perform their duties.

(13) For the purposes of this section, "metropolitan planning organization" means an organization located wholly within the State of Oregon and designated by the Governor to coordinate transportation planning in an urbanized area of the state pursuant to 49 U.S.C. 5303(c).

SECTION 11. Section 10 of this 2009 Act is repealed on the date of the convening of the next regular biennial legislative session.

SECTION 12. This 2009 Act being necessary for the immediate preservation of the public peace, health and safety, an emergency is declared to exist, and this 2009 Act takes effect on its passage.

Passed by House May 8, 2009

Repassed by House June 25, 2009

.....
Chief Clerk of House

.....
Speaker of House

Passed by Senate June 24, 2009

.....
President of Senate

Received by Governor:

.....M,....., 2009

Approved:

.....M,....., 2009

.....
Governor

Filed in Office of Secretary of State:

.....M,....., 2009

.....
Secretary of State



September 26, 2008

Electrical vehicle charging stations

Purpose of the rule:

This temporary rule addresses the needs of an emerging electrical technology in Oregon by adopting a permit and inspection protocol for the installation of charging stations for electric and hybrid vehicles. This temporary rule provides guidance where the Oregon Electrical Specialty Code does not specifically cover this new technology while still providing safety to Oregonians.

This temporary rule is effective September 26, 2008.

Citation:

Adopt: OAR 918-311-0065

History:

Oregon is experiencing an increasing use of electric and hybrid vehicles. As a result, the division under the Governor's sustainability agenda, is working to accommodate new advances in sustainable technologies. A pilot program has been established under the sustainability agenda to allow electric hybrid vehicle charging station installations in certain areas of the state. Once installed, vehicle owners will have access to convenient plug-in type charging stations.

Contact:

If you have questions or need further information, please contact Green Building Services Manager Andrea Simmons at 503-373-7235, or Andrea.F.Simmons@state.or.us.



Secretary of State
Certificate and Order for Filing
TEMPORARY ADMINISTRATIVE RULES
A Statement of Need and Justification accompanies this form..

I certify that the attached copies* are true, full and correct copies of the TEMPORARY Rule(s) adopted on [Upon Filing] by the
Date prior to or same as filing date

Department of Consumer and Business Services, Building Codes Division 918
Agency and Division Administrative Rules Chapter Number

Shauna M. Parker PO Box 14470 Salem, OR 97309 (503) 373-7438
Rules Coordinator Address Telephone

to become effective [Upon Filing] through [March 25, 2009].
Date upon filing or later A maximum of 180 days including the effective date.

RULE CAPTION

Establishes permitting and inspection procedures for electric vehicle charging stations.

Not more than 15 words that reasonably identifies the subject matter of the agency's intended action.

RULEMAKING ACTION

List each rule number separately, 000-000-0000.

Secure approval of new rule numbers (Adopted rules) with the Administrative Rules Unit prior to filing

ADOPT: 918-311-0065

AMEND:

SUSPEND:

Stat. Auth.: ORS 455.065

Other Auth.:

Stats. Implemented: ORS 455.065

RULE SUMMARY

This temporary rule establishes a permitting and inspection protocol for electric vehicle charging stations. As part of the governor's sustainability agenda, the division is working to accommodate new sustainable technology advances. The proposed rule addresses emerging technology, defining permit and inspection requirements for the installation of charging stations for electric vehicles.

Mark Long

Authorized Signer Printed name Date

*With this original and Statement of Need, file one photocopy of certificate, one paper copy of rules listed in Rulemaking Actions, and electronic copy of rules. ARC 940-2005

STATEMENT OF NEED AND JUSTIFICATION

A Certificate and Order for Filing Temporary Administrative Rules accompanies this form.

Department of Consumer and Business Services, Building Codes Division
Agency and Division

918

Administrative Rules Chapter Number

In the Matter of: Adopting 918-311-0065

Rule Caption: (Not more than 15 words that reasonably identifies the subject matter of the agency's intended action.)
Establishes permitting and inspection procedures for electric vehicle charging stations.

Statutory Authority: ORS 455.065

Other Authority:

Stats. Implemented: ORS 455.065

Need for the Temporary Rule(s):

A time sensitive pilot program to install electric car charging stations in various Willamette Valley locations cannot go forward without this rule. Portland boasts the highest number of hybrid owners per capita in the U.S. The rule enables the division to meet the increasing need of electric and hybrid vehicle owners in Oregon for convenient plug-in options in the state. The rule addresses the emerging electrical technology involved in the implementation of the pilot project. The pilot project is a result of the governor's agenda addressing climate control, sustainability, and positioning Oregon in the new "green" economy. Because the Oregon Electrical Specialty Code (OESC) does not adequately address the emerging technology necessary to implement this pilot project, these rules are necessary to allow the extremely time sensitive project to go forward while still protecting the safety of Oregonians.

Documents Relied Upon, and where they are available: Temporary rule and supporting documents are available from the division's rules coordinator located at 1535 Edgewater Street NW, Salem, OR 97304 and are available on the division's Web site: www.bcd.oregon.gov .

Justification of Temporary Rule(s):

The division finds that failure to enact these rules will seriously prejudice the pilot project to install electric vehicle charging stations in the Willamette Valley. The rule provides standardized installation requirements, permitting, and inspection standards, addressing the barriers to new technology presented by the OESC. An immediate rule is necessary to provide guidelines for the industry allowing the time sensitive project to move forward.

Mark Long

Authorized Signer

Printed name

Date

Electrical Vehicle Charging Station
Temporary Rule Effective: 9-26-08

918-311-0065

Electric Vehicle Charging Station Statewide Permit and Inspection Protocol

(1) To ensure a path for the emerging technology and enable the installation of charging stations for electric vehicles, the following permit and inspection protocols will apply throughout the state, notwithstanding contrary provisions contained in the Oregon Electrical Specialty Code.

(2) Building officials and inspectors shall permit and allow installation of an electric vehicle charging station that has a Building Codes Division's special deputy certification label without further testing or certification.

(3) Persons installing an electric vehicle charging station must obtain a permit for a feeder from the inspecting jurisdiction. No other state building code permit is required.

(4) The jurisdiction may perform up to two (2) inspections under the permit issued in subsection (3) above.

(5) Inspection of the installation is limited to examining the feeder for compliance with the following Oregon Electrical Specialty Code provisions:

(a) Overcurrent protection, per articles 225 and 240;

(b) Physical protection of conductors, per article 300;

(c) Separation and sizing of the grounding and neutral conductors, per article 250.20; and

(d) Provisions for locking out the breaker for maintenance, per chapter 4.

(6) For the purpose of this rule, the service, feeder, and charging station pedestal will be considered a single structure as defined by the Oregon Electrical Specialty Code.

The structure's owner may opt to install a grounding electrode system to supplement lightning protection, but cannot be required to do so.

Stat. Auth: ORS 455.065

Stat. Implemented: ORS 455.065

Hist: New

APPENDIX A

BY-LAW NO. _____

**A By-law to amend Building By-law No. 9419 regarding
green building strategy for one family homes,
one family homes with secondary suites, and two family homes**

THE COUNCIL OF THE CITY OF VANCOUVER, in public meeting, enacts as follows:

1. This By-law amends the indicated provisions of the Building By-law.
2. In Table 9.25.2.1 of Part 9 of Division B and the notes to that table, Council:
 - (a) from the first column, strikes out "(insulation to 600 mm below grade)";
 - (b) from the first sub-column of the second column, strikes out "Less than 4500 Celsius Degree Days⁽¹⁾";
 - (c) from the first sub-column of the second column, strikes out the "3.5" that is in the same row as "Frame Walls", and substitutes "3.85";
 - (d) from the first sub-column of the second column, strikes out the "2.1" that is in the same row as "Foundation Walls", and substitutes "3.85";
 - (e) from the first sub-column of the second column, strikes out the "1.8" that is in the same row as "Unheated Concrete Slabs on Ground at or above grade", and substitutes "2.1";
 - (f) from the first column, strikes out "Unheated Concrete Slabs on Ground at or above grade", and substitutes "Concrete Slabs on Ground at, above, or below grade (insulation under all slab area and around edge of slab)";
 - (g) from the first column, strikes out "Radiant Heating Slabs on Ground (insulation under all slab area and around edge of slab⁽⁴⁾)";
 - (h) from the first sub-column of the second column, strikes out the "2.1" that is in the same row as "Radiant Heating Slabs on Ground (insulation under all slab area and around edge of slab⁽⁴⁾)";
 - (i) strikes out the second sub-column of the second column entitled "4500 and Greater Celsius Degree Days⁽¹⁾", and the contents of the second sub-column of the second column;
 - (j) strikes out Notes 1) and 2); and
 - (k) re-numbers Notes 3), 4), and 5) as Notes 1), 2), and 3).
3. After Part 11 of Division B, Council adds:

**"Part 12
Environmental Protection**

Section 12.1. General

12.1.1. Application

12.1.1.1. Scope

1) The scope of this Part shall be as described in Subsection 1.3.3. of Division A except that this Part shall apply only to one-family dwellings, two-family dwellings, and one-family dwellings with secondary suites.

12.1.2. Definitions

12.1.2.1. Defined Terms

1) Words that appear in italics are defined in Article 1.4.1.2. of Division A.

12.1.3. Conflicts

1) In case of a conflict between any provision of this Part 12 and any other provision of this By-law, the Part 12 provision shall prevail.

Section 12.2. Building Envelope Performance and Energy Efficiency

12.2.1. Building Envelope Performance

12.2.1.1. Windows

1) Windows shall have a maximum thermal conductance (U value) of 2.00 W/(K·m²).

12.2.2. Energy Efficiency

12.2.2.1. Light Fixtures

1) At least 40% of hard wired, electrically powered light fixtures shall be hard wired so as not to accept incandescent or halogen light bulbs.

12.2.2.2. Energy Usage Display Meter

1) Electrical installations shall have an energy usage display meter in the dwelling unit capable of calculating and displaying electrical consumption on at least a monthly basis.

12.2.2.3. Hot Water Tanks

1) Electrically powered hot water tanks shall have insulation that provides a minimum RSI value of 1.76.

12.2.2.4. Hot Water Tank Piping

1) The first 3 m of non-recirculating hot water piping leading from both electrically powered and gas powered hot water tanks, and the last 1 m of piping prior to connecting to the hot water tank, shall have insulation that provides a minimum RSI value of 0.35.

2) Despite Sentence 12.2.2.4.(1), the entire hot water piping system, if it is of constant recirculation design, shall have insulation that provides a minimum RSI value of 0.35.

12.2.2.5. Gas-Fuelled Fireplaces

1) Gas-fuelled fireplaces shall use electronic ignitions.

2) Gas-fuelled fireplaces shall be direct vented so that all products for and of combustion circulate to and from the dwelling unit without the use of a chimney.

12.2.2.6. Toilets

1) Toilets shall be of dual flush design, with a maximum single flush consumption of 6 litres.

12.2.2.7. Heat recovery ventilators

1) Each dwelling unit, in the case of a one-family dwelling or two-family dwelling, and each one-family dwelling with secondary suite shall have one heat recovery ventilator.

2) Each heat recovery ventilator shall

a) be designed and tested to meet the CSA International Standard CAN/CSA-F326 M91 ("Residential Mechanical Ventilation Systems"),

b) be installed by persons trained by the Heating, Refrigeration and Air Conditioning Institute of Canada or equivalent,

c) supply outdoor air directly to the principal living area, each bedroom, and any floor without a bedroom,

d) be operated by centrally located manual controls or by automatic controls,

- e) not exhaust supplemental exhausts in the kitchens and bathrooms which shall be controlled by a manual switch in the room being served,
 - f) if a solid-fuel-fired appliance is present, be installed to operate without depressurizing the house in any operating mode,
 - g) be located in an accessible location within the dwelling unit, having a minimum headroom clearance of 2 m,
 - h) have an air intake equipped with a damper or bird screen, and be a minimum of 450mm above finished grade,
 - i) have an air exhaust equipped with a damper or bird screen, and be a minimum of 100mm above finished grade,
 - j) have supply-air ducts carrying un-tempered air through heated spaces insulated to at least RSI 0.5 (R-2.9), and
 - k) have exhaust ducts in unheated spaces insulated to RSI 0.5 (R-2.8).
- 3) Door under-cuts or transfer grilles shall be installed in doors to rooms where both supply and return air ducts are not located.

12.2.2.8. Energuide Rating System Audit

1) Before issuance of an occupancy permit, the Chief Building Official shall be provided with an Energuide Rating System Audit, as defined by the EnerGuide™ Rating Service of Natural Resources Canada.

12.2.2.9. Vertical Service Shaft

1) A vertical service shaft shall extend from the service room, which contains the service water heater, to the attic space, consisting of at least two 50 mm PVC pipes, capped at both ends, and having at least a 20° angle.

12.2.2.10. Cable Raceway

1) Each dwelling unit shall have a cable raceway leading from the electricity circuit panel to an enclosed outlet box in the garage or carport.

2) A raceway not smaller than size 21 shall be provided to accommodate future conductors of a separate branch circuit intended to supply a future receptacle for use with the electric vehicle charging system.

3) An outlet box for the receptacle referred to in Sentence (2) and approved for the purpose shall be provided in a parking space or a parking stall of a storage garage or carport intended for use with the electric vehicle charging system.

4) The raceway described in Sentence (2) shall be installed between the dwelling unit panel board and the outlet box referred to in Sentence (3).

12.3 Objective and Functional Statements

12.3.1. Objective and Functional Statements

1) For the purposes of compliance with this By-law as required in Clause 1.2.1.1.(1)(b) of Division A, the objectives and functional statements attributed to the acceptable solutions in this Part shall be the objectives and functional statements listed in Table 12.3.1.1. (See A-1.1.2.1.(1) in Appendix A.)

**Table 12.3.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 12
Forming Part of Sentence 12.3.1.1.(1)**

Acceptable Solutions	Objectives and Functional Statements
12.2.1.1. Windows	
(1)	[F51, F52, F53, F54, F55, F61, F63, FEP1-OEP1]
12.2.2.1. Light Fixtures	
(1)	[FEP1-OEP1]
12.2.2.2. Energy Usage Display Meter	
(1)	[FEP1-OEP1]
12.2.2.3. Hot Water Tanks	
(1)	[FEP1-OEP1]
12.2.2.4. Hot Water Tanks	
(1)	[FEP1-OEP1]
(2)	[FEP1-OEP1]
12.2.2.5. Gas-Fuelled Fireplaces	
(1)	[F40, F41, F43, F44, FEP1-OEP1, OEP3]
(2)	[F40, F41, F43, F44, F54, F55, FEP1-OEP1, OEP3]
12.2.2.6. Toilets	
(1)	[F72, FEP1-OEP4]
12.2.2.7. Heat Recovery Ventilators	
(1)	[F40, F44, F50, F51, F52, F53, F54, F63, OEP1]
12.2.2.8. EnerGuide Rating System Audit	
(1)	[OEP1, OEP5]



CITY OF VANCOUVER

CITY OF VANCOUVER

POLICY REPORT DEVELOPMENT AND BUILDING

Report Date: June 9, 2008
Author: Tim Ryce / David Ramslie
Phone No.: 604.871.6751 / 604.873.7946
RTS No.: 7183
VanRIMS No.: 08-2000-31
Meeting Date: June 26, 2008

TO: Standing Committee on Planning and Environment

FROM: Chief Building Official in consultation with the Office of Sustainability, Planning, Development Services and Engineering Services

SUBJECT: The Green Homes Program - Building By-law Amendments for New One Family Dwellings, One Family Dwellings with Secondary Suites, and Two Family Dwellings (in this report called "New Dwellings")

RECOMMENDATION

- A. THAT Council approve the proposed amendments to the Building By-law, generally as set out in Appendix A, directed at reducing the environmental impacts of new dwellings, and
- B. THAT Council authorize the Director of Legal Services to bring forward the By-law amendments generally as shown in Appendix A to this report.

