

# Electric Vehicle Infrastructure

*A Guide for Local Governments in Washington State*



JULY 2010

**Model Ordinance, Model Development Regulations, and Guidance Related to Electric Vehicle Infrastructure and Batteries per RCW 47.80.090 and 43.31.970**



**Department of Commerce**  
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Puget Sound Regional Council  
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# Summary

## Model Ordinance, Model Development Regulations, and Guidance Related to Electric Vehicle Infrastructure and Batteries per RCW 47.80.090 and 43.31.970

Electric vehicles and electric vehicle charging stations are coming to Washington State. In 2009 the Washington State Legislature recognized this as both an economic and environmental priority and with the support of the Governor, enacted a new law designed to encourage electric vehicles.

To create a consistent regulatory framework that would help this industry grow across Washington State, the legislature required the Puget Sound Regional Council and Department of Commerce to develop guidance for local governments.

To meet this requirement, the Puget Sound Regional Council and Department of Commerce formed a broad-based technical advisory committee made up of local governments, charging equipment vendors, utilities, ports, state agencies, and consumer interests.

The state's new electric vehicle law requires that all local governments in Washington State allow electric vehicle charging stations in most of their zoning categories. Allowing charging stations creates the need to address a number of issues beyond zoning. These include on-street and off-street signage, charging station design standards, parking enforcement, accessibility for all users, SEPA exemptions, and more. These issues are addressed in this document.

The guidance includes the following:

- A discussion of the context within which charging stations are provided **(Introduction)**.
- A model ordinance **(Section 1)**.
- Model development regulations and, for topics where regulations may not be required or standards do not yet exist, information that is provided as guidance **(Section 2)**.
- A set of resource documents and glossary **(Section 3)**.
- Under a separate cover, the guidance includes a set of appendices that include templates, checklists, and research findings.

By addressing topics beyond allowed uses and zoning, the guidance provides options for local governments that want to go further than the minimum to support an efficient roll-out of electric vehicles and electric vehicle charging stations in their jurisdiction.



# Introduction

In 2009 the Washington State Legislature passed and the Governor signed into law House Bill 1481 an Act relating to electric vehicles.<sup>1</sup> The law addresses electric vehicle infrastructure which are defined as the structures, machinery, and equipment necessary and integral to support an electric vehicle, including battery charging stations, rapid charging stations, and battery exchange stations.

The purpose of the law is to encourage the transition to electric vehicle use and to expedite the establishment of a convenient and cost-effective electric vehicle infrastructure that such a transition necessitates. The Legislature agreed that the development of a convenient infrastructure to recharge plug-in electric vehicles is essential to increase consumer acceptance of these vehicles.

As the state agency with expertise in land use and electric vehicle infrastructure, Section 18 of HB 1481 (codified as RCW 43.31.970) requires the Washington State Department of Commerce (Commerce) to distribute to local governments model ordinances, model development regulations, and guidance for local governments for siting and installing electric vehicle infrastructure, in particular battery charging stations, and for appropriate handling, recycling, and storage of electric vehicle batteries and equipment.

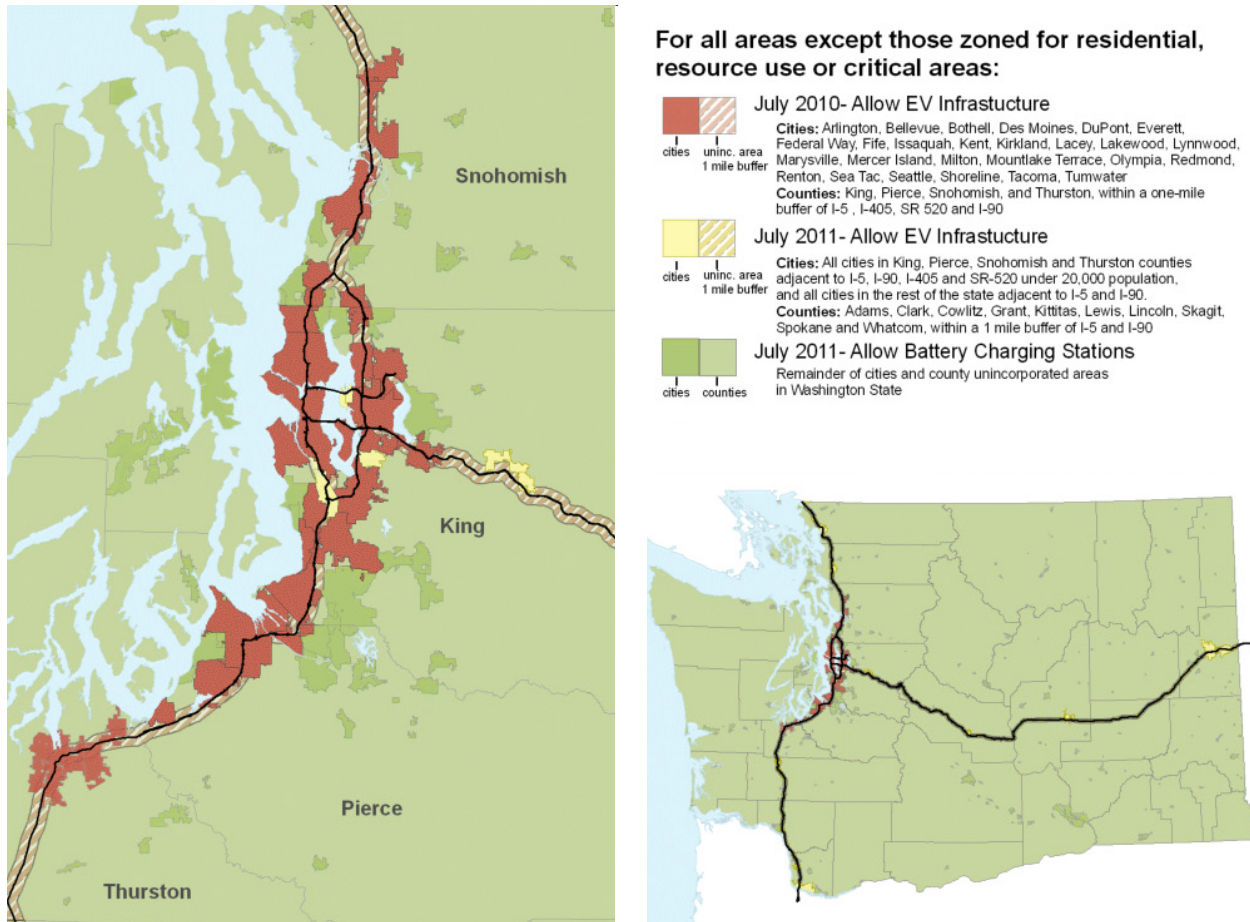
The law requires that local government development regulations allow electric vehicle infrastructure as a use in all zones except those zoned for residential, resource, or critical areas. This guidance extends the permitted use to these zones as well, although with some restrictions and limitations. The requirements apply to local jurisdictions as follows:

- By July 1, 2010, municipalities greater than 20,000 in population in King County that are adjacent to Interstate 5, Interstate 90, Interstate 405, or State Route 520, and all municipalities adjacent to I-5 in Pierce, Snohomish and Thurston Counties, must allow electric vehicle infrastructure (these municipalities are shown in red on the map on the following page).
- By July 1, 2011, municipalities less than 20,000 in population in King County that are adjacent to these freeways, and all municipalities statewide adjacent to I-5 and I-90 statewide, are required to allow electric vehicle infrastructure (shown in yellow).
- The remaining municipalities across the state are required to allow battery charging stations by July 1, 2011 (shown in green).
- For unincorporated county lands, the law imposes similar 2010 and 2011 deadlines for electric vehicle infrastructure, but only within a 1-mile buffer around these freeways (shown in red and yellow hatch-marks). For battery charging stations, the entire area of the county is affected — except those zoned for residential, resource, or critical areas — by 2011.

For both cities and counties, the law allows jurisdictions to adopt incentives programs as well as other development regulations that do not have the effect of precluding the siting of electric vehicle infrastructure in areas where that use is allowed.

***Comment:*** For the jurisdictions required to allow electric vehicle infrastructure, the definition includes Battery Charging Stations (referred to as Level 1, Level 2, and Rapid charging), Rapid Charging Stations (referred to as Level 3 or Fast charging), and Battery Exchange Stations. For the jurisdictions required to allow Battery Charging Stations, the definition does not include Battery Exchange Stations (see Section 2, Chapter 1: Definitions).

**Figure 1. Electric Vehicle Infrastructure Requirements for Cities and Towns (per RCW 35.63.126, 35A.63.107, 36.70A.695) and for Counties (per RCW 36.70.695, 36.70A.695, 35.63.127)**



An additional requirement under Section 7 (codified as RCW 43.19.648) is that by June 2015 local governments and state agencies must satisfy 100% of their fuel usage for operating publicly owned vessels, vehicles, and construction equipment from electricity or biofuel, to the extent determined practicable by rules adopted by Commerce (RCW 43.325.080). An interim requirement of 40% is set for state agencies for June 2013. Commerce has not yet initiated this rulemaking; however, Commerce is considering strategies to implement Section 7 as part of the State Energy Strategy (SES) update currently underway.<sup>2</sup>

To assist local jurisdictions in meeting the requirements set for them under the law, Section 2 (codified as RCW 47.80.090) requires that the Puget Sound Regional Council, in collaboration with representatives from the Department of Ecology, the Department of Commerce, local governments, and the Office of Regulatory Assistance, seek federal or private funding for the planning for, deployment of, or regulations concerning electric vehicle infrastructure. In particular, Section 2 of 47.80.090 includes the development of model ordinances and guidance for local governments for siting and installing electric vehicle infrastructure, in particular battery charging stations, and appropriate handling, recycling, and storage of electric vehicle batteries and equipment. When completed, PSRC is to submit the guidance to the state legislature, local jurisdictions within its jurisdiction, and to Commerce for distribution statewide.

In the fall of 2009, Commerce identified Energy Efficiency Community Block Grant (EECBG) funds to begin planning for deployment of and regulations for electric vehicle infrastructure. With the assistance of a consultant team, a Technical Advisory Committee representative of key stakeholders and jurisdictions from across the state (see inside of front cover for a list of committee members), and input from a broader set of

public and private entities in the electric vehicle industry and state agencies including the Department of Transportation, Department of Ecology, State Building Code Council, and Labor & Industries, PSRC and Commerce prepared model guidance. The model ordinance, model development regulations, and guidance is written so that individual sections can be lifted out and modified to suit local government needs while still meeting the requirements of the new law.

## The Purpose of These Model Provisions

Several car manufacturers are preparing to commercialize electric-drive vehicle models. By 2012, an estimated 10 to 12 models of highway capable electric vehicles (EVs) will be available to consumers. Electric vehicle infrastructure (EVI) is necessary to serve this growing consumer base, and HB 1481 recognizes this need by requiring that local governments allow EVI. A review of local government codes indicates that there does not currently seem to be prohibitions to EVI. However, there is a need for local governments to adopt regulations to provide for consistency in the installation of EVI across the state to assist in quicker transition to electric vehicle use. In addition to development regulations, local governments may want to consider the use of guidance documents and other written materials that explain EVs and EVI (see Appendix B. Model Installation Guides for Charging Stations).

To assist local governments in meeting the purpose and requirements of the new law, the model provisions in this document include three key sections. These sections, and the use of “**Comments**” within each of these sections, are explained further below.