GENERAL MANAGER'S COMMENTS

The General Manager of Community Services RECOMMENDS approval of A and B.

COUNCIL POLICY

Council may pass by-laws to regulate the construction of buildings and adopt any code relating to the construction of buildings, with any changes that Council consider appropriate.

In March 2005, Council approved the Community Climate Change Action Plan to reduce greenhouse gas (GHG) emissions in the community to 6% below 1990 levels by 2012.

In March 2007, Council passed a motion directing staff to begin planning for significant, long-range GHG reductions with the eventual goal of becoming a carbon-neutral city.

In May 2007, Council adopted the Building By-law which included environmental protection objectives. Although no new “green building” requirements were added to the by-law at that time, the environmental protection objectives were put into place to facilitate the future development of the City’s Green Building Strategy.

In July 2007, Council adopted targets to reduce community GHG emissions to 33% below current levels by 2020 and 80% below current levels by 2050. In addition, Council adopted the target of having all new construction in Vancouver be GHG neutral by 2030.

PURPOSE

The purpose of this report is to propose a set of Building By-law amendments directed at reducing the environmental impacts of new dwellings (new one and two family dwellings, including secondary suites). The recommended by-law amendments address the following issues:

- A. Building envelope performance in the areas of wall, basement, foundation, and window insulation,
- B. Energy performance in the areas of lighting fixtures, energy monitoring systems, hot water heating, and fireplaces,
- C. In-building water efficiency in the area of water closets,
- D. Indoor air quality and ventilation, and
- E. Infrastructure development in the areas of roof-mounted solar energy generation and electric vehicle charging.

BACKGROUND

In November 2005, Council approved the Green Building Strategy (GBS) to develop specific zoning guidelines and By-laws to enhance the environmental and human health performance of all Part 3 buildings (generally over 3 storeys or greater than 600 m² in building area). In May 2007, Council received an update report on the progress of the Green Building Strategy in which staff presented the refined Strategy and conveyed industry support for the program as it now stood. Council instructed staff to develop options and recommendations for future scope, approach, staffing and resourcing for broadening Vancouver’s green building and infrastructure strategy, including expanding the GBS to include buildings that are not classified as Part 3 in the Building By-law.

Recently Council adopted a series of ambitious targets for greenhouse gas (GHG) reductions including targets to reduce community GHG emissions by 33% below current levels by 2020 and 80% below current levels by 2050 to reflect and support adopted provincial targets. In addition to these, Council adopted the target of having all new construction in Vancouver be GHG neutral by 2030.

Section 306(a) of the Vancouver Charter provides that Council may make by-law regulating the constructions of buildings in certain circumstances. Bill 10 recently amended s. 306(a) to add the following circumstances:

“(iv) where the provision of access to a building, or to part of a building, for a person with disabilities is concerned;

(v) where the conservation of energy or water is concerned;

(vi) where the reduction of greenhouse gas emissions is concerned;”

DISCUSSION

As directed by Council, staff have developed Building By-law amendments aimed specifically at new dwellings as a plan of action for broadening the scope and approach of the Green Building Strategy. These amendments are collectively known as the Green Homes Program.

The amendments proposed in this report are aimed at providing Vancouverites with environmentally responsible homes while helping to address the causes of climate change by reducing GHG emissions. The Green Homes Program provides substantial environmental impact reductions without significantly impacting the costs of new construction. According to building energy use data collected by the Natural Resources Canada (NRCan) EnerGuide™ for New Homes Program, staff believe the recommended amendments will reduce the energy consumption of new dwellings by approximately 33% when compared to current building practices. This program will also move Vancouver toward its targets for GHG emission reductions in the community and its eventual goal of carbon neutrality for all new construction.

54% of all GHG's generated in the City of Vancouver are produced by the construction and operation of buildings. Within City limits, 75% of the land zoned for residential development is occupied by these types of buildings. These statistics highlight the importance of addressing the construction and operation of one and two family dwellings as the City strives to meet our climate change mitigation objectives.

The Province of British Columbia has recently released a similar set of Building Code requirements directed at reducing the environmental impact of buildings throughout British Columbia. Staff from the Office of the Chief Building Official worked collaboratively with the Province in order to stay consistent with the Provincial initiatives, but at the same time is bringing forward additional requirements that will further improve the environmental performance of Vancouver's one and two family dwellings.

For both the Provincial initiatives and the by-law amendments proposed in this report, staff have developed projections for estimated GHG savings based on the NRCan data mentioned above. The analysis is based on the assumption of the construction of 700 new dwellings each year, which is what the City has experienced in the last few years. As seen in Figure 1 below, staff have projected that the Vancouver Green Homes Program will be 14% more effective in reducing GHG's in new dwellings than what has recently been introduced in the Provincial Building Code.

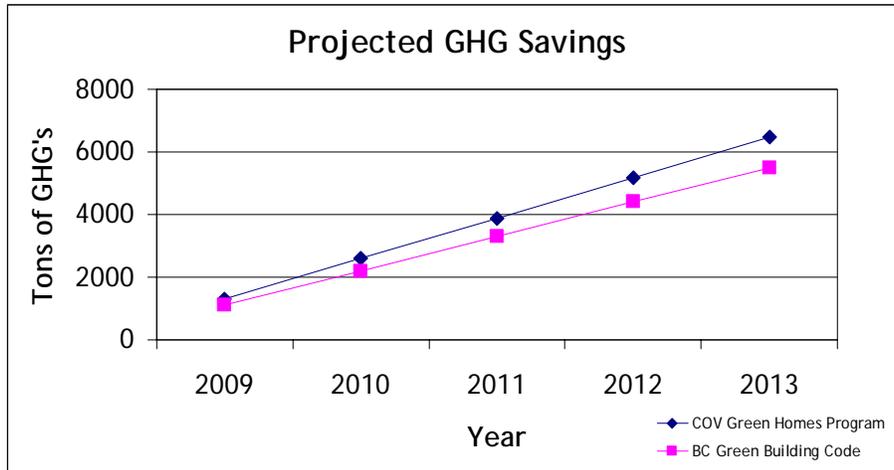


Figure 1: Projected GHG Savings from the proposed Green Homes Program

The projections presented in Figure 1 are based solely upon the adoption of the proposed By-law amendments outlined in this report. However, the recommendations in this report represent the requisite first step needed to achieve carbon neutrality targets by 2030.

The proposed amendments related to energy efficiency and future renewable energy generation are designed to move new dwellings as far as possible towards Vancouver’s 2030 target without adversely impacting affordability. Staff estimate that if the proposed amendments are accepted by Council, all new dwellings will achieve a minimum rating of EnerGuide 80. Figure 2 below shows the projected level of performance the proposed Green Homes Program is expected to meet, correlated to the EnerGuide Rating Service measurement system.

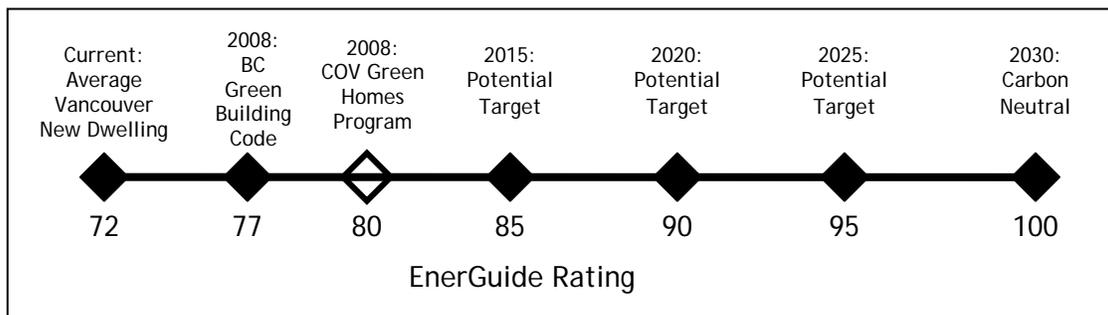


Figure 2: Estimated EnerGuide Rating for the proposed Green Homes Program

Consultation with industry has advised that a dwelling built to or above an EnerGuide 80 standard should be provided with a constant ventilation system, such as a heat recovery ventilator. To accommodate potential future updates of the Green Homes Program and to enable carbon neutral new dwelling construction by 2030, the recommendations in this report include reference to this component, detailed in the following section.

The proposed amendments to the Building By-law are as follows:

A. Building Envelope Performance

Increasing Insulation Requirements:

Currently, the Building By-law addresses heat loss from the interior of dwellings by mandating the installation of specific levels of insulation in wall and ceiling/roof assemblies. To reduce these heat losses in new dwellings, staff are recommending increasing these minimum insulation requirements and adding a new requirement for insulation under basement floors. The proposed amendments would increase both wall and basement insulation requirements, reducing heat losses through both above-ground and below-ground walls. Furthermore, the new requirement for insulation under basement floors would reduce the amount of heat loss to the ground through the foundation, and allow for a more comfortable basement indoor environment.

In addition to foundations, walls, and roof assemblies, windows permit a substantial amount of heat loss. In order to limit heat loss through windows, staff are recommending requiring a minimum performance specification that will apply to all windows in new dwellings. If Council accepts this recommendation, these new requirements would mandate better window performance and, when combined with the proposed insulation requirements mentioned above, would address and improve the thermal performance of the entire building envelope.

B. Energy Efficiency

Reducing Electricity Consumption:

A substantial portion of dwelling energy usage is electricity for lighting. Despite the fact that several alternatives to the standard incandescent light bulb are commonly available, consumer adoption of these energy-saving, long-lasting lighting elements is slow, largely due to the wide availability of standard bulbs. In order to promote consumer adoption and education, staff are recommending requiring that a minimum of 40% of light fixtures in a dwelling be hard-wired to not accept incandescent or halogen light bulbs. In doing so, homeowners will utilize energy-saving lighting technologies, such as compact fluorescent (CFL) or light-emitting diode (LED). This recommendation will provide City-wide electrical savings that will support BC Hydro and senior government efforts to “green” the provincial electricity supply.

Requiring In-home Energy Display Meters:

Research has shown that homeowners are more likely to augment their behaviour when they are provided with a near real-time indication of how their actions impact resource consumption. To that end, staff are recommending requiring in-home electrical energy usage display meters in all new dwellings. In-home energy usage display meters provide residents with up-to-the-minute statistics of energy consumption through easy-to-understand devices inside the house. Through this device, dwelling residents will be able to directly observe the positive effects of energy-conscious behaviour.

Reducing Hot Water Heating Energy Losses:

Another significant energy use in a dwelling is the generation and supply of hot water; heat losses in hot water piping networks, as well as at the hot water tank itself, can greatly increase the amount of energy required to provide residents with hot water. In order to limit these losses, staff are recommending requiring that insulation be provided around all electrically-powered hot water tanks, and around a portion of the hot water piping leading to and from the tank itself on both electrically and gas-

powered systems. In the case of constant recirculation hot water systems (i.e. - systems that continuously circulate hot water throughout the hot water piping system, regardless of whether hot water is being consumed), staff are recommending that all hot water piping in the systems be required to be insulated.

Increasing Natural Gas Fireplace Efficiency:

Natural gas fireplaces, while not commonly considered to be a component of a dwelling that would consume a large amount of energy, are in fact very detrimental to home energy efficiency. Heat losses through chimneys and typical gas fireplace vents, combined with an always-on pilot light consume a substantial amount of resources. Statistics from Terasen Gas indicate that pilot lights alone cost the average home owner \$120 a year in natural gas. To limit these losses, staff are recommending requiring that all natural gas fireplaces be direct-vented and use electronic ignition. Direct venting, a process that eliminates the need for a chimney, ensures that the fireplace consumes only unheated outdoor air. Electronic ignition removes the need for a pilot light, effectively eliminating the standby energy consumption of the fireplace.

C: In-Building Water Efficiency

Reducing Potable Water Consumption:

Currently, the Building By-law addresses potable water consumption in dwellings by requiring the use of low-flow fixtures throughout the home, as well as mandating the installation of toilets that use a maximum of 6 litres of water for each flushing action. While effective, a substantial amount of potable water is still consumed with each toilet flush. Dual-flush toilets, toilets that allow the user to choose between a large or small flushing volume, can reduce this consumption by using appropriate water volumes. If Council accepts this recommendation, this requirement will allow residents to further reduce potable water consumption.

D: Indoor Air Quality and Ventilation:

Requiring a Heat Recovery Ventilator:

As industry adopts more energy efficient construction techniques, it is projected that air leakage through the dwelling's envelope (walls, ceiling, windows, etc.) will be notably reduced. While this is considered a positive change from an energy perspective, the continued assurance of a minimum standard of indoor air quality is required. To that effect, staff are recommending that all new dwellings be provided with a heat recovery ventilator (HRV). Capable of ensuring that adequate ventilation is provided to a home, an HRV continuously exchanges stale indoor air with fresh air while transferring the heat contained in the outgoing exhaust to the incoming ventilation. By minimizing heat loss while ensuring the delivery of fresh air, this recommendation will promote new dwellings that are both healthy and energy efficient.

E: Infrastructure and Data Collection for Future Green Homes

Data Collection for Future Green Homes Program Development:

Future development of the Green Homes Program would greatly benefit from an ongoing analysis of the effects of current Building By-law requirements and Green

Homes initiatives. To facilitate this, staff are recommending requiring that an EnerGuide Rating System Audit, as defined by NRCan's EnerGuide™ Rating Service, be carried out on all new dwellings. The audit involves a plan review, on-site inspection and Blower Door Test; the latter component is specifically designed to test the airtightness of the dwelling, which directly relates to the dwelling's long-term energy efficiency. The audit also provides some analysis on general home efficiency related to large appliances, layout, and design of the home. This information will be critical for staff to track the performance of the Green Homes Program, and to help them identify where they can provide targeted development, training and incentives to the industry, and prioritize future directions for the Program.

The adoption of the EnerGuide™ Rating Service metric is advantageous on several fronts. While acting as a tool to help build capacity in energy efficient design and construction within the residential construction industry, EnerGuide™ audits promote public awareness on the topic of dwelling energy efficiency. Research has shown that this type of consumer-friendly rating tool can help to promote market transformation in the building sector.

Infrastructure Installation for Future Roof-Mounted Energy Generation:

As the typical dwelling can be in use for half a century or more, some allowances for the adoption of future technologies is prudent. One such technology that will be undergoing widespread adoption in the coming years is that of on-site solar energy generation, namely roof-mounted photovoltaic or solar thermal systems. In order to facilitate the simple addition of such systems to dwellings at a future date, staff are recommending requiring that a vertical service shaft be provided, extending from the dwelling's service room to the attic space. When desired, homeowners would be able to use this service shaft to easily install the piping and cabling required by the systems they chose. This recommendation recognizes that infrastructure must be put in place at the time of construction in order to mitigate future cost barriers and ease the adoption of emerging technologies by the homeowner at a later date.

Infrastructure Installation for Plug-in Electric Vehicles:

Over the past 5 years there has been a growing market for electric bicycles and scooters. It is also expected that plug-in electric hybrid vehicles will be available to the public in the near future, followed soon after by the widespread availability of fully electric vehicles. The adoption of this technology represents a significant opportunity to further reduce GHG's in our community. However, a primary challenge to their adoption is the fact that they require a charging station in the user's home. To that end, staff are recommending requiring the installation of a cable raceway from the building's electricity circuit panel to an enclosed outlet box in the home's garage or carport. In doing so, staff are ensuring that the home can be easily retrofitted at a later date to allow for the installation of electric vehicle charging facilities. This recommendation recognizes that infrastructure must be put in place at the time of construction in order to ease the adoption of emerging technologies by the homeowner at a later date.

Staff developed these recommendations with the goal of improving the overall environmental performance of Vancouver's housing stock while minimizing the impact on cost and affordability. Staff defined "minimizing costs" to mean that all recommendations could not add up to more than 2% of overall construction costs. The recommendations in this report

would add approximately 1.4% to the cost of constructing a new dwelling. According to statistics produced by the Greater Vancouver Real Estate Board, the impact of these recommendations on the list price of a new home will be less than 1%.

Recognizing that affordability is a concern to many residents in Vancouver, staff have designed the program to take advantage of incentives already present within the market to further mitigate the cost impact. The recommendations meet the criteria necessary to receive \$600 from BC Hydro as part of their PowerSmart™ Homes Program. Furthermore, they will also allow all new dwellings to qualify for the Canadian Mortgage and Housing Corporation's (CMHC) Mortgage Loan Insurance Program, which offers a 10% refund on Mortgage Loan Insurance and extended amortization periods.

The proposed Green Homes Program also provides access to several green homebuilding marketing opportunities such as EnerGuide™ for Homes, PowerSmart™ for Homes, and the Energy Star™ rating system. The recommendations pre-qualify all new dwellings built in Vancouver to achieve the highest levels of energy efficiency certification for each of these rating systems.

CONSULTATION

These recommendations were circulated to members of industry, the general public, and City staff for review and comments. The Greater Vancouver Home Builders' Association (GVHBA) was presented with draft recommendations in January 2008, and shortly after provided written commentary. A concern was raised that the increased wall insulation requirements would reduce the saleable square footage of a new dwelling. To address this, staff are investigating modifying the methods used to calculate allowable floor space ratios such that varying wall thicknesses would have no effect on allowable square footage. The GVHBA questioned the necessity of requiring that 40% of lighting fixtures be non-incandescent and non-halogen, stating that the market is trending towards this already. Staff considered the pace of market adaptation in the development of this requirement, and determined the proposed amendment to have value in promoting consumer awareness.

The feedback from the GVHBA questioned the use of the EnerGuide Rating System audit, noting that the tool is site-dependant and based on "average" resource consumption data. Staff are aware of the audit's limitations; however, as the purpose of the proposed audit is to inform future research and development of the Green Homes Program, the EnerGuide tool is well-suited for the task. Furthermore, as a prominent green home rating system, the ability to promote consumer awareness and market transformation is unmatched in Canada. The final concern of the GVHBA related to the estimated cost of the HRV; it was their belief that the cost of that component is greater than that determined by staff. While the GVHBA's estimate represents a cost increase for the proposed Green Homes Program, the increment is minor; using the GVHBA's values, the overall cost of the Program would still be less than 2% of total construction costs.

GVHBA members were invited to attend a forum held by the City in February 2008. The majority of attendees expressed their support for the initiative and provided feedback throughout the development of the Green Homes Program.

Representatives from the Window and Door Manufacturers Association of BC also provided commentary on the recommendations, drawing attention to the ramifications in mandating 3rd party window performance classifications, as discussed in the following paragraph.

In order to receive feedback from industry as well as the general public, a website was developed to allow for public consultation and feedback on a wider scale. Responses were received from a range of respondents, including design professionals, manufacturers, interest groups, and the general public. Comments were positive, and the vast majority of respondents supported the proposed By-law amendments. Respondents appreciated the initiatives; in many cases the proposed amendments were considered a “good start”, and that the Green Homes Program would “inspire other municipalities to follow suit”. Some concerns were raised by the building industry and design professionals regarding the use of a 3rd party classification for window performance standards; this was resolved through the revision of the amendment to reference a specific level of performance, as determined by staff. Overall, respondents suggested that while these proposed amendments were a solid start, continued efforts to create, maintain, and develop future By-law amendments would be required for the Green Homes Program to be successful.

Consultation with the various City departments that would be affected by the recommendations has been carried out; direction has also been received from the Green Building Strategy Steering Committee and the Planning and Implementation Advisory Committee. Feedback from staff members has been incorporated into the Green Homes Program. It was observed that since the majority of the proposed by-law amendments in this report are modifications to existing By-law requirements, the impact on staff of the Green Homes Program thus far was deemed to be minimal.

Numerous organisations have also come forward to voice their support for the proposed Green Homes Program, including BC Hydro and the Ministry of Energy, Mines, and Petroleum Resources. Letters of support are on file at the City Clerks Office.

FINANCIAL IMPLICATIONS

There are no financial implications for the City of Vancouver.

PERSONNEL IMPLICATIONS

It is anticipated that there are no personnel implications with respect to City resources to administer the Green Homes Program requirements.

ENVIRONMENTAL IMPLICATIONS

The Green Homes Program will result in an annual reduction of 1300 tons of greenhouse gases. Based on staff projections, staff believe that over five years the program will cumulatively save over 25000 tons of greenhouse gases. The recommendations will provide residents with homes that conserve energy and potable water, create opportunities for on-site renewable energy generation, and allow for the future use of electric vehicles.

IMPLEMENTATION PLAN

Should Council adopt the by-law amendments proposed in this report, staff recommend that these amendments come into effect on September 5, 2008. This will give the Chief Building Official time to develop a training program for permit processing and inspection staff, as well as inform builders and homeowners about these new requirements. It should be noted that the majority of these proposed requirements relate to issues that staff currently regulate. Therefore, extensive training will not be required.

CONCLUSION

This report recommends amendments to the Building By-law directed at reducing the environmental impacts of new dwellings (new one and two family dwellings, including secondary suites). The proposed amendments include changes to promote energy efficiency and potable water consumption reduction, improve indoor air quality, and provide infrastructure for the adoption of future technologies. Staff estimations extrapolated from NRCan data state that these amendments will reduce the energy of consumption of new dwellings by approximately 33%, and will be 14% more effective in reducing GHG's than what was recently adopted as part of the BC Green Building Code.

Through public consultation with City staff, the Vancouver building community, industry, and the general public, there was general support for the recommended amendments. The comments received have been reviewed and some of the amendments have been revised based on their concerns. Support was also expressed for further initiatives to reduce environmental impacts of new dwellings; staff will continue to work with this feedback on future Green Homes Program components. In order to provide sufficient time for City staff and industry education, an adoption date of September 5, 2008 is recommended.

Should Council adopt these recommendations, the Green Homes Program will put Vancouver at the forefront of sustainable development home construction practices in North America. It would be, once implemented, the most progressive green buildings standard required for new dwellings in North America.

* * * * *

Supports Item No. 3
P&E Committee Agenda
July 9, 2009



POLICY REPORT
DEVELOPMENT AND BUILDING

Report Date: June 22, 2009
Contact: Brian Beck
Phone No.: 604.871.6752
RTS No.: 07195
VanRIMS No.: 08-2000-20
Meeting Date: July 9, 2009

TO: Standing Committee on Planning and Environment

FROM: Manager of the Sustainability Group in consultation with the Director of Legal Services, and General Manager of Engineering Services

SUBJECT: Report on Electric Vehicle Charging

RECOMMENDATION

- A. THAT Council approve the provision of infrastructure for charging electric vehicles (EVs) in new multi-family buildings, generally in accordance with Appendix A;

And that Council instructs the Director of Legal Services to bring forward amendments to by-laws, generally in accordance with Appendix A, to implement this scheme.
- B. THAT an 18 month grace period be provided following the enactment of the requirements for EV charging infrastructure.
- C. THAT Council direct staff to develop a strategy for retrofitting existing buildings that explores the use of incentives to encourage the installation of EV charging infrastructure in existing buildings.
- D. THAT Council direct staff to partner with Easy Park to pilot a limited number of public EV charging locations at existing City owned EasyPark lots, and explore possibilities to expand this pilot to on-street locations, at a cost to the City of not more than \$15,000, source of funds being the 2009 Engineering Operating Budget - Climate Protection Program.

CITY MANAGER'S COMMENTS

Developing capacity for electric vehicle charging, as outlined by the Mayor's Greenest City Action Team Quick Start Report, is an essential first step for encouraging the adoption of

electric mobility in Vancouver. The recommendations of this report advance a number of important Council policy directions related to greener buildings, climate protection and sustainable transportation. They will also encourage investment in Vancouver's green economy by providing infrastructure and pilot projects needed to attract green jobs and technologies related to electric mobility.

COUNCIL POLICY

In March 2005, Council approved the Community Climate Change Action Plan to reduce greenhouse gas (GHG) emissions in the community to 6% below 1990 levels by 2012.

In March 2007, Council passed a motion directing staff to begin planning for significant, long range GHG reductions with the eventual goal of becoming a carbon-neutral city.

In May 2007, Council adopted amendments to the Building By-law which included environmental protection objectives. Although no new "green building" requirements were added to the by-law at that time, the environmental protection objectives were put into place to facilitate the future development of the City's Green Building Strategy.

In July 2007, Council adopted targets to reduce community GHG emissions to 33% below current levels by 2020 and 80% below 1990 by 2050. In addition, Council adopted the target of having all new construction in Vancouver be GHG neutral by 2030

In January 2007 Council approved membership in Plug-in-Partners a grass-roots initiative with a goal to demonstrate to automakers that a market for flexible-fuel Plug-in Hybrid Electric Vehicles (PHEV) exists today.

In May 2008, Council adopted an Off-street bicycle parking requirements report which included allowance for a vehicle charging plug in bicycle parking locations.

In June 2008, Council adopted the Green Homes Program which included a requirement within the Building By-law to require provisions for Plug-in Electric Vehicle (EV) charging infrastructure in all new one and two family dwellings.

In September 2008, Council approved Street and Traffic By-law changes to allow Neighborhood Zero Emission Vehicles to travel on streets with speed limits of 50 km/hr or less

SUMMARY

Electric vehicles (EVs) present a significant opportunity to reduce greenhouse gases from the light duty transportation sector in Vancouver. EV automakers have clearly identified that to support mass production of EVs, urban communities will need to enable the necessary charging infrastructure.

Last year, the City instituted by-law changes to provide EV charging infrastructure for new one- and two-family dwellings. This report recommends providing EV charging infrastructure for 10% of parking stalls in new multi-family buildings at the initial stage, along with a process by which this requirement could be adapted in future phases. It also recommends a public charging pilot at a number of publicly available parking locations. Lastly, there is a

recommendation to develop a strategy to provide incentives for the retrofits of existing buildings with charging infrastructure as the market for EVs increases.

Staff have consulted widely with the auto industry, utilities, vehicle associations, other levels of government, and have also held initial discussions with the development community to consider options for charging EVs. There is broad support from the majority of these stakeholders to proceed with these recommendations. Within the development community questions were raised about the value of building a limited infrastructure now, when there are still only a few EVs on the road today. To address this feedback, staff have developed a phased approach that is informed by ongoing EV market research and stakeholder consultation.

This report recommends a reasonable level of EV charging infrastructure now in new multi-family buildings to support early EV adopters, while at the same time creating a plan for future upgrades to make it easier for strata corporations to increase the number of charging locations later as needed. Staff will work with the development community to explore other mechanisms to offset these new incremental costs. Introduction of these by-law amendments will help to enable the earlier adoption of EVs in Vancouver, and provide an attractive location for automakers to deploy EVs.

PURPOSE

The purpose of this report is to recommend next steps towards expanding local charging infrastructure for new multi-family buildings, existing buildings, and public parking locations to support market adoption of EVs in Vancouver.

BACKGROUND

In 2005, the City of Vancouver Community Climate Change Action Plan estimated that vehicles powered by internal combustion engines produce approximately 1/3 of the City's overall community greenhouse gas emissions. In response, staff have continued to encourage more sustainable modes of personal transportation, while exploring new low carbon vehicle technologies and fuel solutions. Plug-in electric vehicles (EVs) offer one promising vehicle solution that has the potential to significantly reduce passenger vehicle greenhouse gas emissions. Automakers are now indicating that the commercial launch of these vehicles will happen sooner than expected due to advances in battery technology and renewed consumer demand. Still it may be a number of years before these vehicles are available in large commercial volumes (see Appendix B).

Staff reported to Council in September 2008, outlining the City work in progress to enable the local use of EVs. A more detailed summary of staff efforts to date, as well as a status of the EV industry is included in Appendix B. This information provides further context for the next steps recommended in this report.

In addition to supporting the City's sustainable transportation and climate protection objectives, this report will directly support the Mayor's Greenest City Action team efforts to advance electric mobility in Vancouver.

DISCUSSION

This report addresses the next phase of infrastructure work including:

- Amending By-laws: Requiring EV charging infrastructure in multi-family buildings.
- Retrofitting Strategy: Developing a strategy to enable the retrofitting of existing residential buildings with EV charging infrastructure (including guidelines, and incentives).
- Public Charging Pilots: Piloting public EV charging infrastructure to support early adopters of EVs and to help foster a public dialogue on the subject.

1. Amending By-laws

The following sections explain rationale for regulation, provisions for the charging infrastructure, and some factors to consider related to parking allocation.

Rationale for Regulation

Providing EV charging infrastructure to new multi-family buildings and new City-owned public parking facilities is a natural next step beyond the EV charging infrastructure changes implemented last year for new one- and two-family dwellings. Residents living in multi-family homes within the urban community tend to have shorter trips in city driving conditions. These driving patterns are well-suited to the operational capabilities of EV's.

Introducing a regulation instead of a voluntary measure will help to future-proof the new multi-family building stock. This effort is also a strategic move intended to encourage EV makers to deploy EVs in our City as soon as possible, which may in-turn help create new local EV business opportunities in sales, service, and infrastructure.

Vehicle Charging Provisions in By-laws - New Multi-Family Residential Homes

The by-law framework outlined in Appendix A proposes revisions to by-laws for multi-family homes to require a baseline level of EV charging infrastructure now to support early EV adopters, as well as planning for capacity to support future EV market adoption.