- **Model Ordinance (Section 1).** This section provides language that jurisdictions may include in their adopting ordinances for electric vehicle infrastructure. This language can be used unchanged or may be modified to suit local government needs. The model ordinance includes “Whereas” findings for both “fully planning” and “partially planning” jurisdictions.<sup>3</sup>
- **Model Development Regulations and Guidance (Section 2).** These regulations and guidance include and build on provisions in statute (see Appendix A for where the sections of HB 1481 have been codified in the RCW). The model regulations and guidance are summarized in Table 1 and include regulations that are designed to ensure that a local jurisdiction is consistent with the required provisions in RCW. In some cases, they include options which jurisdictions may choose to include in their development regulations that provide for additional allowance of EVI (for example, allowing for EVI in areas including those zoned for residential and some critical areas).

**Table 1. Suggested Model Regulations and Guidance**

CHAPTER	REGULATION	GUIDANCE
Definitions	EV and EVI related terms	None
Vehicles and Traffic	EV Enforcement	None
Zoning	Allowed Uses Off-street Parking Design	Accessibility Off-street Signage
Street, Sidewalks and Public Places	On-street Parking Design	On-street Signage
Buildings and Utilities	None	Battery Recycling and Handling State EVI Rules
SEPA	Categorical exemptions	None

- **Comments.** *The guidance also includes a variety of comments that provide supporting information and serve as a resource to local government for consideration in the adoption of development regulations and guidance for EVI. The comments generally provide information as to why the model development regulation and/or guidance are necessary and what the source is (e.g., best practice or regulation from another jurisdiction which has EVI).*
- **Resources (Section 3).** This section contains a listing of all the supporting resource documents, a glossary of terms, and the footnotes.
- **Appendices.** These support the model ordinance, model development regulations, and guidance. It includes the research documents, including a code compilation and listing of practices for local, regional, and state agencies identified from the code compilation, interview results, battery research, and a web-based EV driver survey. Appendix B includes EVI Model Installation Guides for single family and commercial parking lots that local jurisdictions can use at their permit counters.

## Identification of Existing Codes

The consultant team researched codes, ordinances, incentives, state laws, standards, white papers, and other guiding documents from past efforts of jurisdictions and other agencies across the country, as well as some international, national, and local jurisdictions. The task included examining the known universe of ordinances, regulations, and guidance and evaluating which aspects of the research would be most useful for inclusion in the models and guidance.<sup>4</sup> Part of this research also included identification of those codes that would provide the highest value for follow-up with agencies to discuss and document best practices and lessons learned.<sup>5</sup> Once this research was completed, PSRC and Commerce convened a meeting with a Technical Advisory Committee to review the results of the research and begin the process of identifying what to include in the model ordinance, model development regulations, and guidance. The TAC included representatives of local governments, charging station vendors, utilities, state agencies, ports, and consumer groups working on deployment of electric vehicles in Washington State.

## State Law

The consultant team also assessed any unique provisions of planning laws and regulations in states or provinces identified from the document research described above and compared them to Washington’s planning statutes. This assessment included identification of any necessary adaptations statewide, given Washington’s planning statutes. Based on a review of the documents, the consultant team concluded that none of the adopted or draft codes poses major conflicts with Washington planning statutes, such as the various planning enabling acts (including the Growth Management Act (GMA), and the State Environmental Policy Act (SEPA). However, as discussed, these statutes contain procedural requirements for the adoption of development regulations.

### Growth Management Act

The legislation applies to all local governments in Washington State, including those planning under Washington’s GMA, and those planning under other statutes. For GMA “Fully Planning” jurisdictions, the development regulations must be consistent with its comprehensive plan,<sup>6</sup> and therefore GMA’s procedural requirements for comprehensive plans may affect the timing of a jurisdiction’s adoption of development regulations for EVI.

Local governments planning under GMA should ensure that their comprehensive plans include policies that support the adoption of the proposed regulations. EVI considerations could affect several different elements of the comprehensive plan, including land use, capital facilities, utilities, and transportation. If the comprehensive plan already includes such policies or the policies are broadly stated to support EVI, the jurisdiction can adopt the proposed regulations at any time. However, if the comprehensive plan does not include such policies, the plan may need to be amended before the adoption of development regulations. Because the GMA generally allows comprehensive plan amendments to be adopted only once a year,<sup>7</sup> jurisdictions should plan ahead and evaluate the need for a comprehensive plan amendment well in advance of the adoption of development regulations for EVI.

In the situation where a jurisdiction wishes to implement the regulations outside the annual cycle, GMA allows amendments or revisions whenever an emergency exists or to resolve an appeal.<sup>8</sup> It is possible that an amendment outside the regular annual cycle could be justified by an “emergency” need to ensure consistency between the comprehensive plan, development regulations, and the requirements imposed by RCW 36.70A.695. In declaring such an emergency, the jurisdiction should be sure to adopt findings explaining the reasons for its declaration.

## State Environmental Policy Act

SEPA requires state and local agencies to give proper consideration to environmental matters before taking major actions. If the initial environmental review of a proposed action (the “threshold determination”) indicates that the action will have probable and significant adverse environmental impacts, a detailed environmental impact statement (EIS) must be prepared.<sup>9</sup> SEPA’s procedural requirements, including the requirement to prepare a threshold determination, apply to “proposals for legislation and other major actions.”<sup>10</sup> “Actions” include “[n]ew or revised agency rules, regulations, plans, policies, or procedures.”<sup>11</sup> Thus, before adopting development regulations for EVI, jurisdictions must first prepare a threshold determination under SEPA. Given the limited scope of the suggested model regulations and anticipated minor impacts associated with the adoption of such regulations, SEPA review would not likely require the preparation of an EIS. Rather, it is anticipated jurisdictions would complete a non-project SEPA checklist that results in a Determination of Non-Significance or Mitigated Determination of Non-Significance.

It should also be noted that SEPA amendments (RCW 43.21C.410) provide that battery charging stations and battery exchange stations will not lose their categorically exempt status under the SEPA rules as a result of their being part of a larger proposal. This amendment regarding exemption status will be relevant when jurisdictions review proposals to construct projects that include battery charging stations and battery exchange stations. Model development regulations are provided in this document in regard to this categorical exemption (see Section 2, Chapter 5: SEPA).

## Relationship to Other Codes and Standards

As noted above, the model ordinance, model development regulations, and guidance are written so that individual sections can be tailored to the particular needs and characteristics of a community, while still providing for cross-jurisdictional consistency for some standards (e.g., signage) to provide for the establishment of convenient, cost-effective electric vehicle infrastructure. Additionally, the code structure of local governments varies and the model development regulation text may need to be modified for local government use (for example, some jurisdictions have permitted uses in table format, others utilize text format, while others use a combination of both formats. Additionally, some public works standards are contained within code or in a separate design manual, or a mix of both). For development and construction permit reviews, local jurisdictions also rely upon state and national standards (see Section 2, Chapter 6: State Battery, Building and Electrical Provisions).

In regard to incentives for electric vehicles and infrastructure, potential conflicts with the constitutional prohibition against the gifting or lending of public funds could be raised,<sup>12</sup> for example in the context of various incentives offered to encourage the use of EVs, such as providing free parking spaces to EV users. Washington courts have held, however, that if public funds are being expended to carry out a fundamental purpose of the government, then no gift of public funds has been made.<sup>13</sup> The Legislature addressed a component of this issue in 2007 with the passage of Engrossed Second Substitute Bill 1303, section 206 (codified at RCW 43.01.250), which specifically authorizes the state to purchase electric power for the purpose of charging electric vehicles at state office locations for state vehicles or private vehicles of those conducting business with the state.

The potential impact of the regulatory authority of the Washington State Utilities and Transportation Commission, which has broad authority to regulate the rates, services, and practices of companies providing electricity service in Washington was also assessed.<sup>14</sup> This regulatory authority could be implicated by certain aspects of EVI and incentives. For example, private companies that charge customers for electricity provided at EV charging stations could be subject to the UTC's jurisdiction. UTC staff indicated verbally that they have not yet addressed this issue, which could require rulemaking by UTC or legislation in order to clarify that operators of EVI are not subject to UTC jurisdiction. Other states, such as Hawaii and California, have addressed this issue by passing laws that exclude operators of EVI from the definition of "public utility."<sup>15</sup>

Electric utilities that are subject to UTC jurisdiction may be constrained in their ability to charge preferential rates or subsidies for electricity used by EVs. In an analogous context, the UTC has previously ruled that electric utilities may not impose a surcharge on its users to subsidize construction costs for compressed natural gas vehicle refueling stations.<sup>16</sup> This issue may also require clarification through UTC rulemaking or legislation. It should be noted that the UTC recently adopted rules (WAC 480-100-505) requiring electric utilities to submit periodic reports evaluating certain "smart grid" technologies, including EVs.<sup>17</sup> These reports will assist the UTC in evaluating EVI issues and provide additional information that may be helpful to local and state government entities attempting to encourage EV use.

# Section 1. Model Ordinance

## Regarding Electric Vehicle Infrastructure and Batteries

**Purpose of this Section.** This section provides ordinance language that jurisdictions may utilize for their adopting ordinances. The language from the model ordinance can be used unchanged or modified to suit local government needs. The model ordinance includes “Whereas” findings for both “fully planning” and “partially planning” jurisdictions.

**Proposed Ordinance No.** \_\_\_\_\_

**Revisions to Title *[Insert List of Amended Titles]* for the Purpose of Compliance with *[Insert RCW Sections Applicable to Jurisdiction]* and the Development of Electric Vehicle Infrastructure.**

**Comment:** See Appendix A for list of RCWs affected under HB 1481.

*“Whereas” text for jurisdictions to use in their adopting ordinances is suggested in the language shown below. Local governments may also choose to add language from the following original bill finding:*

*“The legislature finds the development of electric vehicle infrastructure to be a critical step in creating jobs, fostering economic growth, reducing greenhouse gas emissions, reducing our reliance on foreign fuels, and reducing the pollution of Puget Sound attributable to the operation of petroleum-based vehicles on streets and highways. Limited driving distance between battery charges is a fundamental disadvantage and obstacle to broad consumer adoption of vehicles powered by electricity. In order to eliminate this fundamental disadvantage and dramatically increase consumer acceptance and usage of electric vehicles, it is essential that an infrastructure of convenient electric vehicle charging opportunities be developed. The purpose of this act is to encourage the transition to electric vehicle use and to expedite the establishment of a convenient, cost-effective, electric vehicle infrastructure that such a transition necessitates. The state’s success in encouraging this transition will serve as an economic stimulus to the creation of short-term and long-term jobs as the entire automobile industry and its associated direct and indirect jobs transform over time from combustion to electric vehicles.”*

**Whereas,** During the 2009 session the Washington State Legislature passed House Bill 1481 (HB 1481), an Act relating to electric vehicles. The Bill addressed electric vehicle infrastructure including the structures, machinery, and equipment necessary and integral to support an electric vehicle, including battery charging stations, rapid charging stations, and battery exchange stations.

**Whereas,** The purpose of HB 1481 is to encourage the transition to electric vehicle use and to expedite the establishment of a convenient and cost-effective electric vehicle infrastructure that such a transition necessitates. The Legislature agreed that the development of a convenient infrastructure to recharge electric vehicles is essential to increase consumer acceptance of these vehicles. The State’s success in encouraging this transition will serve as an economic stimulus to the creation of short-term and long-term jobs as the entire automobile industry and its associated direct and indirect jobs transform over time from combustion to electric vehicles.