The cost to install vehicle charging infrastructure is greater in multi-family residential buildings compared to single family homes due to the extra electrical capacity and wiring required on site for many vehicles to be potentially charging simultaneously. To support these building and electrical by-law changes, staff carefully considered the associated costs in several different scenarios up to and including providing charging infrastructure for 100% of all the available in-building parking stalls. Staff retained an independent cost consultant who has worked with staff and stakeholders using the latest data from industry and actual project pro-formas to determine what the approximate costs of different charging requirements would be. Staff also applied lessons learned from EV charging infrastructure packages that were negotiated in both Southeast False Creek and the East Fraser Lands.

Early cost estimates indicate that an initial deployment of EV charging infrastructure for 10% of the parking stalls, with allowance for future upgrades, would cost less than 0.5% of the building cost. Although this deployment strategy presents a new cost to developers, the phase-in approach will, 1) enable early adoption of EVs in our community, 2) allow for later expansion as the market demands, 3) allow the development industry to test the market take-up of EV charging capable parking stalls, 4) introduce limited new costs that are not likely to adversely affect land values.

An 18 month grace period will be provided following the enactment of the requirements for EV charging infrastructure to allow time for land costs to adjust.

Staff will work with developers to help find possible strategies and partners to offset the new incremental costs associated with this infrastructure.

Allocation of charging infrastructure

It is understood that parking stalls are often allocated during unit purchase. Since only a small percentage of parking spots will have allowance for vehicle charging, situations may arise where a home owner without an EV needs to trade a parking spot with a new EV owner to access overnight charging. It is the responsibility of the building owners to ensure fair allocation of parking stalls with EV charging capability.

Staff will explore opportunities to provide strata corporations and building owners with tools, based on leading practices, to help manage EV parking stall allocation on a voluntary basis.

2. Retro-fitting Strategy

Staff recognize that while changing regulations to support charging for EVs in new buildings is important, further efforts are required to support early adopters of EVs who live or work in existing buildings with no access to electric outlets.

For this reason the City, Provincial Government and BC Hydro have partnered with the Federal government (NR CAN) to fund the development of new Canadian guidelines for retro-fitting buildings to provide for EV charging infrastructure. These guidelines will offer information like costs and charging technology options, so that developers, building owners, strata councils, fleet managers and other businesses will understand their options before hiring a contractor to complete the work.

When these draft guidelines are completed this summer, it is recommended that the staff should begin leveraging these guidelines to negotiate possible retro-fitting incentive programs funded by the Provincial and Federal Governments.

3. Public Charging Point Pilots

Most personal-use EVs can charge overnight at the user's place of residence. However, in order to deliver a robust EV infrastructure strategy, the City should begin to offer some public charge locations to provide EV owners have the flexibility charge during the day away from home.

Staff recommend a pilot program to consider a few scenarios both on-street and off-street. The pilot should be prioritized to take advantage of low cost conventional electric infrastructure at City owned EasyPark parking lots first, followed by considering the public right-of-way and private locations later.

- *First Priority: City Owned Pay Parking Lots*

Pay parking lots are an excellent off-street charging location because they are distributed throughout the city, and because most locations already have plug-ins for servicing purposes. Staff have inventoried existing EasyPark lots for plugs, and evaluated the capacity of some of locations. The electrical infrastructure is sufficient to provide at least a few charging locations to support a pilot program. EasyPark has expressed a willingness to lead this portion of the pilot.

- *2nd Priority: On-street curb-side charging*

These very public charging locations could serve as a powerful reminder of the City's commitment to provide innovative solutions to address climate change. For example, San

Francisco is now piloting a few curbside charging locations across from their City Hall. This portion of the pilot should be limited to a few locations because special secure charging equipment will need to be evaluated. Staff are working with the BC Government and BC Hydro to consider possible external funding sources.

- *3rd Priority: Community Centres and Parks*

Some citizens have reported that our community centers and parks are also possible charging locations. Staff do not have a plan yet to inventory the electrical infrastructure for these lower priority locations.

- *Other Locations*

Other possible locations for public charging include work sites and shopping malls. These locations will have to be scoped further and will depend on staff's ability to encourage private land holders to participate.

PUBLIC CONSULTATION

Staff have consulted extensively with a range of stakeholders including:

- EV users

The City has received periodic inquiries from early adopters of EVs (cars, scooters and bikes) who have encouraged the City to provide new charging locations. Many have explained that there is a lack of charging locations in their parking garage, and that they don't have a place to top off their EV charge at public parking locations.

- Vancouver Electric Vehicles Association (VEVA)

VEVA is the key local advocacy group encouraging the City to leverage its sphere of influence to enable the use of EVs. Over the past two and a half years their members have volunteered significant time to help assess options and scenarios for this report, and to lobby federally for updates to codes and standards to allow Vancouver to move forward with by-law changes before any other city in Canada. VEVA has encouraged the City to plan for a future when most cars will need to have the capability to plug in every parking location. See VEVA letter of support attached in Appendix C.

- Urban Development Institute (UDI)

In November of 2008, UDI was notified that staff were exploring an update to City by-laws to allow for EV charging infrastructure. A presentation was made to the UDI in April, 2009 laying out a proposal to have charging infrastructure for 20% of parking stalls in new multi-unit residential buildings. Members of the UDI liaison committee expressed concern that this target was too high given the cost of providing the infrastructure, the lack of wide spread market penetration of the vehicle technology, and BC Hydro's capacity to deliver the additional power required to charge these vehicles. To address these issues and others, City staff struck a working group with UDI and BC Hydro to develop an approach that addressed these concerns. Since that time staff have shared their research and reports, and initial drafts of this report. UDI membership has had direct input into the writing of the report.

The UDI working group members have continued to advocate for a maximum 5% of parking stalls initially with charging locations.

- BC Hydro

BC Hydro is a key partner on this project, with a new strategy to help enable the use of EVs in this region. The BC Hydro Chief Technology Office has helped the City to understand broader

implications of these proposals, and they are the lead partner on the development of guidelines and public charge locations.

- BC Government

The BC Government is another key partner helping to set policy, developing incentives, and at times providing necessary seed funding.

- The Canadian Standards Association/Canadian Electric Code Committee

This group supported our locally initiated lobby effort to update sub-section 86 of the Canadian Electric Code on vehicle charging, so that our local building and electrical by-laws will be relevant for EVs.

- Global automakers

A number of leading global automakers, including Mitsubishi, GM, and Nissan have strongly encouraged the City to continue to accelerate our local charging infrastructure work to support market adoption.

- Canadian and local EV solution providers

A number of local EV solutions providers, including Dynasty Electric Vehicles, and REV Motors, have expressed an interest to be part of the City's efforts to enable the use of EVs either with the deployment of EVs or the development of the public charging infrastructure.

- Federal Government

A new supporter of the City's local EV enabling efforts, Natural Resources Canada (NRCAN), is providing funding for Canadian vehicle charging infrastructure guidelines at the request of the City, BC Hydro and the BC Government. NRCAN will also need to be a key partner later to help provide retro-fitting incentives.

- Electric Mobility Canada (EMC)

EMC has often provided support for our local infrastructure work, and they have ensured linkages to the new Federal Government EV road-mapping efforts.

- North American EV charging solution providers

Several of the top EV charging companies in North America have expressed their readiness to provide innovative solutions for the public charging pilot.

- The Rocky Mountain Institute (RMI)

One of the outcomes of the Mayor's Greenest City Action team work was to have staff explore the possibility to join RMI's Project Get Ready initiative designed to help large North American Cities prepare a cohesive 5 year plan to enable EVs led by a local champion and an action group of community leaders. RMI has indicated recently that our City is a good candidate to join this initiative in part because of the City's early EV charging infrastructure work.

FINANCIAL IMPLICATIONS

The initial phase of the public charging pilot, using existing EasyPark electric infrastructure, is forecasted to result in minimal costs to Easy Park and may result in new market opportunities. Staff estimate that the cost for electrical service for EV's using the EasyPark locations will be less than \$70 per year per EV parking stall. This cost will be accounted for in EasyPark's operating budget, along with a one time cost of \$1000 to install signage.

Staff have allocated \$15,000 from the Climate Protection Program, within the 2009 Operating Budget in order to fund the delivery of the on-street portion of the public charging pilot. Staff will also work with the BC Government and BC Hydro to consider possible external funding sources to assist with the delivery of this charging pilot.

ENVIRONMENTAL IMPLICATIONS

Greenhouse gases from personal transportation represent approximately 33% of the total community greenhouse gas emissions in Vancouver. Due to British Columbia's large hydro electricity assets, each new EV in Vancouver reduces these emissions by about 4 tons/yr relative to a typical mid-sized gas powered vehicle.

While deployment of EVs is limited today, EV industry experts anticipate significant growth of this market in the next 10 years. As fuel prices increase over time, it is anticipated demand for EVs will grow resulting in a significant new opportunity to reduce greenhouse gas emissions.

CONCLUSION

Vancouver needs to make significant reductions in greenhouse gas emissions to achieve our local targets. There is no "silver bullet" low carbon vehicle solution available today, though EVs show great promise.

This report makes recommendations for phasing in the EV charging infrastructure for multifamily homes, existing buildings, and public parking locations over a reasonable period of time.

The City has adopted a 'build-it and they will come' approach. There is evidence that City efforts are making a difference with at least three automakers considering Vancouver as an early deployment location for EV's, including Mitsubishi Motors Corporation who recently announced a non-exclusive agreement with the City, BC Hydro and the BC Government to test their new EV in the City fleet.

There are at least three main reasons for building this infrastructure now in new buildings versus waiting to retrofit. First, there is a growing population of EVs, including cars, scooters and bikes that require a charge overnight in multi-family homes. Secondly, early adopters have already confirmed that it is very challenging to individually convince their building owners and strata councils to retrofit the infrastructure. And lastly, the City must find new ways to significantly reduce greenhouse gas emissions from our transportation sector if we are to meet our greenhouse gas target of 33% below 2007 levels by 2020, even though this may come at a marginal new cost to the development industry.

The directions recommended in this report will help to put Vancouver along-side other leading cities best positioned for wide deployment of EVs.

* * * * *

APPENDIX A

Criteria for the development of By-laws requiring Electric Vehicle Charging Infrastructure in Multi-Family Buildings

Initial By-law Amendment:

Provide infrastructure for electric vehicle charging in 10% of parking stalls in multi-unit residential buildings, and make allowances for future upgrades.

Program Development and Maintenance:

Review amount and nature of EV charging infrastructure annually over the next 5 years with the development community, and other stake-holders, to ensure this EV charging infrastructure supports current needs and future demands.

As required, include provisions for signage to exclude charging of older types of EVs that may require additional venting.

APPENDIX B: Summary of City Support for EVs, and EV Industry Status

The recommendations and strategies discussed in this report are based on research compiled from industry experts, Association groups, and other stakeholders. This Appendix outlines the City's ability to leverage infrastructure, as well as the general status of the EV commercialization and EV charging infrastructure to provide some additional context for the report.

City Lever: Infrastructure

Automakers are responsible for building the EVs that many people want to drive today. Local, Provincial and Federal Governments also have the ability to develop policies, incentives, and, most importantly, infrastructure to support the early adoption of EVs.

Two years ago, staff initiated a national lobby effort, along with Electric Mobility Canada and the the Vancouver Electric Vehicle Association, to update and simplify the Canadian Electric Code for charging EVs in order to support local Building By-law amendments. That effort was successful and the new CEC section 86, combined with the prescriptive requirements defined in Vancouver's revised Building, Electrical, and Parking By-laws, offer an approach that other jurisdictions might follow.

The main goal of the City infrastructure work is to require an initial number of overnight charging points in new residential buildings, encourage the retro-fitting of existing buildings, and provide some public convenience charging infrastructure. Also, because the most common form of EVs in Vancouver today are electric bikes and smaller electric scooters, the City has updated parking by-laws in 2008 to enable plug-ins in off-street bicycle parking areas.

The local work on building and parking by-laws has helped staff to influence policy decisions at other levels of government. In 2008, the City was a founding member of the Provincial Government led Plug-in Vehicle Working Group, along with BC Hydro. This group now helps to facilitate plug-in electric vehicles in a much more coordinated way.

EV Industry Status

Staff have observed significant new advances with battery technologies, and new commitments from automakers and governments to produce plug-in EVs sooner. Even so, some experts believe it will take a number of years before the industry reaches a low volume commercial level¹. The vehicle technologies are certainly viable now, but the early costs of production are, for a now, a little too high for EVs with similar performance to gasoline engine vehicles.

The sequence of availability of EVs is expected to start with speed limited neighbourhood electric vehicles, city electric vehicles, and existing gasoline powered vehicles converted to EVs, will reach low commercial volumes first. These EVs will be followed likely by plug-in hybrids, and then full performance battery electric vehicles. Fuel cell electric vehicles are still a possible longer term solution.

The US is planning to offer new credits for the purchase of EVs because at the early stage, these vehicles will cost more than combustion engines. The City is encouraging the Canadian

¹ The 'Low volume commercial' level of production was defined in 2007 by a California Air Resources Board ZEV panel as 10,000 units a year globally. Other levels included: demo's- 100's/yr; pre-commercial-1000's /yr; and mass commercialization-100,000's/yr

Government, through Electric Mobility Canada, to also consider offering similar vehicle credits.

Status of Charging EVs

The vast majority of EV charging will likely be done at home overnight, and off peak load on the grid. Adoption issues include availability of plugs, time required to charge the vehicles which is limited by capacity of the local and upstream electric utility. Some plug-in EVs, like the new City of Vancouver plug-in hybrid Prius, can be easily charged overnight via a receptacle supplied by a dedicated 120V 20 Amp circuit, which will provide an average of 10 Km of driving range per hour of charging. Some full performance EVs, with larger battery capacity and range, take longer to receive a full charge from the same circuit. For this case a medium speed of charging is likely to be standardized to allow a full charge in about 3 hours by a 240V 40 Amp power supply. This may be available at both residential and public destination locations at a higher cost.

Full performance EV makers are also providing an option to increase the charge rate by using a higher voltage circuit. This may be useful for fleet applications when vehicles need to be available for longer periods of time.

Additionally, fast charging for a 20 minute or less fill up is contemplated with specialized and expensive equipment from high power infrastructure at public charge stations. This will be essential for inter-city and longer distance travel or by fleets such as taxis doing longer distances with numerous stops. Some EV makers are planning for very fast charging rates from high power charging equipment.

It is expected that the cost of batteries will come down as more vehicles enter production, enabling larger battery packs and greater driving range in EVs. The time to charge will remain invariant with EV infrastructure capacity. Overnight charging on lower power outlets off peak (i.e 120V 20Amp) will suffice for the majority of charging given that the average trip distances in Vancouver are under 50km.

Metering

The design scenarios for power supply metering continue to evolve. It is likely that automakers will encourage end-point (or in car) metering which will eliminate the costly step of having to run wires back to individual residential meters.

Also, smart metering or time of use billing may be introduced to assist with peak demand loads. Smart charging which works with smart metering is planned by the American SAE J1772 standard. This combined with building management systems will address peak load management in the future. The expected reductions through conservation in peak load may be as much as 40% per residence allowing existing infrastructure and supply capacity to suffice.

Most electric vehicle charging will most likely occur overnight. The proposed by-law anticipates evolving standards and these management strategies. Therefore this report proposes infrastructure to be installed which is needed now and delays expensive metering equipment installations until they are needed. What will not change is the total capacity and wire size because average driving range is constant and most cars are parked longer than they need to charge.