- Whereas,** Greenhouse gas emissions related to transportation constitute more than fifty percent of all greenhouse gas emissions in the State of Washington.
- Whereas,** The use of electricity from the Northwest as a transportation fuel instead of petroleum fuels results in significant reductions in the emissions of pollutants, including greenhouse gases, and reduces the reliance of the state on imported sources of energy for transportation.
- Whereas,** With the potential emerging market for plug-in electric vehicles, new industry standards have been adopted to ensure universal compatibility between vehicle manufacturers. Broad-based installation of new universally compatible charging stations is intended to ensure that plug-in electric vehicles will be a viable alternative to gasoline-powered vehicles.
- Whereas,** This ordinance regarding electric vehicle infrastructure and batteries, revising *[Local government to insert list of amended Titles]*, contains *[Local government to insert # of sections, as applicable to jurisdiction standard practice]* sections of findings, as follows:

## Section I — Procedural and Substantive Findings

**Comment:** *Text below to be modified by local governments, as applicable. For example, not all jurisdictions that are required to allow EVI are fully planning GMA jurisdictions so the “Whereas” findings related to GMA are not applicable to those jurisdictions. Also, some jurisdictions, after evaluating their Comprehensive Plans, may determine that no amendments to their comprehensive plans are required in order to adopt development regulations to implement EVI. For those jurisdictions, a “Whereas” finding in that regard would be provided.*

*Additionally, jurisdictions may choose to provide text regarding regional and state coordination (e.g., countywide planning policies and development regulations that implement these policies). Last, while the statute provides an exception for areas zoned for residential or resource use or critical areas, allowing electric vehicle infrastructure in these zones may be appropriate and beneficial. As such, these “Whereas” statements can be revised to identify the zones in which the infrastructure will be allowed.*

- Whereas,** *[insert section of RCW]* requires that *[insert jurisdiction name]* must allow electric vehicle infrastructure as a use in all areas except those zoned for residential or resource use or critical areas by *[insert deadline for compliance with RCW]*; and
- Whereas,** because most of the recharging for private electric vehicles will be done in residential settings, which includes residences in residential as well as some resource areas or critical areas, and therefore allowing electric vehicle infrastructure in these areas is in the public interest; and
- Whereas,** because businesses in resource areas and in some critical areas may want to install electric vehicle infrastructure and therefore allowing this infrastructure in these areas is in the public interest; and
- Whereas,** pursuant to *[Insert section of RCW]*, this ordinance proposes to amend development regulations found in *[insert Title(s) and Chapter(s) of local code containing development regulations]* to allow electric vehicle infrastructure as a use in *[local government to insert where EVI is allowed]*; and

- Whereas,** an amendment to the *[insert GMA jurisdiction name]* Comprehensive Plan is required in order to ensure consistency with the proposed development regulations, as required by RCW 36.70A.040; and
- Whereas,** RCW 36.70A.130(2)(b) authorizes the adoption of comprehensive plan amendments outside the normal annual cycle for such amendments “whenever an emergency exists,” after appropriate public participation; and
- Whereas,** *[jurisdiction name]* finds that the need to amend the *[insert GMA jurisdiction name]* Comprehensive Plan to ensure consistency with the proposed development regulations constitutes an emergency under RCW 36.70A.130(2)(b);

**Comment:** *It should be noted that an “emergency” under RCW 36.70A.130(2)(b) is not the same as other types of emergencies that may be declared by cities and counties, such as “public” emergencies under RCW 35A.12.130 or “nondebtable” emergencies under RCW 36.40.180. A finding of “emergency” under RCW 36.70A.130(2)(b) allows local government to amend the comprehensive plan outside of the normal annual cycle and to limit public participation to what is “appropriate” under the circumstances. For example, see Clark Revocable Living Trust v. City of Covington, WWGMHB Case No. 02-3-005 (September 27, 2002) (holding that amendments within the exception of RCW 36.70A.130(2)(b) are not subject to normal GMA process requirements). However, unlike a finding of “public” emergency under RCW 35A.12.130 or a finding of “nondebtable” emergency under RCW 36.40.180, a finding of “emergency” under RCW 36.70A.130(2)(b) does not make the ordinance effective upon adoption or automatically allow action to be taken without a hearing or public notice.*

## Section II — Attachments

*[Local government to add amended or new sections of code, as applicable]*

### Now, Therefore, be it Ordained as Follows:

Adopted this \_\_\_\_\_ day of \_\_\_\_\_, 2010, at \_\_\_\_\_.

*[Insert local government signature block]*



# Section 2. Model Development Regulations and Guidance

## Regarding Electric Vehicle Infrastructure and Batteries

**Purpose of this Section.** Except for RCW 43.19.648 which addresses usage of electricity as a fuel source, public agencies or private entities are not required to install EVI. Instead, these model regulations and guidance are provided to assist jurisdictions to efficiently and effectively allow EVI. In some cases, they include and go beyond “must allow” for EVI by including development regulations that provide for additional allowance of EVI (see Chapter 3: Zoning: allow for EVI in areas including those zoned for residential and some critical areas, such as aquifer recharge areas).

Some provisions also provide options for local governments. For example, if a jurisdiction wishes to utilize an enforcement mechanism that prevents internal combustion engine cars from parking in electric vehicle charging stations, regulations are provided. And, in some chapters, a section of guidance is provided. These are topics where either there may not be clearly defined standards (such as accessibility) or there are clear standards (such as signage) and there is nothing a local jurisdiction needs to adopt in their development regulations.

- Chapters:**
- Chapter 1. Definitions
  - Chapter 2. Vehicles and Traffic
  - Chapter 3. Zoning
  - Chapter 4. Streets, Sidewalks, and Public Places
  - Chapter 5. SEPA
  - Chapter 6. State Battery, Building, and Electrical Provisions

# Chapter 1. Definitions

**Definitions.** This Chapter ensures that terms are defined consistently with the RCW and with other regulatory documents. Additionally, local governments may choose to develop user-friendly written materials that explain EVI (see Appendix B: “Model Installation Guides for Charging Stations”). All such documents should utilize the definitions and terminology below for consistent understanding.

To improve consistency across jurisdictions, these definitions should also be considered for adoption at the state level.

## A. Regulations

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

*Comment: As defined in HB 1481 (codified as RCW 35.63.126(5)(a), RCW 35.63.127(5)(a), RCW 35A.63.107(5)(a), RCW 36.70.695(5)(a), RCW 36.70A.695(5)(a) and RCW 47.80.090(3)(a).*

*Battery charging stations include Level 1, Level 2, and Level 3 charging stations (see definition 1.4).*

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

*Comment: Definition is a subcategory of electric vehicles (see “Electric Vehicle” below).*

**1.3: “Battery exchange station”** means a fully automated facility that will enable an electric vehicle with a swappable battery to enter a drive lane and exchange the depleted battery with a fully charged battery through a fully automated process, which meets or exceeds any standards, codes, and regulations set forth by chapter 19.27 RCW and consistent with rules adopted under RCW 19.27.540.

*Comment: As defined in HB 1481 (codified as RCW 35.63.126(5)(b), RCW 35.63.127(5)(b), RCW 35A.63.107(5)(b), RCW 36.70.695(5)(b), RCW 36.70A.695(5)(b) and RCW 47.80.090(3)(b).*

**1.4: “Charging levels”** means the standardized indicators of electrical force, or voltage, at which an electric vehicle’s battery is recharged. The terms 1, 2, and 3 are the most common EV charging levels, and include the following specifications:

- Level 1 is considered slow charging.
- Level 2 is considered medium charging.
- Level 3 is considered fast or rapid charging.

*Comment: Definitions provided for consistent use and understanding of various charging levels and are modified from definitions and usage in various resource documents.<sup>18</sup> Level 1 is present in homes and businesses and typically operates on a 15- or 20-amp breaker on a 120-volt Alternating Current (AC) circuit and standard outlet. Level 2 is expected to become the standard for home and public charging and typically operates on a 40-amp to 100-amp breaker on a 208 or 240-volt AC circuit.*

*Level 3 is primarily for commercial and public applications (e.g., taxi fleets and charging along freeways) and typically operates on a 60-amp or higher dedicated breaker on a 480-volt or higher three-phase circuit with special grounding equipment. Note that the term “Level 3” is recommended to identify the increased power need in a numerical fashion (i.e., “3”), but the Level 3 charging level is also sometimes*

referred to as “Fast” charging,<sup>19</sup> and “Rapid” charging (see definition of Rapid Charging Station below). Use of “Level 3” also appears in other EVI documents (e.g., see page 25 of the “Report of the Alternative Fuel Vehicle Infrastructure Working Group”).<sup>20</sup>

*It is important to note that only the terms “Level 1” and “Level 2” are consistently used between industry and consumers. The use of “Level 3” is not consistently used at this time. Once a consistent term is defined, local governments should adopt amendments to adopted definitions. Opportunities for amendments to development regulations include a jurisdiction’s annual evaluation and amendment process or as part of the required GMA periodic update process (RCW 36.70A.130).*

**1.5: “Electric scooters and motorcycles”** means any 2-wheel vehicle that operates exclusively on electrical energy from an off-board source that is stored in the vehicle’s batteries and produces zero emissions or pollution when stationary or operating.

***Comment:** These vehicles are defined as being distinct from “electric vehicle” to enable local governments to treat parking and charging locations for them separately.*

**1.6: “Electric vehicle”** means any vehicle that operates, either partially or exclusively, on electrical energy from the grid, or an off-board source, that is stored on-board for motive purpose. “Electric vehicle” includes: (1) a battery electric vehicle; (2) a plug-in hybrid electric vehicle; (3) a neighborhood electric vehicle; and (4) a medium-speed electric vehicle.

***Comment:** This definition provides for inclusion of a variety of electric vehicles and is modeled after a definition used in the State of Minnesota<sup>21</sup> and is designed for regulatory purposes, so that factors such as signage are not required to call out detailed differences among BEVs, PHEVs, NEVs, and MSEVs. Note that extended range electric vehicles (EREV) are not separately defined but are included in the definitional components for PHEV (i.e., runs on electricity from its battery, and then it runs on electricity it creates from gas). Other terms, such as Grid Enabled Vehicle (GEV), are also sometimes used when referring to PHEVs and EVs together.*

**1.7: “Electric vehicle charging station”** means a public or private parking space that is served by battery charging station equipment that has as its primary purpose the transfer of electric energy (by conductive or inductive means) to a battery or other energy storage device in an electric vehicle. An electric vehicle charging station equipped with Level 1 or Level 2 charging equipment is permitted outright as an accessory use to any principal use.

***Comment:** This definition is modeled after a definition for “electric vehicle parking space” used in the City of Davis.<sup>22</sup> The Davis definition has been modified to combine the parking and battery charging characteristics into one definition as these features are functionally related. As the electric vehicle charging station facility is not a parking facility, its interaction with accessibility provisions is different from that of a parking space (see Section 3.3).*

*Regarding allowed uses, Level 1 and Level 2 charging are expected to be a secondary use, not the principal use. However, Level 3 (i.e., Rapid or Fast) may be a primary use given their size and scale, as well as their potential to generate traffic and vehicle queuing, and therefore the need to mitigate the associated impacts. As such, Level 3 is to be permitted differently (see section 3.1).*

*The inclusion of permitted uses in the definition is meant to allow a jurisdiction to add EV charging stations categorically to existing allowed uses tables (see Section 3.1, Option 2). If a jurisdiction adds a new Allowed Uses table for the different types of Electric Vehicle Infrastructure (see Section 3.1, Option 1), inclusion of permitted uses in the definition may not be necessary.*

**1.8: “Electric vehicle charging station — restricted”** means an electric vehicle charging station that is (1) privately owned and restricted access (e.g., single-family home, executive parking, designated employee parking) or (2) publicly owned and restricted (e.g., fleet parking with no access to the general public).

*Comment: This definition is provided to clarify that the off-street parking requirements Chapter 3: Zoning, do not apply to “restricted” EV charging stations. (See subsection 3.2.01A).*

**1.9: “Electric vehicle charging station — public”** means an electric vehicle charging station that is (1) publicly owned and publicly available (e.g., Park & Ride parking, public library parking lot, on-street parking) or (2) privately owned and publicly available (e.g., shopping center parking, non-reserved parking in multi-family parking lots).

*Comment: This definition is provided to clarify the variety of charging stations that are anticipated to be publicly available.*

**1.10: “Electric vehicle infrastructure”** means structures, machinery, and equipment necessary and integral to support an electric vehicle, including battery charging stations, rapid charging stations, and battery exchange stations.

*Comment: As defined in HB 1481 (codified as RCW 35.63.126(5)(c), RCW 35.63.127(5)(c), RCW 35A.63.107(5)(c), RCW 36.70.695(5)(c), RCW 36.70A.695(5)(c) and RCW 47.80.090(3)(c). Per these definitions, this term is broader than Electric Vehicle Service Equipment (ESVE) which refers to the charging equipment, cable and connector.*

**1.11: “Electric vehicle parking space”** means any marked parking space that identifies the use to be exclusively for the parking of an electric vehicle.

*Comment: While this term is not used other than in this chapter, it provides the potential for a space to be designated, perhaps as an incentive by a private company, for electric vehicles even if charging equipment is not provided.*

**1.12: “Medium-speed Electric Vehicle”** means a self-propelled, electrically powered four-wheeled motor vehicle, equipped with a roll cage or crush-proof body design, whose speed attainable in one mile is more than 25 miles per hour but not more than 35 miles per hour and otherwise meets or exceeds the federal regulations set forth in 49 C.F.R. Sec. 571.500.

*Comment: Definition of a subcategory of electric vehicles (see “Electric Vehicle” above). Definition from RCW 46.04.295, as amended in 2010 by SSB 6346.*

**1.13: “Neighborhood Electric Vehicle”** means a self-propelled, electrically powered four-wheeled motor vehicle whose speed attainable in one mile is more than 20 miles per hour and not more than 25 miles per hour and conforms to federal regulations under Title 49 C.F.R. Part 571.500.

*Comment: Definition of a subcategory of electric vehicles (see “Electric Vehicle” above). Definition from RCW 46.04.357.*

**1.14: “Non-Electric Vehicle”** means any motor vehicle that does not meet the definition of “electric vehicle.”

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

*Comment: Definition of a subcategory of electric vehicles (see “Electric Vehicle” above).*

**1.16: “Rapid charging station”** means an industrial grade electrical outlet that allows for faster recharging of electric vehicle batteries through higher power levels and that meets or exceeds any standards, codes, and regulations set forth by chapter 19.28 RCW and consistent with rules adopted under RCW 19.27.540.

**Comment:** *As defined in HB 1481 (codified as RCW 35.63.126(5)(d), RCW 35.63.127(5)(d), RCW 35A.63.107(5)(d), RCW 36.70.695(5)(d), RCW 36.70A.695(5)(d) and RCW 47.80.090(3)(d).*

## Chapter 2. Vehicles and Traffic

**Vehicles and Traffic.** This Chapter provides model regulations for when a local jurisdiction chooses to authorize enforcement for non-electric vehicles that park in electric vehicle charging station spaces or for electric vehicles parked out of compliance with posted days and hours of charging operation. These model regulations are only for electric vehicle charging station spaces located in publicly owned and/or operated parking areas (e.g., on-street parking, municipal garages, park-and-ride lots, etc.). Signage for enforcement is included in Chapter 4: Street, Sidewalks and Public Places.

### A. Regulations

#### Section 2.1: Electric Vehicle Charging Stations — Generally

**2.1.01:** Electric vehicle charging stations are reserved for parking and charging electric vehicles only.

**2.1.02:** Electric vehicles may be parked in any space designated for public parking, subject to the restrictions that would apply to any other vehicle that would park in that space.

***Comment:** The purpose of adopting enforcement provisions for electric vehicle charging station spaces is to maximize the use of limited EV public infrastructure.*

#### Section 2.2: Prohibitions

**2.2.01:** Pursuant to Section 2.4, when a sign authorized under Section 2.3 provides notice that a space is a designated electric vehicle charging station, no person shall park or stand any non-electric vehicle in a designated electric vehicle charging station space. Any non-electric vehicle is subject to fine or removal.

***Comment:** The purpose of adopting enforcement provisions for non-electric vehicles parking in electric vehicle charging station spaces is to ensure that the space is available for EV drivers. As found in a recent EV driver survey, 22% of the problems encountered at public charging stations were attributed to EV spaces being occupied by non-EVs.<sup>23</sup>*

**2.2.02:** Pursuant to Section 2.4, any electric vehicle in any designated electric vehicle charging station space and not electrically charging or parked beyond the days and hours designated on regulatory signs posted at or near the space, shall be subject to a fine and/or removal. For purposes of this subsection, “charging” means an electric vehicle is parked at an electric vehicle charging station and is connected to the charging station equipment.

***Comment:** In regard to assessing whether an electric vehicle is not charging, being plugged in and connected to the charging station equipment serves as the charging indicator.*

#### Section 2.3: Noticing of Electric Vehicle Charging Stations

**2.3.01:** Upon adoption by the [insert jurisdiction], the [insert jurisdiction] engineer shall cause appropriate signs and marking to be placed in and around electric vehicle charging station spaces, indicating prominently thereon the parking regulations. The signs shall define time limits and hours of operation, as applicable, shall state that the parking space is reserved for charging electric vehicles and that an electric vehicle may only park in the space for charging purposes. Violators are subject to a fine and/or removal of their vehicle.

***Comment:** Wherever possible, MUTCD signage standards should be used.<sup>24</sup> Also, see signage guidance in Chapter 4: Streets, Sidewalks and Public Places. Note that these signage recommendations are included as guidance as they contain a combination of MUTCD and non-recognized MUTCD signs. Also, adopting time limits will be a local choice. Jurisdictions may define time limits for reasons other than just charging (e.g., for turnover of parking adjacent to businesses, such as retail).*

## **Section 2.4: Violations-Penalties**

**2.4.01:** Violations of this chapter shall be punishable as infractions. Punishment shall be by a fine not to exceed the fine prescribed in accordance with section \_\_\_\_\_ of the *[insert jurisdiction]* code. Each day such violation is committed shall constitute a separate offense and shall be punishable as such.

**2.4.02:** In addition to a fine, a person who has parked or left a vehicle standing upon a street, alley, or *[insert jurisdiction]* parking lot or garage in violation of this article is subject to having the vehicle removed from the street, alley, or *[insert jurisdiction]* parking lot or garage by any member of the police department authorized by the police chief or designated law official in the manner and subject to the requirements of the \_\_\_\_\_. *[insert]*

***Comment:*** *All of the above sections are modeled after regulations adopted by the City of Davis. (See footnote 22.)*

## Chapter 3. Zoning

**Zoning.** This Chapter ensures that local governments meet the requirements in HB 1481 to allow electric vehicle infrastructure as a “use” in all areas, except those zoned for residential or resource use or critical areas. It also includes regulations for when they choose to also to allow Level 1, Level 2, and Level 3 charging stations (with some limitations) in residential and resource zones and critical areas, given that the statute contains **no** prohibition on allowing this infrastructure in any zones.

This chapter also contains guidance related to accessible use of EV charging stations for all users, and clarifies how these stations are different than typical parking spaces in terms of accessibility regulations. Additionally, this Chapter includes model development regulations and guidance that a jurisdiction may impose to provide guidance when a private property owner chooses to provide electric vehicle charging stations.

### A. Regulations

#### Section 3.1: Allowed Uses

##### OPTION 1:

**Comment:** *As many local governments list their use regulations in a table format, this format is provided below. While the reference to the specific applicable types of zones will vary in comparison to the broad zone category listed below, the zones in which the use must be allowed and the related development standard should be common across jurisdictions. The table below includes highlighting for purpose of quickly identifying where EVI must be allowed (i.e., as a use in all areas except those zoned for residential or resource use or critical areas, consistent with the statute.*

*Jurisdictions should also consider adopting the other provisions in the table below to support efficient and effective transition to electric vehicles. An example, as noted in a number of Resource documents at the end of this Guidance, the majority of charging will occur in homes. This is why electric vehicle infrastructure in residential and mixed-use areas is included in the allowed uses table.*

EVI TYPE	ZONING DISTRICT						
	LOW-DENSITY RESIDENTIAL	HIGH-DENSITY RESIDENTIAL	MIXED-USE	COMMERCIAL	INDUSTRIAL	INSTITUTIONAL	RESOURCE
EV Charging Station 1, 2	P <sub>3</sub>	P <sub>3</sub>	P	P	P	P	P <sub>3</sub>
Rapid Charging Station 4	P <sub>5</sub>	P <sub>5,6</sub>	P or P <sub>6</sub>	P	P	P	P <sub>3</sub>
Battery Exchange Station				P	P	P	

P: Use is permitted.      Absence of “P”: Use is not allowed in the given zoning district.

#### DEVELOPMENT STANDARDS

1. Level 1 and Level 2 charging only.
2. Level 1 and Level 2 charging are permitted in aquifer recharge areas and in other critical areas when serving an existing use.
3. Allowed only as accessory to a principal outright permitted use or permitted conditional use.
4. The term “Rapid” is used interchangeably with Level 3 and Fast Charging.
5. Only “electric vehicle charging stations - restricted” as defined in Chapter 1, subsection A.1.8.
6. Local governments may choose to allow Level 3 charging stations as an outright permitted use or may determine that it is appropriate to adopt development standards applicable to the mixed-use or high density residential zoning districts. For example, there may be instances where this type of charging station would require screening or placement within a parking garage to meet other objectives of the mixed-use zone (e.g., a pedestrian friendly environment) or high-density residential zone.

OPTION 2:

**Comment:** Add battery exchange stations and rapid charging stations (also known as Level 3 charging and Fast charging) as an allowed use in all zones, except those zoned for residential or resource use or critical areas. Note that installation of these uses must be consistent with the rules for EVI requirements adopted by the State Building Code Council, and the rules adopted by the Department of Labor and Industries for the installation of EVI, including all wires and equipment that convey electric current and any equipment to be operated by electric current, in, on, or about buildings or structures (RCW 19.27.540 and RCW 19.28.281) — see Chapter 6: State Battery, Building and Electrical Provisions. Local governments may choose to modify the suggested Allowed Use model regulations below and adopt development regulations which reference this consistency requirement.

Note that Level 1 and Level 2 battery charging stations, defined as “electric vehicle charging station” in Chapter 1: Definitions, are not listed as an allowed use in this Allowed Uses option. This is because these types of charging stations are similar to other building and street infrastructure (e.g., parking meters) and do not function as a separate land use. However, since the statute states, in part, that jurisdictions “must allow electric vehicle infrastructure as a use,” and the definition of EVI includes battery charging stations, the definition of “electric vehicle charging station” in Chapter 1 provides that these types of battery charging stations are allowed as accessory to the specific principal use that they serve.

### 3.1.01: Rapid Charging Stations



Rapid charging stations in Vacaville, California. Photos: Darell Dickey.

### 3.1.02: Battery Exchange Stations

To view a video of a battery exchange station, follow this link to Better Place:  
<http://www.betterplace.com/global-progress-japan>



Battery Exchange Station in Tokyo. Photo: Better Place.

## Section 3.2: Off Street Parking — Electric Vehicle Charging Stations

To ensure an effective installation of electric vehicle charging stations, the regulations in this subsection provide a framework for when a private property owner chooses to provide electric vehicle charging stations (also, see Appendix C: Model Electric Vehicle Charging Station Installation Checklist).