Appendix C- Vancouver Electric Vehicle Association Letter

Mayor and Councillors
City of Vancouver
453 West 12th Ave
Vancouver, BC V5Y 1V4

June 12, 2009

RE: Recommendations from the Manager of the Sustainability Group,
Report on Plug-in Vehicle Charging before the Standing Committee on
Planning and Environment, 2009

Your Worship and Councillors:

The Vancouver Electric Vehicle Association (VEVA) strongly supports the forward thinking put forward by the Manager of the Sustainability Group in the Interim Report on Plug-in Vehicle Charging. Operational infrastructure for charging electric vehicles (EVs) is an essential prerequisite to the adoption of EVs.

Charging batteries takes time, as we are all familiar with from using our cell phones and laptop computers. EVs have large batteries and they require either significant time or very high power electrical infrastructure to charge. The amount of power an EV consumes on average is one half that used by an average household, or comparable to running an electric dryer for a few hours a day. For this reason most EV charging should take place at home, overnight and off-peak load times of the grid.

Most residential buildings in Vancouver lack any electrical outlets in parking garages, let alone outlets of sufficient power to charge an EV in a reasonable amount of time. The standard branch circuit outlet on a shared circuit is very marginal for all but the smallest or shortest range capable EVs. Running long extension cords from apartment windows is not a feasible solution.

New Construction

The recommendation to provide operational infrastructure for charging electric vehicles in all new multi-family residential buildings is increasingly important as density increases. As new EV models have been announced by most of the major auto makers, it is urgent to start building this infrastructure.

There has been some debate over the cost of installing EV infrastructure and how soon EVs will be widely available, which has led to proposals to delay full implementation. The average cost of a parking stall without electricity is about \$30000. VEVA estimates the average costs to fully implement EV infrastructure with smart demand load control at time of construction is around \$1500 per parking stall. EV infrastructure is much less expensive at the time of design and construction of new buildings. VEVA encourages council to adopt our recommendation to complete 100% installation at the time of construction rather than delaying only to incur higher costs later. Our and other studies support end user willingness to bear this expense.

A number of considerations support a full, not a partial or a delayed implementation in new construction.

Delaying implementation costs more.

- The cost to not install or rough in adds about 40% to the total cost in future.
- The cost to install 10% of the plugs is almost a third of the cost of a 100% installation.
- The cost to install 10% plus rough-in now, costs almost 3 times as much per plug initially.
- The cost to install 100% now with smart load control is only about 30% more than installing 10% plus rough-in initially.
- Smart load control technology shaves peak loads and saves costs.
- Upgrading the service supply to each building is a major renovation for BC Hydro.
- Studies of early adopters indicate a willingness to pay the cost of plugs now.

A phased approach adds administrative overhead.

- Administering a partial implementation and maintaining updates will introduce complex by-laws, require regular re-training of city staff and tradespeople, as well as the ongoing cost of re-evaluation and updates. By comparison a similar requirement in the electrical code requires a dedicated plug for refrigerators, dryers, and stoves and is easy to implement and does not require annual review.
- The detailed design for electrical plans is not done on project start up so the advance notice needed on smaller Part 9 buildings is less.

We need to get ready now.

- Almost half of Vancouver residents live in condos in the inner core and typically drive less distance than average so are more likely to be early adopters of EVs creating demand for plugs in condos.
- Other cities are installing a public infrastructure now and are leading Vancouver in green initiatives.
- The automotive industry in North America is being re-structured with electric vehicles as a key component.
- In 2009 most of the major automotive companies have announced plug-in vehicle models for near future production.
- Plug-in automobiles, as 100% battery electric and plug-in hybrids, will soon join the thousands of electric bicycles, scooters, low-speed electric vehicles and electric conversions now on city streets.

VEVA recommends a 100% installation of plugs in all new residential buildings at time of construction as the most economical approach to reducing GHGs ASAP. This can be achieved by simply amending the Vancouver electrical code (Section 26) to add a rule to say that "at least one receptacle shall be provided for each car space in a garage or carport serving residential occupancies for use with an electric vehicle charging system in accordance with Section 86".

If only a partial installation is done, it is very important to rough-in electrical infrastructure raceways and space for future equipment to avoid high retrofit cost.

Retrofitting Existing Buildings

Existing buildings will also need to be upgraded to provide this same infrastructure. Renovations to green our residential buildings need to include incentives that support the installation of EV charging infrastructure. Tradespeople, owners and others will need guidelines. The work currently ongoing by the City of Vancouver, the Provincial Government, BC Hydro, Electric Code Committees, NRCAN, and others needs continuing support.

Public Charging Access

Most charging will take place daily, at home overnight, but EVs still have limitations on range.

When the batteries run low on longer trips, owners need planned access to public charging locations. The ideal locations are in public parking lots, shopping malls, curbside parking, and other popular destination locations such as employee parking lots, popular city park attractions or community recreation facilities where City residents and visitors spend time to allow for top-up charging. VEVA notes that due to the high efficiency of EVs, and low electricity costs in BC, that profitable fee based charging in public locations is possible and acceptable to EV motorists

VEVA notes that relatively few distributed public charging locations would be required to provide for the occasional need to charge away from home at peak times and to indicate an EV friendly city. As of 1998 there were only 39 gas stations in Vancouver, down from 248 in 1970. There are just 53 auto propane filling locations in BC, which was sufficient for some early adopters to transition to that alternative fuel. As fuel tanks provide a greater range and are faster to fill than EV batteries, a comparable number or more of public charging locations spaced within two km of each other are necessary to support the adoption of EVs in Vancouver. If made available for public use, the existing plug-ins at Easy Park lots and other available locations is a simple, inexpensive and viable solution.

Thank you for considering this letter and for considering the recommendations put forward by the Manager of the Sustainability Group.



Don Chandler
Past President
Vancouver Electric Vehicle Association
604-224-1136 home
604-307-1136 cell & voice mail
4053-W32nd Ave. Vancouver



Washington Electric Laws and Incentives

State Incentives

Alternative Fuel Vehicle (AFV) and Hybrid Electric Vehicle (HEV) Tax Exemption

New passenger cars, light-duty trucks, and medium-duty passenger vehicles that are dedicated AFVs are exempt from the state sales tax. Qualified vehicles must operate exclusively on natural gas, propane, hydrogen, or electricity, meet the California motor vehicle emissions standards effective January 1, 2005, and comply with the rules of the Washington Department of Ecology. In addition, all new passenger cars, light-duty trucks, and medium-duty passenger vehicles that utilize hybrid electric technology and have a U.S. Environmental Protection Agency estimated highway fuel economy of at least 40 miles per gallon are exempt from the 0.30% motor vehicle sales tax. These tax exemptions expire on January 1, 2011. (Reference [House Bill](#) 6170, 2009, and [Revised Code of Washington](#) 82.08.020 and 82.08.809)

Electric Vehicle (EV) Battery and Infrastructure Tax Exemptions

Public lands used for installing, maintaining, and operating EV infrastructure are exempt from leasehold excise taxes until January 1, 2020. Additionally, the state sales and use taxes do not apply to EV batteries; labor and services for installing, repairing, altering, or improving EV batteries and EV infrastructure; and the sale of property on land used for EV infrastructure. (Reference [House Bill](#) 1481, 2009, and [Revised Code of Washington](#) 82.29A, 82.08, and 82.12)

Alternative Fuel Loans and Grants

The Energy Freedom Program (Program) is administered by the Washington Department of Commerce in consultation with other state agencies. The Program includes the Energy Freedom Account, which provides financial and technical assistance for bioenergy production, research, and market development, primarily in the form of loans used to convert farm products, organic wastes, cellulose and biogas into electricity, biofuel, and related coproducts. The Program also includes the Green Energy Incentive Account, which provides financial assistance for alternative fueling infrastructure along Interstate corridors. Funds have yet to be appropriated for these accounts, which are set to expire June 30, 2016. (Reference [House Bill](#) 2289, 2009, and [Revised Code of Washington](#) 43.325)

Electric and Plug-In Hybrid Electric Vehicle Demonstration Grants

The Vehicle Electrification Demonstration Grant Program is administered by the Washington Department of Community, Trade, and Economic Development. Eligible applicants are state agencies, public school districts, public utility districts, or political subdivisions of the state. Grants may be awarded to projects involving the purchase or conversion of existing vehicles to plug-in hybrid electric vehicles or battery electric vehicles for use in an applicant's fleet or operations; additional eligibility requirements apply. (Reference [Revised Code of Washington](#) 43.325.110)

Alternative Fuel Vehicle (AFV) and Hybrid Electric Vehicle (HEV) Emission Inspection Exemption

Electric, compressed natural gas, and liquefied petroleum gas vehicles are exempt from emission control inspections. HEVs that obtain a U.S. Environmental Protection Agency fuel economy rating of at least 50 miles per gallon of gasoline during city driving are also exempt from these inspections. (Reference [Revised Code of Washington](#) 46.16.015)

State Laws and Regulations

Electric Vehicle (EV) Infrastructure Development

In an effort to foster economic growth and reduce emissions, the Washington Legislature encourages EV use and the development of EV infrastructure. Any regional transportation planning organization containing a county with a population greater than one million must collaborate with state and local governments to promote EV use, invest in EV infrastructure, and seek federal or private funding for these efforts. Collaborative planning efforts may include: 1) developing short-term and long-term plans outlining how state, regional, and local governments may construct EV charging locations and ensure that the infrastructure can be electrically supported; 2) supporting public education and training programs on EVs; 3) developing an implementation plan for counties with a population greater than 500,000 to have 10% of public and private parking spaces ready for EV charging by December 31, 2018; and 4) developing model ordinances and guidance for local governments for site assessment and installing EV infrastructure. (Reference [House Bill](#) 1481, 2009)

Electric Vehicle (EV) Charging Infrastructure Availability

Recognizing that it is in the State of Washington's interest and to the benefit of the public to encourage the use of EVs to reduce emissions and improve air quality, publicly and privately owned EVs may be charged at state office locations where the vehicles are used for state business, commuter vehicles, or conducting business with the state. Additionally, contingent upon funding, the state must install electrical outlets suitable for charging EVs in each of the state's fleet parking and maintenance facilities as well as every state-operated highway rest stop by December 31, 2015. (Reference [House Bill](#) 1481, 2009, and [Revised Code of Washington](#) 43.01.250, 43.19.648, and 47.38)

Local Government Electric Vehicle (EV) Charging Infrastructure Requirements

A jurisdiction meeting specific location criteria (as defined in [Revised Code of Washington](#) 35.63) must develop regulations to allow the use of EV charging infrastructure in all areas except critical areas or areas zoned for residential or resource use. These regulations must be developed six months after the Washington Department of Community, Trade, and Economic Development distributes model ordinances, development regulations, and guidance for local governments for site assessment and installing EV infrastructure, or by July 1, 2010, whichever is later. This requirement is contingent upon federal funding. Additionally, cities or municipalities are authorized to adopt incentive programs to encourage retrofitting of existing structures capable of charging EVs. (Reference [House Bill](#) 1481, 2009, and [Revised Code of Washington](#) 35.63, 35A.63, 36.70, and 36.70A)

Electric Vehicle (EV) Charging and Battery Exchange Station Regulations

State and local governments are authorized to lease land for installing, maintaining, and operating EV charging stations or battery exchange stations for up to 50 years. Additionally, the installation of battery charging and exchange stations is categorically exempt from the Washington Environmental Policy Act. (Reference [House Bill](#) 1481, 2009, and [Revised Code of Washington](#) 79.13 and 43.21C)

Electric Vehicle (EV) Infrastructure Definitions

EV infrastructure is defined as structures, machinery, and equipment necessary and integral to support an EV, including battering charging stations, rapid charging stations, and battery exchange stations. A battery charging station is defined as an electrical component assembly or cluster of component assemblies designed specifically to charge batteries within an EV. A rapid charging station is defined as an industrial grade electrical outlet that allows for faster recharging of EV batteries through higher power levels. A battery exchange station is defined as a fully automated facility that will enable an EV with a swappable battery to enter a drive lane and exchange the depleted battery with a fully charged battery through a fully automated process. Infrastructure must meet or exceed any applicable state building standards, codes, and regulations. (Reference [House Bill](#) 1481, 2009, and [Revised Code of Washington](#) 19.28)

Alternative Fuels Corridor Pilot Project

Under the Alternative Fuels Corridor Pilot Project, the Washington Department of Transportation may enter into partnership agreements with other public and private entities to use land for alternative fuel corridor pilot projects. These agreements are subject to funding availability. (Reference [House Bill](#) 1481, 2009, and [Revised Code of Washington](#) 47.38)

State Agency Coordination to Address Climate Change

The Director of the Washington Department of Ecology must work with the Washington Departments of Commerce and Transportation to assess whether the California low-carbon fuel standard or other state standards would help Washington meet its greenhouse gas emission reduction target of 1990 levels by 2020. The Secretary of the Washington Department of Transportation must also work in consultation with the Washington Departments of Ecology and Commerce and other interest groups to address low or zero emission vehicles. Additionally, the Office of the Governor will work with state agencies to seek funding to implement a project for the electrification of the West Coast interstate highway and associated metropolitan centers and to purchase electric vehicles and install public fueling and/or charging infrastructure for electric and other high-efficiency, zero- or low-carbon vehicles. (Reference [Executive Order](#) 09-05, 2009)

Alternative Fuel Vehicle (AFV) Identification Requirement

Every automobile, truck, motorcycle, motor home, or off-road vehicle that is fueled by an alternative fuel must bear a reflective placard issued by the National Fire Protection Association indicating that the vehicle is powered by an alternative fuel. (Reference [Revised Code of Washington](#) 46.37.467)

Medium-Speed and Neighborhood Electric Vehicle (NEV) Access to Roadways

NEVs and medium-speed electric vehicles are defined as self-propelled, electrically powered four-wheeled motor vehicles that are permitted on roads having speed limits of up to 35 miles per hour (mph). NEVs can reach speeds greater than 20 mph but not more than 25 mph. Medium-speed electric vehicles can reach speeds greater than 30 mph but not more than 35 mph. NEVs and medium-speed electric vehicles must be in compliance with the national highway and traffic safety administration standards in Title 49 of the [Code of Federal Regulations](#), Part 571.500. (Reference [Revised Code of Washington](#) 46.04.295, 46.04.357 and 46.61.723 through 46.61.725)

Alternative Fuel Use Requirement

Effective June 1, 2015, all state and local government agencies are required to use 100% biofuels or electricity to operate all publicly owned vehicles. To phase in this requirement, all state agencies must achieve 40% biofuel or electricity use by June 1, 2013. To allow the motor vehicle fuel needs of state and local government to be satisfied by Washington-produced biofuels, the Department of General Administration and local governments may contract in advance and execute contracts with public or private producers and suppliers for the purchase of appropriate biofuels. (Reference [House Bill](#) 1481, 2009, and [Revised Code of Washington](#) 43.19.647 and 43.19.648)

Clean Fuel Vehicle Purchasing Requirement

At least 30% of all new vehicles purchased through a state contract must be clean fuel vehicles; this percentage will increase at the rate of 5% each year. It is preferred that dedicated clean fuel vehicles be purchased. In the event that dedicated clean fuel vehicles are not available or would not meet operation requirements, conventionally powered vehicles may be converted to operate on clean fuel or dual-fuel use. (Reference [Revised Code of Washington](#) 43.19.637)

Fleet Action Plan - Seattle

The Clean Green Fleet Action Plan ([PDF 444 KB](#)) aims to increase the use of alternative fuels, reduce fleet fuel use, reduce vehicle emissions, and improve the fuel efficiency of the City of

Seattle's (Seattle's) fleet. [Download Adobe Reader](#). Seattle's long-term intent is to continue participating in the Northwest Hybrid Medium and Heavy Duty Truck Consortium and to continue increasing the use of E85 fuel and electric vehicles. Seattle met its original goal to have a fleet that is 100% clean and green, through the use of clean fuels and vehicles that have the highest fuel efficiency and the lowest emissions and meet the needs of Seattle's operations. Seattle also met the specific measures called for in the plan, including a 5% reduction in the fleet's annual fuel use by 2005 as compared to 1999.