### 3.2.01: Electric Vehicle Charging Station Spaces

- A. Purpose. For all parking lots or garages, except those that include restricted electric vehicle charging stations.
- B. Number. No minimum number of charging station spaces is required.
- C. Minimum Parking Requirements. An electric vehicle charging station space may be included in the calculation for minimum required parking spaces that are required pursuant to other provisions of code.
- D. Location and Design Criteria. The provision of electric vehicle parking will vary based on the design and use of the primary parking lot. The following required and additional locational and design criteria are provided in recognition of the various parking lot layout options.
  - 1. Where provided, parking for electric vehicle charging purposes is required to include the following:
    - a. Signage. Each charging station space shall be posted with signage indicating the space is only for electric vehicle charging purposes. Days and hours of operations shall be included if time limits or tow away provisions are to be enforced.
    - b. Maintenance. Charging station equipment shall be maintained in all respects, including the functioning of the charging equipment. A phone number or other contact information shall be provided on the charging station equipment for reporting when the equipment is not functioning or other problems are encountered.
    - c. Accessibility. Where charging station equipment is provided within an adjacent pedestrian circulation area, such as a sidewalk or accessible route to the building entrance, the charging equipment shall be located so as not to interfere with accessibility requirements of WAC 51-50-005.
    - d. Lighting. Where charging station equipment is installed, adequate site lighting shall exist, unless charging is for daytime purposes only.
  - 2. Parking for electric vehicles should also consider the following:
    - a. Notification. Information on the charging station, identifying voltage and amperage levels and any time of use, fees, or safety information.
    - b. Signage. Installation of directional signs at the parking lot entrance and at appropriate decision points to effectively guide motorists to the charging station space(s).
- E. Data Collection. To allow for maintenance and notification, the local permitting agency will require the owners of any private new electric vehicle infrastructure station that will be publicly available (see definition “electric vehicle charging station — public”) to provide information on the station’s geographic location, date of installation, equipment type and model, and owner contact information.

## B. Guidance

### Section 3.3: Accessible Electric Vehicle Charging Stations

**Comment:** *Accessibility standards specific to electric vehicle infrastructure are not currently established in the WAC. As such, this guidance is provided to assist local jurisdictions in establishing compliance with the Americans with Disabilities Act and its enactment through the WAC, as appropriate to the unique characteristics of this infrastructure given their function as charging facilities. Generally, as Electric Vehicle Charging Stations are provided where ADA accessible parking is already provided, a key issue is for the equipment itself to have accessible heights, controls, and operating mechanisms that allow*

the disabled to use it. For local jurisdictions, the responsibility is for permitting agencies to ensure the equipment meets the requirements and, in on-street and off-street environments, to ensure that there be an accessible route from the electric vehicle charging stations to the building or path of travel.

The accessibility guidance below is comparable to accessibility provisions that require that some percentage of hotel rooms be accessible (i.e., an accessible hotel room can be used by anyone, but is located and designed for persons with disabilities). Similarly, some percentage of EV charging stations should be accessible to all users because they offer a service to the general public. The percentage is shown below, as are provisions describing different options for siting accessible EV charging stations. Until such time as the state amends WAC 51-50-005 with regard to barrier-free access for EVI (see RCW 19.27.540), this guidance will assist local governments in ensuring that reasonable accommodation is provided for EV drivers with disabilities.

### 3.3.01: Quantity and Location

Where electric vehicle charging stations are provided in parking lots or parking garages, accessible electric vehicle charging stations shall be provided as follows:

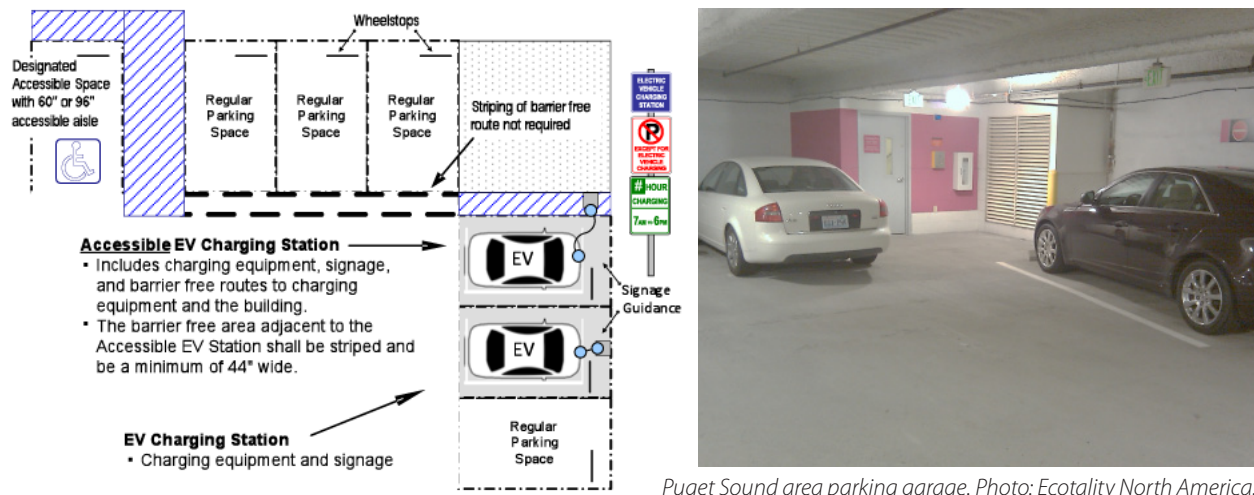
- A. Accessible electric vehicle charging stations shall be provided in the ratios shown on the following table.

**Comment:** Recognizing that an ADA accessible stall will already be available in the parking lot or garage, the table at right reflects the approach of some of the federally-funded electric vehicle infrastructure projects, the currently limited market penetration rates of electric vehicles, current information regarding automakers plans for vehicle types and sizes that will be publicly available in the next few years, and information from the survey of current EV drivers regarding accessibility. As the market share grows for electric vehicles and as new vehicles are made available, the ratio of stations shown in the table above should be re-evaluated. As previously noted, this guidance exists until and unless the state amends WAC 51-50-005 to specifically address EVI.

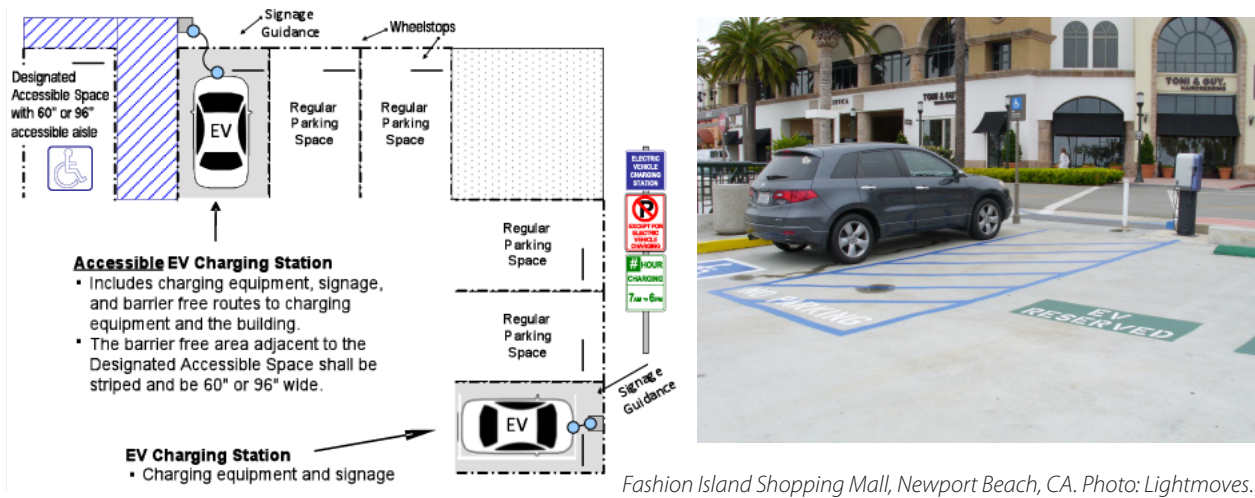
NUMBER OF EV CHARGING STATIONS	MINIMUM ACCESSIBLE EV CHARGING STATIONS
1-50	1
51-100	2
101-150	3
151-200	4
201-250	5
251-300	6

- B. Accessible electric vehicle charging stations should be located in close proximity to the building or facility entrance and shall be connected to a barrier-free accessible route of travel. It is not necessary to designate the accessible electric vehicle charging station exclusively for the use of disabled persons. Below are two options for providing for accessible electric vehicle charging stations.

Figure: Off-Street Accessible Electric Vehicle Charging Station — Option 1



**Figure: Off-Street Accessible Electric Vehicle Charging Station — Option 2**



**Comment:** The illustrations and photos above show two options for providing accessible EV charging stations. Option 1 is a likely scenario for installation in existing parking lots. By using an existing wider end parking stall or restriping, an accessible EV charging station may be more cost effectively installed. Where feasible, a wider clear area around the equipment (60") is preferable. Additionally, this location away from the near building prime parking has a better likelihood of being available for disabled persons, since the accessible charging station is not exclusively reserved for disabled persons. Option 2 provides a location that has a shorter travel distance for disabled persons and can be easily installed in a new parking lot. This option may allow the installer to provide a wider, more fully-compliant aisle.

While other options, depending on the specific layout of the new or reconfigured parking area, are likely, at a minimum, an accessible EV charging station must be located within accessible reach of the barrier-free access aisle (minimum 44-inch width) and the electric vehicle and connect to a barrier-free route of travel. However, because the charging station facility is not a parking facility, the accessible charging station does not need to be located immediately adjacent to the building entrances or reserved exclusively for the use of disabled persons.

### 3.3.02: Definitions

- A. Designated Accessible Space. A WAC 51-50-005 required accessible parking space designated for the exclusive use of parking vehicles with a State Disabled Parking Permit.
- B. Accessible Electric Vehicle Charging Station. An electric vehicle charging station where the battery charging station equipment is located within accessible reach of a barrier-free access aisle (minimum 44-inch width) and the electric vehicle.

### Section 3.4: Signage

#### 3.4.01: Directional — Off-street Parking Lot or Parking Garage

**Comment:** The directional sign for an on-site parking lot or parking garage should be used in the parking facility with a directional arrow at all decision points.



12" X 12"



12" X 6"

#### Section 3.4.02: Off-street EV Parking — Parking Space with Charging Station Equipment

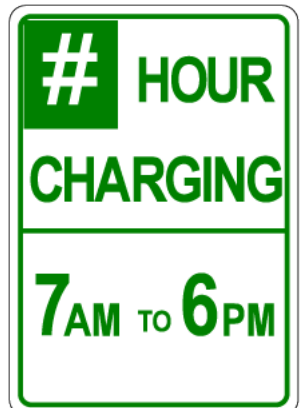
**Comment:** Combination sign identifying space as an electric vehicle charging station, prohibiting non-electric vehicles, with charging time limits. The use of time limits is optional. The blue/white and red/black signs define that only an electric vehicle that is charging can use the spaces. The green sign defines time limits for how long an electric vehicle can be in the space during the specified hours. Outside of the specified hours, electric vehicles can charge for an indefinite period of time.



12" X 12"



12" X 18"



12" X 18"

## Chapter 4. Streets, Sidewalks, and Public Places

**Streets, Sidewalks, and Public Places.** This Chapter provides model regulations for when a jurisdiction chooses to install electric vehicle charging station stations in publicly owned and/or operated parking areas (e.g., on-street parking, municipal garages, park-and-ride lots, etc.).

Signage for way-finding (i.e., directional signage), and regulatory and general service signage for the EV charging space is also provided. Note that use of the directional signage that identifies the level of charging available at the charging station is not an approved sign and is subject to future FHWA approval.

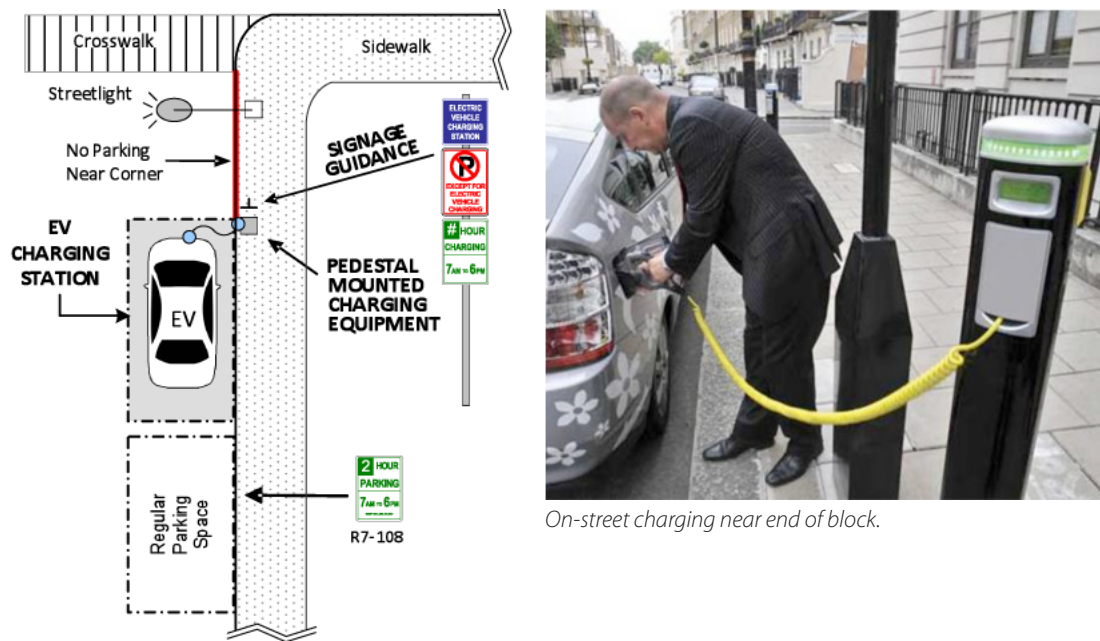
### A. Regulations

#### Section 4.1: On-street Electric Vehicle Charging Stations — Generally

- A. Purpose. Curbside electric vehicle charging stations adjacent to on-street parking spaces are reserved for charging electric vehicles.
- B. Size. A standard size parking space may be used as an electric vehicle charging station.
- C. Location and Design Criteria.
  1. Where provided, parking for electric vehicle charging purposes is required to include the following:
    - a. Signage. Each charging station space shall be posted with signage indicating the space is only for electric vehicle charging purposes. Days and hours of operations shall be included if time limits or tow away provisions are to be enforced.
    - b. Maintenance. Charging station equipment shall be maintained in all respects, including the functioning of the charging equipment. A phone number or other contact information shall be provided on the charging station equipment for reporting when the equipment is not functioning or other problems are encountered.
    - c. Accessibility. Charging station equipment located within a sidewalk shall not interfere with accessibility requirements of WAC 51-50-005.
    - d. Clearance. Charging station equipment mounted on pedestals, light posts, bollards or other devices shall be a minimum of 24 inches clear from the face of curb.
    - e. Lighting. Where charging station equipment is installed, adequate site lighting shall exist, unless charging is for daytime purposes only.
    - f. Charging Station Equipment. Charging station outlets and connector devices shall be no less than 36 inches or no higher than 48 inches from the top of surface where mounted, and shall contain a retraction device and/or a place to hang permanent cords and connectors sufficiently above the ground or paved surface.
    - g. Charging Station Equipment Protection. When the electric vehicle charging station space is perpendicular or at an angle to curb face and charging equipment, adequate equipment protection, such as wheel stops or concrete-filled steel bollards shall be used. Appropriate signage indicating if backing in is allowed or not shall be posted.

2. Parking for electric vehicles should also consider the following:
  - a. Notification. Information on the charging station identifying voltage and amperage levels and any time of use, fees, or safety information.
  - b. Signage. Installation of directional signs at appropriate decision points to effectively guide motorists to the charging station space(s).
  - c. Location. Placement of a single electric vehicle charging station is preferred at the beginning or end stall on a block face.
- D. Data Collection. To allow for maintenance and notification, the local permitting agency will require the owners of any private new electric vehicle infrastructure station that will be publicly available (see definition “electric vehicle charging station — public”) to provide information on the station’s geographic location, date of installation, equipment type and model, and owner contact information.

**Figure: Electric Vehicle Charging Station — On Street**



*On-street charging near end of block.*

**Comment:** On-street EV charging stations should first be installed at either end of a row of regular on-street parking spaces. Subsequent EV charging stations should be installed adjacent to existing EV charging stations. Several factors that suggest an end-stall as the preferred location include, but are not limited to: proximity to electrical service, adjacency to existing no-parking zone, better accessibility for all users, higher lighting levels and less clearance and obstruction issues with existing parking spaces. The charging station equipment should be installed in a well-lit area, on a hard surface, near the front of the designated space, and have adequate clearance from the face of curb (24”) and leave a barrier-free sidewalk clearance (36” or other applicable distance). Signage shall be at or near the charging station. All regulatory signs shall comply with visibility, legibility, size, shape, color and reflectivity requirements contained within the Federal Manual on Uniform Traffic Control Devices.

## B. Guidance

### Section 4.2: Signage.

#### 4.2.01: Directional — Highways and Freeways

**Comment:** The directional sign (MUTCD D9-11b) for highways and freeways should be installed at a suitable distance in advance of the turn-off point or intersecting highway. If used at an intersection or turn-off point, it shall be accompanied by a directional arrow. As the symbol on the sign at right appears to be a gasoline pump, this sign may also be supplemented with the sign below (MUTCD D9-11bP) to avoid confusion with liquid fuel stations for early EV drivers.



30" X 24"

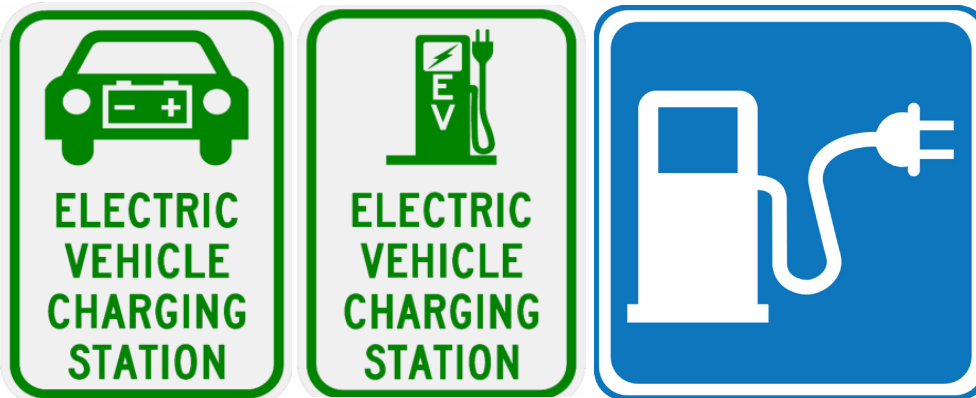


30" X 30"



30" X 12"

Figure: New Experimental Electric Vehicle Signs Under Consideration



**Comment:** To address some of the limitations of the existing approved sign, and to provide for clearer direction to EV drivers, WSDOT and the City of Seattle are considering Federal Highway Administration experimentation<sup>25</sup> of a new International iconic white/blue sign. Oregon is already undergoing a sign experimentation process as well and, as these experiments move forward, efforts will be made to coordinate such that consistent signage is provided (see signs above).

The long-term objective of the revised iconic sign is to have a consistent symbol from the federal highway, to state highways, to local streets, and finally at the charging station. Use of one federal symbol is the simplest way to accomplish this end. A current federal study of a symbol for EV charging stations should have preliminary results in September. Recognizing that the experimentation process may result in revisions to the signs shown below, the currently approved federal iconic signage shown on the previous page should be utilized by local government and installers during the experimentation period. One potential revision that may be proposed from Washington State is that the sign include information on the charging level (i.e., Level 1, Level 2, and Level 3) provided at the station.

#### 4.2.02: Directional — Local Street

**Comment:** The directional sign for local streets should be installed at a suitable distance in advance of the intersection or charging station facility. If used at an intersection or parking lot entrance, it shall be accompanied by a directional arrow. As the symbol on the sign at right appears to be a gasoline pump, this sign may also be supplemented with the sign below (MUTCD D9-11bP) to avoid confusion with liquid fuel stations for early EV drivers.



24" X 18"



24" X 24"



24" X 9"

#### 4.2.03: On-Street Parking Space with Charging Station Equipment

**Comment:** Combination sign identifying space as an electric vehicle charging station, prohibiting non-electric vehicles, with charging time limits. The use of time limits is optional and is included to allow the charging equipment to be available for more than one use during the day. For example, a jurisdiction may want to utilize time limits in areas where the on-street charging station spaces would turn over consistent with whatever time limits might otherwise be posted on a block (e.g., 2-hour time limits). The design of the time limit charging sign is modeled after the existing R7-108 sign in the federal MUTCD. If time limits are used, suggested enforcement regulations are provided in Chapter 2: Vehicles and Traffic. If the jurisdictions wishes to allow dual use of the space (i.e., the spaces is for electric vehicles only during a certain period of time, but then allow all vehicles to park after specified hours), the time limits would need to be added to the red/black/white sign rather than the green sign.



12" X 12"



12" X 18"



12" X 18"

## Chapter 5. SEPA

**SEPA.** This Chapter ensures that local government SEPA regulations include the SEPA categorical exemption language contained in RCW 43.21C.410. This model document includes two alternative ways to accomplish this. One is for the jurisdiction to simply add the reference to RCW 43.21C.410 in the same way that many jurisdictions adopt by reference other RCW and WAC categorical exemptions. The second alternative is to interpret RCW 43.21C.410 and add the following as a new categorical exemption category.

### A. Model Regulations

#### OPTION 1:

**Comment:** Add the reference to RCW 43.21C.410 in the “Categorical Exemptions and Threshold Determinations” section of local government SEPA rules in the same way that many jurisdictions adopt by reference other RCW and WAC categorical exemptions. See existing SEPA regulations below with RCW 43.21C.410 added.

#### Section 5.1: Categorical Exemptions and Threshold Determinations — Purpose of This Part and Adoption by Reference

This part contains the rules for deciding whether a proposal has a “probable significant, adverse environmental impact” requiring an environmental impact statement (EIS) to be prepared. This part also contains rules for evaluating the impacts of proposals not requiring an EIS. The [insert jurisdiction] adopts the following sections by reference, as supplemented in this part:

RCW 43.21C.410 Battery charging and exchange station installation.

WAC 197-11-300 Purpose of this part.

WAC 197-11-305 Categorical exemptions.

#### OPTION 2:

**Comment:** The second alternative is to interpret RCW 43.21C.410 and add the following as a new categorical exemption category. Definitions for “Battery charging station” and “Battery exchange station” are included, but if these are adopted elsewhere in the local government code, these could be deleted.

#### Section 5.1: Categorical Exemptions for Battery Charging and Exchange Station Installation

**5.1.01:** The construction of an individual battery charging station or an individual battery exchange station, that is otherwise categorically exempt shall continue to be categorically exempt even if part of a larger proposal that includes other battery charging stations, other battery exchange stations, or other related utility networks.

**5.1.02:** The definitions in this subsection apply throughout this section unless the context clearly requires otherwise.

- A. “Battery charging station” means an electrical component assembly or cluster of component assemblies designed specifically to charge batteries within electric vehicles, which meets or exceeds any standards, codes, and regulations set forth by Chapter 19.28 RCW and consistent with rules adopted under RCW 19.27.540.
- B. “Battery exchange station” means a fully automated facility that will enable an electric vehicle with a swappable battery to enter a drive lane and exchange the depleted battery with a fully charged battery through a fully automated process, which meets or exceeds any standards, codes, and regulations set forth by chapter 19.28 RCW and consistent with rules adopted under RCW 19.27.540.