Utilities/Private Incentives

Clean and Efficient Fleet Assistance

The Puget Sound Clean Air Agency has launched the [Evergreen Fleets](#) program, a comprehensive greening plan and certification system for fleets. Evergreen Fleets provides fleet managers with tools to help "green" public and private fleets, reduce pollution, and save money. Evergreen Fleets provides a step-by-step guide to identify the most effective way for fleet managers to green their fleets, including buying greener vehicles, switching to greener fuels, or improving fleet efficiency.

[AFDC Home](#) | [EERE Home](#) | [U.S. Department of Energy](#)
[Webmaster](#) | [Web Site Policies](#) | [Security & Privacy](#) | [AFDC Disclaimer](#) | [USA.gov](#)

Content Last Updated: 07/10/2009

CERTIFICATION OF ENROLLMENT
SECOND SUBSTITUTE HOUSE BILL 1481

61st Legislature
2009 Regular Session

Passed by the House April 24, 2009
Yeas 65 Nays 29

Speaker of the House of Representatives

Passed by the Senate April 22, 2009
Yeas 35 Nays 14

President of the Senate

Approved

Governor of the State of Washington

CERTIFICATE

I, Barbara Baker, Chief Clerk of the House of Representatives of the State of Washington, do hereby certify that the attached is **SECOND SUBSTITUTE HOUSE BILL 1481** as passed by the House of Representatives and the Senate on the dates hereon set forth.

Chief Clerk

FILED

**Secretary of State
State of Washington**

SECOND SUBSTITUTE HOUSE BILL 1481

AS AMENDED BY THE SENATE

Passed Legislature - 2009 Regular Session

State of Washington 61st Legislature 2009 Regular Session

By House Finance (originally sponsored by Representatives Eddy, Crouse, McCoy, Haler, Carlyle, Armstrong, Hunt, White, Dunshee, Priest, Appleton, Orwall, Rolfes, Hudgins, Hinkle, Upthegrove, Clibborn, Morrell, Ormsby, Kenney, Maxwell, Dickerson, and Pedersen)

READ FIRST TIME 03/03/09.

1 AN ACT Relating to electric vehicles; amending RCW 43.19.648;
2 adding a new section to chapter 82.29A RCW; adding a new section to
3 chapter 82.08 RCW; adding a new section to chapter 82.12 RCW; adding a
4 new section to chapter 79.13 RCW; adding a new section to chapter
5 43.21C RCW; adding new sections to chapter 35.63 RCW; adding a new
6 section to chapter 35A.63 RCW; adding a new section to chapter 36.70
7 RCW; adding a new section to chapter 36.70A RCW; adding new sections to
8 chapter 47.38 RCW; adding a new section to chapter 19.27 RCW; adding a
9 new section to chapter 19.28 RCW; creating new sections; and providing
10 expiration dates.

11 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

12 NEW SECTION. **Sec. 1.** The legislature finds the development of
13 electric vehicle infrastructure to be a critical step in creating jobs,
14 fostering economic growth, reducing greenhouse gas emissions, reducing
15 our reliance on foreign fuels, and reducing the pollution of Puget
16 Sound attributable to the operation of petroleum-based vehicles on
17 streets and highways. Limited driving distance between battery charges
18 is a fundamental disadvantage and obstacle to broad consumer adoption
19 of vehicles powered by electricity. In order to eliminate this

1 fundamental disadvantage and dramatically increase consumer acceptance
2 and usage of electric vehicles, it is essential that an infrastructure
3 of convenient electric vehicle charging opportunities be developed.
4 The purpose of this act is to encourage the transition to electric
5 vehicle use and to expedite the establishment of a convenient, cost-
6 effective, electric vehicle infrastructure that such a transition
7 necessitates. The state's success in encouraging this transition will
8 serve as an economic stimulus to the creation of short-term and long-
9 term jobs as the entire automobile industry and its associated direct
10 and indirect jobs transform over time from combustion to electric
11 vehicles.

12 NEW SECTION. **Sec. 2.** (1) A regional transportation planning
13 organization containing any county with a population in excess of one
14 million in collaboration with representatives from the department of
15 ecology, the department of community, trade, and economic development,
16 local governments, and the office of regulatory assistance must seek
17 federal or private funding for the planning for, deployment of, or
18 regulations concerning electric vehicle infrastructure. These efforts
19 should include:

20 (a) Development of short-term and long-term plans outlining how
21 state, regional, and local government construction may include electric
22 vehicle infrastructure in publicly available off-street parking and
23 government fleet vehicle parking, including what ratios of charge spots
24 to parking may be appropriate based on location or type of facility or
25 building;

26 (b) Consultations with the state building code council and the
27 department of labor and industries to coordinate the plans with state
28 standards for new residential, commercial, and industrial buildings to
29 ensure that the appropriate electric circuitry is installed to support
30 electric vehicle infrastructure;

31 (c) Consultation with the workforce development council and the
32 higher education coordinating board to ensure the development of
33 appropriate educational and training opportunities for citizens of the
34 state in support of the transition of some portion of vehicular
35 transportation from combustion to electric vehicles;

36 (d) Development of an implementation plan for counties with a

1 population greater than five hundred thousand with the goal of having
2 public and private parking spaces, in the aggregate, be ten percent
3 electric vehicle ready by December 31, 2018; and

4 (e) Development of model ordinances and guidance for local
5 governments for siting and installing electric vehicle infrastructure,
6 in particular battery charging stations, and appropriate handling,
7 recycling, and storage of electric vehicle batteries and equipment.

8 (2) These plans and any recommendations developed as a result of
9 the consultations required by this section must be submitted to the
10 legislature by December 31, 2010, or as soon as reasonably practicable
11 after the securing of any federal or private funding. Priority will be
12 given to the activities in subsection (1)(e) of this section and any
13 ordinances or guidance that is developed will be submitted to the
14 legislature, the department of community, trade, and economic
15 development, and affected local governments prior to December 31, 2010,
16 if completed.

17 (3) The definitions in this subsection apply through this section
18 unless the context clearly requires otherwise.

19 (a) "Battery charging station" means an electrical component
20 assembly or cluster of component assemblies designed specifically to
21 charge batteries within electric vehicles, which meet or exceed any
22 standards, codes, and regulations set forth by chapter 19.28 RCW and
23 consistent with rules adopted under section 16 of this act.

24 (b) "Battery exchange station" means a fully automated facility
25 that will enable an electric vehicle with a swappable battery to enter
26 a drive lane and exchange the depleted battery with a fully charged
27 battery through a fully automated process, which meets or exceeds any
28 standards, codes, and regulations set forth by chapter 19.28 RCW and
29 consistent with rules adopted under section 16 of this act.

30 (c) "Electric vehicle infrastructure" means structures, machinery,
31 and equipment necessary and integral to support an electric vehicle,
32 including battery charging stations, rapid charging stations, and
33 battery exchange stations.

34 (d) "Rapid charging station" means an industrial grade electrical
35 outlet that allows for faster recharging of electric vehicle batteries
36 through higher power levels, which meets or exceeds any standards,
37 codes, and regulations set forth by chapter 19.28 RCW and consistent
38 with rules adopted under section 16 of this act.

1 NEW SECTION. **Sec. 3.** A new section is added to chapter 82.29A RCW
2 to read as follows:

3 (1) Leasehold excise tax may not be imposed on leases to tenants of
4 public lands for purposes of installing, maintaining, and operating
5 electric vehicle infrastructure.

6 (2) The definitions in this subsection apply throughout this
7 section unless the context clearly requires otherwise.

8 (a) "Battery charging station" means an electrical component
9 assembly or cluster of component assemblies designed specifically to
10 charge batteries within electric vehicles, which meet or exceed any
11 standards, codes, and regulations set forth by chapter 19.28 RCW and
12 consistent with rules adopted under section 16 of this act.

13 (b) "Battery exchange station" means a fully automated facility
14 that will enable an electric vehicle with a swappable battery to enter
15 a drive lane and exchange the depleted battery with a fully charged
16 battery through a fully automated process, which meets or exceeds any
17 standards, codes, and regulations set forth by chapter 19.28 RCW and
18 consistent with rules adopted under section 16 of this act.

19 (c) "Electric vehicle infrastructure" means structures, machinery,
20 and equipment necessary and integral to support an electric vehicle,
21 including battery charging stations, rapid charging stations, and
22 battery exchange stations.

23 (d) "Rapid charging station" means an industrial grade electrical
24 outlet that allows for faster recharging of electric vehicle batteries
25 through higher power levels, which meets or exceeds any standards,
26 codes, and regulations set forth by chapter 19.28 RCW and consistent
27 with rules adopted under section 16 of this act.

28 (3) This section expires January 1, 2020.

29 NEW SECTION. **Sec. 4.** A new section is added to chapter 82.08 RCW
30 to read as follows:

31 (1) The tax imposed by RCW 82.08.020 does not apply to:

32 (a) The sale of batteries for electric vehicles;

33 (b) The sale of or charge made for labor and services rendered in
34 respect to installing, repairing, altering, or improving electric
35 vehicle batteries;

36 (c) The sale of or charge made for labor and services rendered in

1 respect to installing, constructing, repairing, or improving electric
2 vehicle infrastructure; and

3 (d) The sale of tangible personal property that will become a
4 component of electric vehicle infrastructure during the course of
5 installing, constructing, repairing, or improving electric vehicle
6 infrastructure.

7 (2) Sellers may make tax exempt sales under this section only if
8 the buyer provides the seller with an exemption certification in a form
9 and manner prescribed by the department. The seller must retain a copy
10 of the certificate for the seller's files.

11 (3) The definitions in this subsection apply throughout this
12 section unless the context clearly requires otherwise.

13 (a) "Battery charging station" means an electrical component
14 assembly or cluster of component assemblies designed specifically to
15 charge batteries within electric vehicles, which meet or exceed any
16 standards, codes, and regulations set forth by chapter 19.28 RCW and
17 consistent with rules adopted under section 16 of this act.

18 (b) "Battery exchange station" means a fully automated facility
19 that will enable an electric vehicle with a swappable battery to enter
20 a drive lane and exchange the depleted battery with a fully charged
21 battery through a fully automated process, which meets or exceeds any
22 standards, codes, and regulations set forth by chapter 19.28 RCW and
23 consistent with rules adopted under section 16 of this act.

24 (c) "Electric vehicle infrastructure" means structures, machinery,
25 and equipment necessary and integral to support an electric vehicle,
26 including battery charging stations, rapid charging stations, and
27 battery exchange stations.

28 (d) "Rapid charging station" means an industrial grade electrical
29 outlet that allows for faster recharging of electric vehicle batteries
30 through higher power levels, which meets or exceeds any standards,
31 codes, and regulations set forth by chapter 19.28 RCW and consistent
32 with rules adopted under section 16 of this act.

33 (4) This section expires January 1, 2020.

34 NEW SECTION. **Sec. 5.** A new section is added to chapter 82.12 RCW
35 to read as follows:

36 (1) The tax imposed by RCW 82.12.020 does not apply to the use of:

37 (a) Electric vehicle batteries;

1 (b) Labor and services rendered in respect to installing,
2 repairing, altering, or improving electric vehicle batteries; and

3 (c) Tangible personal property that will become a component of
4 electric vehicle infrastructure during the course of installing,
5 constructing, repairing, or improving electric vehicle infrastructure.

6 (2) The definitions in this subsection apply throughout this
7 section unless the context clearly requires otherwise.

8 (a) "Battery charging station" means an electrical component
9 assembly or cluster of component assemblies designed specifically to
10 charge batteries within electric vehicles, which meet or exceed any
11 standards, codes, and regulations set forth by chapter 19.28 RCW and
12 consistent with rules adopted under section 16 of this act.

13 (b) "Battery exchange station" means a fully automated facility
14 that will enable an electric vehicle with a swappable battery to enter
15 a drive lane and exchange the depleted battery with a fully charged
16 battery through a fully automated process, which meets or exceeds any
17 standards, codes, and regulations set forth by chapter 19.28 RCW and
18 consistent with rules adopted under section 16 of this act.

19 (c) "Electric vehicle infrastructure" means structures, machinery,
20 and equipment necessary and integral to support an electric vehicle,
21 including battery charging stations, rapid charging stations, and
22 battery exchange stations.

23 (d) "Rapid charging station" means an industrial grade electrical
24 outlet that allows for faster recharging of electric vehicle batteries
25 through higher power levels, which meets or exceeds any standards,
26 codes, and regulations set forth by chapter 19.28 RCW and consistent
27 with rules adopted under section 16 of this act.

28 (3) This section expires January 1, 2020.

29 NEW SECTION. **Sec. 6.** A new section is added to chapter 79.13 RCW
30 under the subchapter heading "general provisions" to read as follows:

31 (1) The state and any local government, including any housing
32 authority, is authorized to lease land owned by such an entity to any
33 person for purposes of installing, maintaining, and operating a battery
34 charging station, a battery exchange station, or a rapid charging
35 station, for a term not in excess of fifty years, for rent of not less
36 than one dollar per year, and with such other terms as the public
37 entity's governing body determines in its sole discretion.

1 (2) The definitions in this subsection apply throughout this
2 section unless the context clearly requires otherwise.

3 (a) "Battery charging station" means an electrical component
4 assembly or cluster of component assemblies designed specifically to
5 charge batteries within electric vehicles, which meet or exceed any
6 standards, codes, and regulations set forth by chapter 19.28 RCW and
7 consistent with rules adopted under section 16 of this act.

8 (b) "Battery exchange station" means a fully automated facility
9 that will enable an electric vehicle with a swappable battery to enter
10 a drive lane and exchange the depleted battery with a fully charged
11 battery through a fully automated process, which meets or exceeds any
12 standards, codes, and regulations set forth by chapter 19.28 RCW and
13 consistent with rules adopted under section 16 of this act.

14 (c) "Electric vehicle infrastructure" means structures, machinery,
15 and equipment necessary and integral to support an electric vehicle,
16 including battery charging stations, rapid charging stations, and
17 battery exchange stations.

18 (d) "Rapid charging station" means an industrial grade electrical
19 outlet that allows for faster recharging of electric vehicle batteries
20 through higher power levels, which meets or exceeds any standards,
21 codes, and regulations set forth by chapter 19.28 RCW and consistent
22 with rules adopted under section 16 of this act.