## Chapter 6. State Battery, Building, and Electrical Provisions

**State Battery, Building and Electrical Provisions.** This Chapter provides guidance for appropriate handling, recycling, and storage of electric vehicle batteries and equipment. This Chapter also provides guidance regarding the applicability of existing rules and regulations for the installation of EVI, including battery exchange stations.

### A. Guidance

#### Section 6.1: Battery Recycling and Handling Provisions

**Lithium-ion Battery.** Batteries in electric vehicles differ from batteries currently used with internal combustion engine (ICE) vehicles. ICE vehicles utilize a battery (normally 12V) to provide cranking power to start the engine as well as to deliver low voltage to accessories such as the lights and ignition. The ICE battery is recharged with the aid of an alternator when the engine is running. The much more powerful battery in an electric vehicle (EV) or plug-in hybrid electric vehicle (PHEV) serves as the source of power and propulsion for the vehicle. Lithium-ion batteries are currently the accepted next-generation of energy storage for EVs and PHEVs. They are lighter, more compact and more energy dense than nickel-metal hydride and other batteries currently available. Batteries used in EVs and PHEVs discharge energy during vehicle use and are primarily recharged by connecting to the grid or other off-board electrical source, and in some cases are able to sustain a charge using an on-board internal-combustion-driven generator. Because an electric motor powered by a battery pack is about three times as energy efficient as an internal combustion engine, an EV can travel much farther than a conventional gas-powered car on the energy equivalent of one gallon of gasoline. Lithium-ion batteries also provide the benefit of multiple reuse options and high recyclability.

**Battery Chemical Composition.** The lithium-ion cells in new electric vehicles meet the requirements set forth by the Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment 2002/95/EC (commonly referred to as the Restriction of Hazardous Substances Directive or RoHS). In contrast to lead acid batteries used in ICE vehicles, lithium-ion batteries do not contain lead, mercury, cadmium, or any heavy metals or federally defined toxic materials. However, as potentially dangerous waste, businesses seeking to dispose of batteries must go through the EPA designation process before they may be safe for landfill disposal. Also, as described below, Washington Department of Ecology regulations may be more stringent than EPA regulations.

**Battery Recycling.** In terms of recycling, the parts, chemicals and components of lithium-ion batteries are highly recyclable. Given the toxicity of lead acid batteries, state law (RCW 70.95) and state regulations (WAC 173-331) tightly regulate the recycling and disposal of lead acid batteries. As described more fully in the Department of Ecology section below, these laws and regulations do not apply to lithium-ion batteries. Once a lithium-ion battery reaches its ultimate end of life, it can be processed at a commercial facility by being shredded and separated into its recyclable components. Metals and other compounds can be sold and the lithium may either be recycled back to battery manufacturers or disposed of as a nonhazardous material. Efforts are underway by industry groups and the federal government to develop increased capabilities for recycling lithium from EV batteries. The U.S. Department of Energy recently issued a grant to Toxco, a California company, to build the first recycling facility for lithium-ion batteries in the U.S.. Toxco has been recycling single-charge and rechargeable lithium batteries used in other devices at a facility in Trail, British Columbia.

**Battery Re-use.** When an electric vehicle battery reaches the end of life in its primary application, it may be possible to use it for a time in other purposes. These include standby power and utility load leveling where battery performance is not as demanding as a vehicle application. As such, opportunities for the reuse of

lithium-ion batteries after the end of their normal vehicle life are expected to be widely established in the near future. Automobile manufacturers will determine when a battery is no longer able to carry a sufficient charge to be used in the vehicle. It is anticipated that, at that point, lithium-ion batteries will still retain 70-80% of their residual capacity and could be reused for energy storage. In October 2009, Nissan Motors and Sumitomo Corporation announced joint plans for a new company, expected to be operational by late 2010 in Japan and the United States, to create a market for second-life EV batteries in such applications as back-up energy storage for solar photovoltaic systems, back-up power supplies, uninterruptable power supplies and load leveling for the electric grid. It has been reported that General Motors is studying similar reuse business models for EV batteries.

**Battery Handling and Storage.** As an identified nonhazardous material (as noted previously), handling and storage of EV batteries will likely fall under typical fire and safety codes established by the State Building Code Council (see below). One unique EV battery concept is battery exchange stations, which are intended to be strategically located automated facilities that can enable an EV with a swappable battery to quickly exchange a depleted battery with a fully charged battery. These have been identified as providing possible EV consumer opportunities in addition to battery charging stations. If battery exchange stations are implemented, those stations would presumably remove from the exchange pool any batteries that are beyond their useful life and would find opportunities for reuse and recycling of these batteries as noted above. Rules and regulations for the handling and storage of batteries, in settings such as car dealerships that may have multiple charged batteries on site, automotive parts stores, and in the context of a battery exchange station, are described below.

## Section 6.2: State Department of Ecology

**Existing Rules and Regulations.** RCW 70.95 and WAC 173-331 address vehicle batteries. The WAC was last updated in 1991 and, as defined in WAC 173-331-100 (14), this code does not apply to electric/hybrid batteries as the core does not consist of a lead element. WAC 173-331-100 (14) states: "Vehicle battery means any battery used or capable of use, without modification, in any vehicle, truck, mobile home, recreational vehicle, boat, airplane, or utility vehicle, having a core of elemental lead, with the capability to produce six or more volts. For purposes of application of the core charge only, a vehicle battery shall be a replacement battery and the core charge shall not apply to original battery installations."(Emphasis added). RCW 70.95.610(4) also defines batteries as including a core of elemental lead.

All batteries can be managed as a universal waste under WAC 173-303, Dangerous Waste Regulations, and under Federal Regulations. Electric/hybrid batteries may or may not be a dangerous waste (DW). Such a determination would be made through the designation process described below. At this time, the only apparent outlets that are likely to accept batteries are the vehicle dealerships/manufacturers. These outlets could be designated as a universal waste destination facility, a universal waste handler, a recycler, or a regulated generator, depending on how they manage the batteries. For example, when a car is brought to a dealer, and the dealer replaces the battery, the dealer becomes the generator of the spent battery taken out of the car. The dealer can manage that battery as a fully regulated DW or can manage the battery as a conditionally regulated DW battery under a process that the state (and EPA) calls universal wastes.

There are advantages to the generator to managing batteries as universal waste. They can become what are referred to as a universal waste handler, which has fewer regulations to follow than a dangerous waste generator. Under the universal waste regulations the battery can be recycled or disposed. With regard to transportation of the battery material, no hazardous waste manifest is required. However the battery may be regulated under Department of Transportation regulations as a hazardous material if it meets the criteria for one or more hazard classes specified in 40 Code of Federal Regulations 173.2.

Below is a link to the EPA website which discusses batteries.

<http://www.epa.gov/osw/hazard/wastetypes/universal/batteries.htm>

**Designation Process for Businesses Handling Batteries.** Businesses in Washington State (whether in this case a battery recycler, vehicle dealership, or auto repair shop taking back or replacing batteries) are responsible for knowing what and how much dangerous waste they generate. The Dangerous Waste Regulations (Chapter 173-303 WAC) describe the characteristics/properties (e.g., flammable, corrosive) that cause a waste to be considered dangerous and what amounts of waste would cause a business to be regulated as a dangerous waste generator. The designation process leads the business through the steps to take to make the determination on whether they generate a dangerous waste that would be subject to special handling requirements. There are exclusions for certain waste streams. The link below provides a tool that would help a business go through the designation process.

[http://www.ecy.wa.gov/programs/hwtr/reg\\_comp\\_guide/pages/des\\_intro.html](http://www.ecy.wa.gov/programs/hwtr/reg_comp_guide/pages/des_intro.html)

Prior to making a determination that the battery is safe for landfills, a business must go through the designation process. They may be safe for landfill disposal after treatment, but more information is needed. Also, Washington State Regulations may be more stringent than EPA regulations.

### **Section 6.3: State Building Code Council**

Section 16 of HB 1481 (codified as RCW 19.27.540) requires the State Building Code Council to adopt rules for electric vehicle infrastructure (EVI) requirements. Such rules must consider applicable national and international standards and be consistent with rules adopted under RCW 19.28.281 (Department of Labor and Industries, discussed in next section). Battery charging stations and rapid charging stations are likely to be freestanding facilities that are adjacent to a building but are not inside a building, and therefore would be regulated under Labor and Industry rules. Battery exchange stations, on the other hand, will be inside buildings and therefore are regulated under the rules set by the State Building Code Council.

In recognition of the directive in the RCW, the State Building Code Council has reviewed the existing rules in Chapters 51-50, 51, 52 and 54 of the WAC and determined that the rules provide for the regulation of EVI. With regard to building construction, current building codes and building occupancy classifications would allow for the installation of battery exchange stations, as discussed further below.

As with any commercial building, a building permit application for a battery exchange station would be accompanied with building plans designed by a registered professional and would include a proposed applicable occupancy classification. This occupancy classification would be reviewed and confirmed by the responsible Building Official and Fire Code Official.

The Building Official must classify by occupancy group the intended use of a proposed new or existing building as the first step to determine applicable technical requirements. The building code defines each occupancy and provides a list of specific included uses with the caveat “but not limited to” giving the building official flexibility to interpret inclusion of similar unstated uses.

A battery exchange station would most likely to be classified as a Group S-1 use (motor vehicle repair garages complying with the maximum allowable quantities of hazardous materials). However, given the relative size of possible associated occupancies such as Group B (motor vehicle showrooms) or Group M (motor fuel dispensing facilities), it could be deemed an accessory occupancy to one of these two. All three of these general occupancies (Storage Group S-1, Mercantile Group M and Business Group B) are often co-located in “mixed use” buildings and, as such, the building code deems them to be of similar fire hazard resulting in no need for physical fire separations between them.

In this regard, building code requirements can be determined for proposed battery exchange stations under existing code language. Current understanding of the operational scope of these stations indicates that they can most likely be constructed within the hazardous material thresholds allowed for the occupancy groups noted above and therefore would not be subject to the costly requirements of high-hazard Group H occupancies.

Simply stated, under the current building code, battery exchange stations can be introduced and readily accommodated in a new or existing commercial “strip” development, or as a stand-alone facility, at a reasonable cost. As a general rule, any proposed change of occupancy classification in existing buildings will require compliance with current technical requirements of the building code.

#### **Section 6.4: State Department of Labor and Industries**

Section 17 of HB 1481 (codified as RCW 19.28.281) requires the director of Labor and Industries to adopt rules for the installation of EVI. The rules must be consistent with rules adopted under RCW 19.27.540 (State Building Code Council, discussed previously).

Labor and Industries has reviewed the existing electrical laws in Chapter 19.28 RCW, rules in WAC 296-46B, and requirements in NFPA 70 (National Electrical Code), including Article 625 that specifically covers Electric Vehicle Charging Stations, and determined that these standards are comprehensive and applicable to the installation of electric vehicle charging systems as written. They meet the intent of RCW 19.28.281 and therefore there is no need for additional rule writing at this time. If any future rule revisions are needed and can be substantiated, the department has an established process which is consistent with the requirements of RCW 34.05 Administrative Procedure Act.

The local building official, fire protection authority or other building authority having jurisdiction (AHJ) will classify the occupancy and conditions of use in the environment where the charging equipment is installed. Once classified, the property owner or licensed electrical contractor (employing certified electricians) will purchase an electrical work permit from the electrical inspection AHJ, and install the electrical equipment in compliance with the appropriate wiring standards for the location. The electrical inspection will verify the electrical installation conforms to the applicable wiring standards for the designated environment.