23 **Sec. 7.** RCW 43.19.648 and 2007 c 348 s 202 are each amended to
24 read as follows:

25 (1) Effective June 1, 2015, all state agencies and local government
26 subdivisions of the state, to the extent determined practicable by the
27 rules adopted by the department of community, trade, and economic
28 development pursuant to RCW 43.325.080, are required to satisfy one
29 hundred percent of their fuel usage for operating publicly owned
30 vessels, vehicles, and construction equipment from electricity or
31 biofuel.

32 (2) In order to phase in this transition for the state, all state
33 agencies, to the extent determined practicable by the department of
34 community, trade, and economic development by rules adopted pursuant to
35 RCW 43.325.080, are required to achieve forty percent fuel usage for
36 operating publicly owned vessels, vehicles, and construction equipment
37 from electricity or biofuel by June 1, 2013. The department of general

1 administration, in consultation with the department of community,
2 trade, and economic development, shall report to the governor and the
3 legislature by December 1, 2013, on what percentage of the state's fuel
4 usage is from electricity or biofuel.

5 (3) Except for cars owned or operated by the Washington state
6 patrol, when tires on vehicles in the state's motor vehicle fleet are
7 replaced, they must be replaced with tires that have the same or better
8 rolling resistance as the original tires.

9 (4) By December 31, 2015, the state must, to the extent
10 practicable, install electrical outlets capable of charging electric
11 vehicles in each of the state's fleet parking and maintenance
12 facilities.

13 (5) The department of transportation's obligations under subsection
14 (2) of this section are subject to the availability of amounts
15 appropriated for the specific purpose identified in subsection (2) of
16 this section.

17 (6) The department of transportation's obligations under subsection
18 (4) of this section are subject to the availability of amounts
19 appropriated for the specific purpose identified in subsection (4) of
20 this section unless the department receives federal or private funds
21 for the specific purpose identified in subsection (4) of this section.

22 (7) The definitions in this subsection apply throughout this
23 section unless the context clearly requires otherwise.

24 (a) "Battery charging station" means an electrical component
25 assembly or cluster of component assemblies designed specifically to
26 charge batteries within electric vehicles, which meet or exceed any
27 standards, codes, and regulations set forth by chapter 19.28 RCW and
28 consistent with rules adopted under section 16 of this act.

29 (b) "Battery exchange station" means a fully automated facility
30 that will enable an electric vehicle with a swappable battery to enter
31 a drive lane and exchange the depleted battery with a fully charged
32 battery through a fully automated process, which meets or exceeds any
33 standards, codes, and regulations set forth by chapter 19.28 RCW and
34 consistent with rules adopted under section 16 of this act.

35 NEW SECTION. Sec. 8. A new section is added to chapter 43.21C RCW
36 to read as follows:

37 (1) The installation of individual battery charging stations and

1 battery exchange stations, which individually are categorically exempt
2 under the rules adopted under RCW 43.21C.110, may not be disqualified
3 from such categorically exempt status as a result of their being parts
4 of a larger proposal that includes other such facilities and related
5 utility networks under the rules adopted under RCW 43.21C.110.

6 (2) The definitions in this subsection apply throughout this
7 section unless the context clearly requires otherwise.

8 (a) "Battery charging station" means an electrical component
9 assembly or cluster of component assemblies designed specifically to
10 charge batteries within electric vehicles, which meet or exceed any
11 standards, codes, and regulations set forth by chapter 19.28 RCW and
12 consistent with rules adopted under section 16 of this act.

13 (b) "Battery exchange station" means a fully automated facility
14 that will enable an electric vehicle with a swappable battery to enter
15 a drive lane and exchange the depleted battery with a fully charged
16 battery through a fully automated process, which meets or exceeds any
17 standards, codes, and regulations set forth by chapter 19.28 RCW and
18 consistent with rules adopted under section 16 of this act.

19 NEW SECTION. **Sec. 9.** A new section is added to chapter 35.63 RCW
20 to read as follows:

21 (1) By July 1, 2010, the development regulations of any
22 jurisdiction:

23 (a) Adjacent to Interstate 5, Interstate 90, Interstate 405, or
24 state route number 520, with a population over twenty thousand, and
25 located in a county with a population over one million five hundred
26 thousand; or

27 (b) Adjacent to Interstate 5 and located in a county with a
28 population greater than six hundred thousand; or

29 (c) Adjacent to Interstate 5 and located in a county with a state
30 capitol within its borders;

31 planning under this chapter must allow electric vehicle infrastructure
32 as a use in all areas except those zoned for residential or resource
33 use or critical areas. A jurisdiction may adopt and apply other
34 development regulations that do not have the effect of precluding the
35 siting of electric vehicle infrastructure in areas where that use is
36 allowed.

1 (2) By July 1, 2011, or six months after the distribution required
2 under section 18 of this act occurs, whichever is later, the
3 development regulations of any jurisdiction adjacent to Interstate 5,
4 Interstate 90, Interstate 405, or state route number 520 planning under
5 this chapter must allow electric vehicle infrastructure as a use in all
6 areas except those zoned for residential or resource use or critical
7 areas. A jurisdiction may adopt and apply other development
8 regulations that do not have the effect of precluding the siting of
9 electric vehicle infrastructure in areas where that use is allowed.

10 (3) By July 1, 2011, or six months after the distribution required
11 under section 18 of this act occurs, whichever is later, the
12 development regulations of any jurisdiction planning under this chapter
13 must allow battery charging stations as a use in all areas except those
14 zoned for residential or resource use or critical areas. A
15 jurisdiction may adopt and apply other development regulations that do
16 not have the effect of precluding the siting of electric vehicle
17 infrastructure in areas where that use is allowed.

18 (4) Cities are authorized to adopt incentive programs to encourage
19 the retrofitting of existing structures with the electrical outlets
20 capable of charging electric vehicles. Incentives may include bonus
21 height, site coverage, floor area ratio, and transferable development
22 rights for use in urban growth areas.

23 (5) The definitions in this subsection apply throughout this
24 section unless the context clearly requires otherwise.

25 (a) "Battery charging station" means an electrical component
26 assembly or cluster of component assemblies designed specifically to
27 charge batteries within electric vehicles, which meet or exceed any
28 standards, codes, and regulations set forth by chapter 19.28 RCW and
29 consistent with rules adopted under section 16 of this act.

30 (b) "Battery exchange station" means a fully automated facility
31 that will enable an electric vehicle with a swappable battery to enter
32 a drive lane and exchange the depleted battery with a fully charged
33 battery through a fully automated process, which meets or exceeds any
34 standards, codes, and regulations set forth by chapter 19.28 RCW and
35 consistent with rules adopted under section 16 of this act.

36 (c) "Electric vehicle infrastructure" means structures, machinery,
37 and equipment necessary and integral to support an electric vehicle,

1 including battery charging stations, rapid charging stations, and
2 battery exchange stations.

3 (d) "Rapid charging station" means an industrial grade electrical
4 outlet that allows for faster recharging of electric vehicle batteries
5 through higher power levels, which meets or exceeds any standards,
6 codes, and regulations set forth by chapter 19.28 RCW and consistent
7 with rules adopted under section 16 of this act.

8 (6) If federal funding for public investment in electric vehicles,
9 electric vehicle infrastructure, or alternative fuel distribution
10 infrastructure is not provided by February 1, 2010, subsection (1) of
11 this section is null and void.

12 NEW SECTION. **Sec. 10.** A new section is added to chapter 35A.63
13 RCW to read as follows:

14 (1) By July 1, 2010, the development regulations of any
15 jurisdiction:

16 (a) Adjacent to Interstate 5, Interstate 90, Interstate 405, or
17 state route number 520, with a population over twenty thousand, and
18 located in a county with a population over one million five hundred
19 thousand; or

20 (b) Adjacent to Interstate 5 and located in a county with a
21 population greater than six hundred thousand; or

22 (c) Adjacent to Interstate 5 and located in a county with a state
23 capitol within its borders;

24 planning under this chapter must allow electric vehicle infrastructure
25 as a use in all areas except those zoned for residential or resource
26 use or critical areas. A jurisdiction may adopt and apply other
27 development regulations that do not have the effect of precluding the
28 siting of electric vehicle infrastructure in areas where that use is
29 allowed.

30 (2) By July 1, 2011, or six months after the distribution required
31 under section 18 of this act occurs, whichever is later, the
32 development regulations of any jurisdiction adjacent to Interstate 5,
33 Interstate 90, Interstate 405, or state route number 520 planning under
34 this chapter must allow electric vehicle infrastructure as a use in all
35 areas except those zoned for residential or resource use or critical
36 areas. A jurisdiction may adopt and apply other development

1 regulations that do not have the effect of precluding the siting of
2 electric vehicle infrastructure in areas where that use is allowed.

3 (3) By July 1, 2011, or six months after the distribution required
4 under section 18 of this act occurs, whichever is later, the
5 development regulations of any jurisdiction planning under this chapter
6 must allow battery charging stations as a use in all areas except those
7 zoned for residential or resource use or critical areas. A
8 jurisdiction may adopt and apply other development regulations that do
9 not have the effect of precluding the siting of electric vehicle
10 infrastructure in areas where that use is allowed.

11 (4) Cities are authorized to adopt incentive programs to encourage
12 the retrofitting of existing structures with the electrical outlets
13 capable of charging electric vehicles. Incentives may include bonus
14 height, site coverage, floor area ratio, and transferable development
15 rights for use in urban growth areas.

16 (5) The definitions in this subsection apply throughout this
17 section unless the context clearly requires otherwise.

18 (a) "Battery charging station" means an electrical component
19 assembly or cluster of component assemblies designed specifically to
20 charge batteries within electric vehicles, which meet or exceed any
21 standards, codes, and regulations set forth by chapter 19.28 RCW and
22 consistent with rules adopted under section 16 of this act.

23 (b) "Battery exchange station" means a fully automated facility
24 that will enable an electric vehicle with a swappable battery to enter
25 a drive lane and exchange the depleted battery with a fully charged
26 battery through a fully automated process, which meets or exceeds any
27 standards, codes, and regulations set forth by chapter 19.28 RCW and
28 consistent with rules adopted under section 16 of this act.

29 (c) "Electric vehicle infrastructure" means structures, machinery,
30 and equipment necessary and integral to support an electric vehicle,
31 including battery charging stations, rapid charging stations, and
32 battery exchange stations.

33 (d) "Rapid charging station" means an industrial grade electrical
34 outlet that allows for faster recharging of electric vehicle batteries
35 through higher power levels, which meets or exceeds any standards,
36 codes, and regulations set forth by chapter 19.28 RCW and consistent
37 with rules adopted under section 16 of this act.

1 (6) If federal funding for public investment in electric vehicles,
2 electric vehicle infrastructure, or alternative fuel distribution
3 infrastructure is not provided by February 1, 2010, subsection (1) of
4 this section is null and void.

5 NEW SECTION. **Sec. 11.** A new section is added to chapter 36.70 RCW
6 to read as follows:

7 (1) By July 1, 2010, the development regulations of any
8 jurisdiction with a population over six hundred thousand or with a
9 state capitol within its borders planning under this chapter must allow
10 electric vehicle infrastructure as a use in all areas within one mile
11 of Interstate 5, Interstate 90, Interstate 405, or state route number
12 520, except those zoned for residential or resource use or critical
13 areas. A jurisdiction may adopt and apply other development
14 regulations that do not have the effect of precluding the siting of
15 electric vehicle infrastructure in areas where that use is allowed.

16 (2) By July 1, 2011, or six months after the distribution required
17 under section 18 of this act occurs, whichever is later, the
18 development regulations of any jurisdiction planning under this chapter
19 must allow electric vehicle infrastructure as a use in all areas within
20 one mile of Interstate 5, Interstate 90, Interstate 405, or state route
21 number 520, except those zoned for residential or resource use or
22 critical areas. A jurisdiction may adopt and apply other development
23 regulations that do not have the effect of precluding the siting of
24 electric vehicle infrastructure in areas where that use is allowed.

25 (3) By July 1, 2011, or six months after the distribution required
26 under section 18 of this act occurs, whichever is later, the
27 development regulations of any jurisdiction planning under this chapter
28 must allow battery charging stations as a use in all areas except those
29 zoned for residential or resource use or critical areas. A
30 jurisdiction may adopt and apply other development regulations that do
31 not have the effect of precluding the siting of electric vehicle
32 infrastructure in areas where that use is allowed.

33 (4) Counties are authorized to adopt incentive programs to
34 encourage the retrofitting of existing structures with the electrical
35 outlets capable of charging electric vehicles. Incentives may include
36 bonus height, site coverage, floor area ratio, and transferable
37 development rights for use in urban growth areas.

1 (5) The definitions in this subsection apply throughout this
2 section unless the context clearly requires otherwise.

3 (a) "Battery charging station" means an electrical component
4 assembly or cluster of component assemblies designed specifically to
5 charge batteries within electric vehicles, which meet or exceed any
6 standards, codes, and regulations set forth by chapter 19.28 RCW and
7 consistent with rules adopted under section 16 of this act.

8 (b) "Battery exchange station" means a fully automated facility
9 that will enable an electric vehicle with a swappable battery to enter
10 a drive lane and exchange the depleted battery with a fully charged
11 battery through a fully automated process, which meets or exceeds any
12 standards, codes, and regulations set forth by chapter 19.28 RCW and
13 consistent with rules adopted under section 16 of this act.

14 (c) "Electric vehicle infrastructure" means structures, machinery,
15 and equipment necessary and integral to support an electric vehicle,
16 including battery charging stations, rapid charging stations, and
17 battery exchange stations.

18 (d) "Rapid charging station" means an industrial grade electrical
19 outlet that allows for faster recharging of electric vehicle batteries
20 through higher power levels, which meets or exceeds any standards,
21 codes, and regulations set forth by chapter 19.28 RCW and consistent
22 with rules adopted under section 16 of this act.

23 (6) If federal funding for public investment in electric vehicles,
24 electric vehicle infrastructure, or alternative fuel distribution
25 infrastructure is not provided by February 1, 2010, subsection (1) of
26 this section is null and void.

27 NEW SECTION. **Sec. 12.** A new section is added to chapter 36.70A
28 RCW to read as follows:

29 (1) By July 1, 2010, the development regulations of any
30 jurisdiction:

31 (a) Adjacent to Interstate 5, Interstate 90, Interstate 405, or
32 state route number 520, with a population over twenty thousand, and
33 located in a county with a population over one million five hundred
34 thousand; or

35 (b) Adjacent to Interstate 5 and located in a county with a
36 population greater than six hundred thousand; or

1 (c) Adjacent to Interstate 5 and located in a county with a state
2 capitol within its borders;
3 planning under this chapter must allow electric vehicle infrastructure
4 as a use in all areas except those zoned for residential or resource
5 use or critical areas. A jurisdiction may adopt and apply other
6 development regulations that do not have the effect of precluding the
7 siting of electric vehicle infrastructure in areas where that use is
8 allowed.

9 (2) By July 1, 2011, or six months after the distribution required
10 under section 18 of this act occurs, whichever is later, the
11 development regulations of any jurisdiction adjacent to Interstate 5,
12 Interstate 90, Interstate 405, or state route number 520 planning under
13 this chapter must allow electric vehicle infrastructure as a use in all
14 areas except those zoned for residential or resource use or critical
15 areas. A jurisdiction may adopt and apply other development
16 regulations that do not have the effect of precluding the siting of
17 electric vehicle infrastructure in areas where that use is allowed.

18 (3) By July 1, 2011, or six months after the distribution required
19 under section 18 of this act occurs, whichever is later, the
20 development regulations of any jurisdiction planning under this chapter
21 must allow battery charging stations as a use in all areas except those
22 zoned for residential or resource use or critical areas. A
23 jurisdiction may adopt and apply other development regulations that do
24 not have the effect of precluding the siting of electric vehicle
25 infrastructure in areas where that use is allowed.

26 (4) Cities are authorized to adopt incentive programs to encourage
27 the retrofitting of existing structures with the electrical outlets
28 capable of charging electric vehicles. Incentives may include bonus
29 height, site coverage, floor area ratio, and transferable development
30 rights for use in urban growth areas.

31 (5) The definitions in this subsection apply throughout this
32 section unless the context clearly requires otherwise.

33 (a) "Battery charging station" means an electrical component
34 assembly or cluster of component assemblies designed specifically to
35 charge batteries within electric vehicles, which meet or exceed any
36 standards, codes, and regulations set forth by chapter 19.28 RCW and
37 consistent with rules adopted under section 16 of this act.

1 (b) "Battery exchange station" means a fully automated facility
2 that will enable an electric vehicle with a swappable battery to enter
3 a drive lane and exchange the depleted battery with a fully charged
4 battery through a fully automated process, which meets or exceeds any
5 standards, codes, and regulations set forth by chapter 19.28 RCW and
6 consistent with rules adopted under section 16 of this act.

7 (c) "Electric vehicle infrastructure" means structures, machinery,
8 and equipment necessary and integral to support an electric vehicle,
9 including battery charging stations, rapid charging stations, and
10 battery exchange stations.

11 (d) "Rapid charging station" means an industrial grade electrical
12 outlet that allows for faster recharging of electric vehicle batteries
13 through higher power levels, which meets or exceeds any standards,
14 codes, and regulations set forth by chapter 19.28 RCW and consistent
15 with rules adopted under section 16 of this act.

16 (6) If federal funding for public investment in electric vehicles,
17 electric vehicle infrastructure, or alternative fuel distribution
18 infrastructure is not provided by February 1, 2010, subsection (1) of
19 this section is null and void.

20 NEW SECTION. **Sec. 13.** A new section is added to chapter 35.63 RCW
21 to read as follows:

22 (1) By July 1, 2010, the development regulations of any
23 jurisdiction with a population over six hundred thousand or with a
24 state capitol within its borders planning under this chapter must allow
25 electric vehicle infrastructure as a use in all areas within one mile
26 of Interstate 5, Interstate 90, Interstate 405, or state route number
27 520, except those zoned for residential or resource use or critical
28 areas. A jurisdiction may adopt and apply other development
29 regulations that do not have the effect of precluding the siting of
30 electric vehicle infrastructure in areas where that use is allowed.

31 (2) By July 1, 2011, or six months after the distribution required
32 under section 18 of this act occurs, whichever is later, the
33 development regulations of any jurisdiction adjacent to Interstate 5,
34 Interstate 90, Interstate 405, or state route number 520 planning under
35 this chapter must allow electric vehicle infrastructure as a use in all
36 areas except those zoned for residential or resource use or critical

1 areas. A jurisdiction may adopt and apply other development
2 regulations that do not have the effect of precluding the siting of
3 electric vehicle infrastructure in areas where that use is allowed.

4 (3) By July 1, 2011, or six months after the distribution required
5 under section 18 of this act occurs, whichever is later, the
6 development regulations of any jurisdiction planning under this chapter
7 must allow battery charging stations as a use in all areas except those
8 zoned for residential or resource use or critical areas. A
9 jurisdiction may adopt and apply other development regulations that do
10 not have the effect of precluding the siting of electric vehicle
11 infrastructure in areas where that use is allowed.

12 (4) Counties are authorized to adopt incentive programs to
13 encourage the retrofitting of existing structures with the electrical
14 outlets capable of charging electric vehicles. Incentives may include
15 bonus height, site coverage, floor area ratio, and transferable
16 development rights for use in urban growth areas.

17 (5) The definitions in this subsection apply throughout this
18 section unless the context clearly requires otherwise.

19 (a) "Battery charging station" means an electrical component
20 assembly or cluster of component assemblies designed specifically to
21 charge batteries within electric vehicles, which meet or exceed any
22 standards, codes, and regulations set forth by chapter 19.28 RCW and
23 consistent with rules adopted under section 16 of this act.

24 (b) "Battery exchange station" means a fully automated facility
25 that will enable an electric vehicle with a swappable battery to enter
26 a drive lane and exchange the depleted battery with a fully charged
27 battery through a fully automated process, which meets or exceeds any
28 standards, codes, and regulations set forth by chapter 19.28 RCW and
29 consistent with rules adopted under section 16 of this act.

30 (c) "Electric vehicle infrastructure" means structures, machinery,
31 and equipment necessary and integral to support an electric vehicle,
32 including battery charging stations, rapid charging stations, and
33 battery exchange stations.

34 (d) "Rapid charging station" means an industrial grade electrical
35 outlet that allows for faster recharging of electric vehicle batteries
36 through higher power levels, which meets or exceeds any standards,
37 codes, and regulations set forth by chapter 19.28 RCW and consistent
38 with rules adopted under section 16 of this act.

1 (6) If federal funding for public investment in electric vehicles,
2 electric vehicle infrastructure, or alternative fuel distribution
3 infrastructure is not provided by February 1, 2010, subsection (1) of
4 this section is null and void.

5 NEW SECTION. **Sec. 14.** A new section is added to chapter 47.38 RCW
6 to read as follows:

7 (1) As a necessary and desirable step to spur public and private
8 investment in electric vehicle infrastructure in accordance with
9 section 1 of this act, and to begin implementing the provisions of RCW
10 43.19.648, the legislature authorizes an alternative fuels corridor
11 pilot project capable of supporting electric vehicle charging and
12 battery exchange technologies.

13 (2) To the extent permitted under federal programs, rules, or law,
14 the department may enter into partnership agreements with other public
15 and private entities for the use of land and facilities along state
16 routes and within interstate highway rights-of-way for an alternative
17 fuels corridor pilot project. At a minimum, the pilot project must:

18 (a) Limit renewable fuel and vehicle technology offerings to those
19 with a forecasted demand over the next fifteen years and approved by
20 the department;

21 (b) Ensure that a pilot project site does not compete with existing
22 retail businesses in the same geographic area for the provision of the
23 same refueling services, recharging technologies, or other retail
24 commercial activities;

25 (c) Provide existing truck stop operators and retail truck
26 refueling businesses with an absolute right of first refusal over the
27 offering of refueling services to class six trucks with a maximum gross
28 vehicle weight of twenty-six thousand pounds within the same geographic
29 area identified for a possible pilot project site;

30 (d) Reach agreement with the department of services for the blind
31 ensuring that any activities at host sites do not materially affect the
32 revenues forecasted from their vending operations at each site;

33 (e) Regulate the internal rate of return from the partnership,
34 including provisions to reduce or eliminate the level of state support
35 once the partnership attains economic self-sufficiency;

36 (f) Be limited to not more than five locations on state-owned land

1 within federal interstate rights-of-way or state highway rights-of-way
2 in Washington; and

3 (g) Be limited in duration to a term of years reasonably necessary
4 for the partnership to recover the cost of capital investments, plus
5 the regulated internal rate of return.

6 (3) The department is not responsible for providing capital
7 equipment nor operating refueling or recharging services. The
8 department must provide periodic status reports on the pilot project to
9 the office of financial management and the relevant standing committees
10 of the legislature not less than every biennium.

11 (4) The provisions of this section are subject to the availability
12 of existing funds. However, capital improvements under this section
13 must be funded with federal or private funds.

14 NEW SECTION. **Sec. 15.** A new section is added to chapter 47.38 RCW
15 to read as follows:

16 (1) By December 31, 2015, the state must, to the extent
17 practicable, install electrical outlets capable of charging electric
18 vehicles in each state-operated highway rest stop.

19 (2) By December 31, 2015, the state must provide the opportunity to
20 lease space for the limited purpose of installing and operating a
21 battery exchange station or a battery charging station in appropriate
22 state-owned highway rest stops.

23 (3) The department of transportation's obligations under this
24 section are subject to the availability of amounts appropriated for the
25 specific purpose identified in this section, unless the department
26 receives federal or private funds for the specific purpose identified
27 in this section.

28 (4) The definitions in this subsection apply throughout this
29 section unless the context clearly requires otherwise.

30 (a) "Battery charging station" means an electrical component
31 assembly or cluster of component assemblies designed specifically to
32 charge batteries within electric vehicles, which meet or exceed any
33 standards, codes, and regulations set forth by chapter 19.28 RCW and
34 consistent with rules adopted under section 16 of this act.

35 (b) "Battery exchange station" means a fully automated facility
36 that will enable an electric vehicle with a swappable battery to enter
37 a drive lane and exchange the depleted battery with a fully charged

1 battery through a fully automated process, which meets or exceeds any
2 standards, codes, and regulations set forth by chapter 19.28 RCW and
3 consistent with rules adopted under section 16 of this act.

4 NEW SECTION. **Sec. 16.** A new section is added to chapter 19.27 RCW
5 to read as follows:

6 The building code council shall adopt rules for electric vehicle
7 infrastructure requirements. Rules adopted by the state building code
8 council must consider applicable national and international standards
9 and be consistent with rules adopted under section 17 of this act.

10 NEW SECTION. **Sec. 17.** A new section is added to chapter 19.28 RCW
11 to read as follows:

12 The director shall adopt by rule standards for the installation of
13 electric vehicle infrastructure, including all wires and equipment that
14 convey electric current and any equipment to be operated by electric
15 current, in, on, or about buildings or structures. The rules must be
16 consistent with rules adopted under section 16 of this act.

17 NEW SECTION. **Sec. 18.** The department of community, trade, and
18 economic development must distribute to local governments model
19 ordinances, model development regulations, and guidance for local
20 governments for siting and installing electric vehicle infrastructure,
21 and in particular battery charging stations, and appropriate handling,
22 recycling, and storage of electric vehicle batteries and equipment,
23 when available. The model ordinances, model development regulations,
24 and guidance must be developed by a federal or state agency, or
25 nationally recognized organizations with specific expertise in land-use
26 regulations or electric vehicle infrastructure.

--- END ---

Electric Vehicle Infrastructure in the MAG Region

Zero Emission Partnership Update

MAG Building Codes Committee

August 19, 2009

History

- **April 16, 2009** - MAG, ECOtality and Nissan North America announced a zero emissions partnership that will help facilitate the introduction of electric vehicles (EVs) in the MAG region.
- **May 20, 2009** - MAG staff provided an update on the zero emission partnership initiative to the MAG Building Codes Committee.

History

- **August 5, 2009** - Electric Transportation Engineering Corporation (eTec), a subsidiary of ECOtality, Inc., a leader in clean electric transportation and storage technologies, was selected by the U.S. Department of Energy for a grant of approximately \$99.8 million.
 - Largest deployment of EVs and charging infrastructure to date
 - Matched by application's project participants to provide a total of approximately \$200 million

Electric Vehicle Infrastructure Initiative

- The eTec initiative proposes to deploy charging infrastructure in major population areas that include Phoenix (AZ), Tucson (AZ), San Diego (CA), Portland (OR), Eugene (OR), Salem (OR), Corvallis (OR), Seattle (WA), Nashville (TN), Knoxville (TN), and Chattanooga (TN).

Arizona

- Phoenix (MAG region)
- Tucson (PAG region)
- I-10 Corridor
 - Strategic fast-charge stations along Interstate-10 to create the first true implementation of an EV Corridor in North America

**Electric Vehicle Infrastructure
Policy and Building Code
Regulation Efforts**

Oregon

- House Bill 2186 (Climate Change Bill)
- Charging Equipment eligible for a 35 percent tax credit through Oregon Department of Energy
- Building Codes Division, Department of Consumer and Business Services, State of Oregon
 - **September 26, 2008** - Notice of Temporary Rule
- Oregon Department of Transportation
 - Development of Installation Manual for the individual consumer, business owner, or government representative

Washington

- House Bill 1481 - Collaborative planning efforts include:
 - Developing short-term and long-term plans outlining how state, regional, and local governments may construct EV charging locations and ensure that the infrastructure can be electrically supported;
 - Supporting public education and training programs on EVs;
 - Developing an implementation plan for counties with a population greater than 500,000 to have 10% of public and private parking spaces ready for EV charging by December 31, 2018; and
 - Developing model ordinances and guidance for local governments for site assessment and installing EV infrastructure

Washington

- Public lands used for installing, maintaining, and operating EV infrastructure are exempt from leasehold excise taxes until January 1, 2020.
 - State sales and use taxes do not apply to EV batteries; labor and services for installing, repairing, altering, or improving EV batteries and EV infrastructure; and the sale of property on land used for EV infrastructure

Washington

- **Local Government Electric Vehicle (EV) Charging Infrastructure Requirements**

A jurisdiction meeting specific location criteria (as defined in Revised Code of Washington 35.63) must develop regulations to allow the use of EV charging infrastructure in all areas except critical areas or areas zoned for residential or resource use. These regulations must be developed six months after the **Washington Department of Community, Trade, and Economic Development** distributes model ordinances, development regulations, and guidance for local governments for site assessment and installing EV infrastructure, or by July 1, 2010, whichever is later. This requirement is contingent upon federal funding. Additionally, cities or municipalities are authorized to adopt incentive programs to encourage retrofitting of existing structures capable of charging EVs. (Reference House Bill 1481, 2009, and Revised Code of Washington 35.63, 35A.63, 36.70, and 36.70A)

Vancouver

- **March 2005** – City of Vancouver Community Climate Change Action Plan
- **January 2007** – Council approved membership in Plug-in Partners
- **June 2008** – Council adopted the Green Homes Program, which included a requirement within the Building By-law to require provisions for Plug-in Electric Vehicle (EV) charging infrastructure in all new one and two family dwellings

Vancouver

- **July 2009** – Council adopted the following recommendations:
 - Providing EV charging infrastructure for 10% of parking stalls in new multi-family buildings, at the initial stage, along with a process by which this requirement could be adapted in future phases
 - A public charging pilot at a number of publicly available parking locations
 - Developing a strategy to provide incentives for the retrofits of existing buildings with charging infrastructure

Vancouver

- City of Vancouver is working to expand upon Building By-law 9691 for Green Homes Program and develop requirements to accommodate overall electric vehicle infrastructure charging.

Next Steps

- **September 2009** – Staff from ECOtality and eTec will present action plan for implementation of electric vehicle infrastructure initiative.
- **GOAL** - Develop a set of building code regulations for electric vehicle infrastructure for residential, commercial and public space use for the MAG region for adoption by the MAG Regional Council by Spring 2010 (February/March) in preparation for private infrastructure installation in June 2010.

Discussion