Manufacturers who provide equipment in Washington must ensure that it is properly identified or labeled as conforming to appropriate safety standards to be approved by an electrical inspector. This means that the equipment will have a mark from an approved testing laboratory that has been applied at the factory or by a laboratory employee who performs an onsite field evaluation. Ultimately it is the responsibility of the equipment owner, however, to ensure that electrical equipment is properly identified and approved prior to energizing the equipment. A list of laboratories approved in Washington State can be found at:

<http://lni.wa.gov/TradesLicensing/Electrical/Install/ProdTest/default.asp>

# Section 3. Resources

## Regarding Electric Vehicle Infrastructure and Batteries

### Resource Documents

- City of Austin, Texas, *Resolution No. 050301-48* (04-12-94). “Buy Green, Drive Clean Program.”
- City of Austin, Texas, *Electric Vehicle Incentives — Guidelines, Dealerships, and Vehicles* (2008).
- City of Boise, Idaho Administrative Services Manager (John Eichmann) Memorandum to Mayor and Council recommending approval of *Zero Emission Vehicle (ZEV) Parking Ordinance* amending Boise City Code 10-17 to enable limited free parking at parking meters for Zero Emission Vehicles (2008).
- City of Davis, California Municipal Code 22.16.0 *Electric Vehicles*.
- City of Houston, Texas, *Project Get Ready: Preparing Cities for the Plug-in Electric Vehicle: Power of the Plug-in Program* (11-17-09).
- City of Indianapolis, Indiana, *Project Get Ready: Preparing Cities for the Plug-in Electric Vehicle — Indianapolis Region: Project Plug-IN* (2010).
- City of Minneapolis, Minnesota, John Bailey, David Morris, *Electric Vehicle Policy For the Midwest — A Scoping Document*. Prepared for the RE-AMP Network, New Rules Project (12-09).
- City of New York, *PlaNYC Exploring Electric Vehicle Adoption in New York City* (01-10).
- City of Sacramento, California, *Resolution No. 94189 of the Sacramento City Council Supporting Electric Vehicle Readiness Program* (04-12-94).
- City of San Diego, California, *Council Policy 600-27 Affordable Housing/In-Fill Housing and Sustainable Building Expedite Program* (05-20-03); *Council Policy 900-14, Sustainable Building Policy* (05-20-03); *Resolution No. 715-00* (07-28-00).
- City and County of San Francisco, California, *Resolution No. 715-00, File No. 001399; Resolution encouraging California Governor Gray Davis to uphold the existing California Air Resources Board zero emission vehicle mandate, which requires that at least four percent of the 2003 model year passenger cars and light duty trucks offered for sale in California be zero emission vehicles* (08-07-00).
- City of San Jose, California, *Resolution No. 74769 — A Resolution of the Council of the City of San Jose Amending the Master Parking Rate Schedule to Increase Flexibility in Setting Parking Rates at the Convention Center and Almaden/Woz Parking Lots for Events at the Convention Center; and Repeal Resolution No. 74210 Effective on July 1, 2009* (01-27-09).
- City of Tacoma, Washington, Community and Economic Development Dept., Annual Amendment Application No. 2010-08, *Electric Vehicle Infrastructure* (01-25-10).
- City of Toronto, Ontario, Canada, *The Toronto Atmospheric Fund — Fleetwise Program* (1998-2010).
- City of Vacaville, California, *City of Vacaville’s Electric Vehicle (EV) Program* (2004).
- City of Vancouver, British Columbia, Canada, *Building By-Law No. 9936 amending Building By-law No. 9419 §13.2.1 Electric Vehicle Charging; §13.2.1.1 Parking Stalls; §13.2.1.2 Electrical Room* (04-20-11).

- City of Vancouver, British Columbia, Canada, *Policy Report Development and Building Report on Electric Vehicle Charging* (06-22-09).
- County of Sonoma, California, *Building Green Policy, Resolution No. 08-0947* (11-04-08). *Draft Resolution Adopting Guidelines, Rating Systems and Compliance Thresholds for the Sonoma County Green Building Program* proposed to be adopted 02-2010.
- David Diamond, Ph.D., LMI Research Institute, *Impact of High Occupancy Vehicle (HOV) Lane Incentives for Hybrids in Virginia* (2008).
- Don Chandler, Past President, Vancouver Electric Vehicle Association, *Pulling the Copper* (November 2009).
- Electric Transportation Engineering Corporation, sponsored by Natural Resources Canada, *Electric Vehicle Charging Infrastructure Deployment Guidelines British Columbia* (July 2009).
- eTec, an ecotality company, *Electric Vehicle Charging Infrastructure Deployment Guidelines for The Central Puget Sound Area* (April 2010).
- Great London Authority, *London's Electric Vehicle Infrastructure Strategy* (December 2009).
- Kelly Sims Gallagher and Erich J. Muehlegger, John F. Kennedy School of Government, Harvard University, *Giving Green to Get Green? Incentives and Consumer Adoption of Hybrid Vehicle Technology* (October 2007).
- National Electrical Code Handbook, *Article 625, Electric Vehicle Charging System* (2008).
- Oregon Advisory Team, *The EV Project, Summary of Localization Findings* (02-05-10).
- Plug In America, *Charged Up & Ready to Roll, The Definitive Guide to Plug-In Electric Vehicles, 1<sup>st</sup> Edition* (January 2010).
- State of California Department of General Services Division of the State Architect: DSA — California Access Compliance Policy 97-03 *Interim Disabled Access Guidelines for Electrical Vehicle Charging* (06-05-97).
- State of California Public Utilities Commission, Policy and Planning Division, Staff White Paper *Light-Duty Vehicle Electrification in California: Potential Barriers and Opportunities* (05-22-09).
- State of California Public Utilities Commission, *Order Instituting Rulemaking to Consider Alternative-Fueled Vehicle Tariffs, Infrastructure and Policies to Support California's Greenhouse Gas Emissions Reductions Goals* (08-24-09).
- State of California, San Francisco Bay Area Mayors, Mayor News Release *Mayors Aim to Make San Francisco Bay Area the Electric Vehicle Capital of the U.S.* (11/20/08).
- State of California Vehicle Code § 22511, *Zero-Emission Vehicles: Display of Decal* (01-01-03).
- State of Delaware, Senate Bill No. 153 *An Act to Amend Title 26 of the Delaware Code Relating to Customer Sited Energy Resources* (06-09-09).
- State of Florida, draft *Electric Automobile Incentives Bill, (3) Tax Credits for Installation of Public Charging Stations* (2010).
- State of Florida, draft *Electric Vehicle Incentives Bill* (Proposal) (2009).
- State of Hawaii, Act 290 (S.B. 1160), *A Bill for an Act Relating to Electric Vehicles* (07-01-97).
- State of Hawaii, Revised Statutes §291-71 *Designation of parking spaces for electric vehicles; charging units and §291-72 Parking spaces reserved for electric vehicles; penalties* (2009) (effective 01-01-12).
- State of Hawaii, S.B. No. 1202, *A Bill for an Act relating to Transportation Energy Initiatives* (2009).

- State of Hawaii, S.B. 2231 § 196 *Placement of electric vehicle charging system* (2010).
- State of Minnesota, Chapter 134-H.F. No. 1250, *An act relating to transportation; regulating electric vehicle infrastructure; amending Minnesota Statutes 2008, sections 16C.137, subdivision 1; 169.011, by adding subdivision; 216B02, subdivision 4; 216B-241, subdivision 9; Laws 2006, chapter 245, section 1; Laws 2008, chapter 287, article I, section 118; proposing coding for new law in Minnesota Statutes, chapter 325F* (05-21-09).
- State of Oregon, Building Codes Division, Statewide Alternate Method No. OESC 09-01 (Ref: ORS 455.060) *Approval of the use of a demand factor table for calculating Electric Vehicle charging equipment services and feeders* (09-04-09).
- State of Oregon, Department of Consumer and Business Services, Building Codes Division, Division 311, *Miscellaneous Electrical Rules* (Effective 10-01-09).
- State of Oregon, Department of Consumer and Business Services Press Release *New building codes standards support electric vehicle growth* (10-14-08).
- State of Oregon, Dennis Clements, Chief Electrical Inspector, Building Codes Division, *Expediting the permit process for installation of EVSE* (02-12-10).
- State of Oregon, Alternative Fuel Vehicle Infrastructure Working Group, *Report of the Alternative Fuel Vehicle Infrastructure Working Group* (January 2010).
- Teal Brown, John Mikulin, Nadia Rhazi, Joachim Seel, and Mark Zimring, Goldman School of Public Policy, University of California, Berkeley, Renewable & Appropriate Energy Laboratory (RAEL) Policy Brief, *Bay Area Electrified Vehicle Charging Infrastructure: Options for Accelerating Consumer Access*, (June 2010).
- The Massachusetts Division of Energy Resources, *Installation Guide for Electric Vehicle Charging Equipment* (September 2000).
- The Royal Academy of Engineering, London, England, *Electric Vehicles: charged with potential* (May 2010).

## Glossary of Terms

- **AC** — Alternating Current, an electric current which changes direction with a regular frequency.
- **AFV** — Alternative Fuel Vehicle.
- **AHJ** — Authority Having Jurisdiction, a term used in National Electric Code to denote lead jurisdiction on electrical matters.
- **BEV** — Battery Electric Vehicle (see definitions Chapter in Model Regulations).
- **Circuit Breaker** — A device designed to open and close a circuit by non-automatic means and to open the circuit automatically on a pre-determined overcurrent without damage to itself when properly applied within its rating.
- **Commerce** — Washington State Department of Commerce.
- **Continuous Load** — A load where the maximum current is expected to continue for 3 hours or more.
- **Current** — The flow of electricity commonly measured in amperes.
- **DC** — Direct Current, an electric current that moves in one direction from anode to cathode.
- **DOE** — United States Department of Energy.
- **DOT** — United States Department of Transportation.
- **DW** — Dangerous Waste, under Ecology rules.
- **Ecology** — Washington State Department of Ecology.
- **EPRI** — Electric Power Research Institute, a utilities industry-based research group.
- **EREV** — Extended Range Electric Vehicle (see PHEV).
- **EV** — Electric Vehicle (see definitions Chapter in Model Regulations).
- **EVI** — Electric Vehicle Infrastructure (see EVSE).
- **EVSE** — Electric Vehicle Supply Equipment, industry acronym for charging hardware located at charging stations provided for the purpose of charging electric vehicle batteries.
- **FHWA** — US Federal Highways Administration.
- **GHG** — Greenhouse Gases.
- **GMA** — Washington State Growth Management Act.
- **HB 1481** — Second Substitute House Bill 1481, from the 2009 session of the Washington State Legislature.
- **ICE** — Internal Combustion Engine.
- **Inverter** — An electrical device which is designed to convert direct current into alternating current.
- **J1772** — Industry-wide standard EV connector.
- **JARI** — Japan Automobile Research Institute.
- **kWh** — Kilowatt hour, a unit of energy commonly used for measuring the energy capacity of a battery. This is the normal quantity used for metering and billing electricity customers.
- **Lithium-ion** — The type of chemistry used in a majority of modern electric vehicles. Lithium-ion batteries are lighter in weight and have higher energy density than previous types of batteries designed

to power these vehicles. Unlike prior generations of rechargeable batteries, lithium-ion batteries lose very little energy when stored or not in use, and are considered to be highly recyclable due to their construction with generally non-hazardous materials.

- **L&I** — Washington State Department of Labor and Industries (also, LNI).
- **MUTCD** — Manual on Uniform Traffic Control Devices, maintained by the U.S. Department of Transportation (Federal Highway Administration).
- **NEC** — National Electrical Code. A code/guideline used for the safeguarding of people and property from hazards related to the use of electricity. It is sponsored and regularly updated by the National Fire Protection Association.
- **NEV** — Neighborhood electric vehicle, largely synonymous with LSV, for low speed vehicle.
- **NiMH** — Nickel metal hydride, a popular battery type for hybrid electric vehicles.
- **NREL** — National Renewable Energy Laboratory, a Colorado-based unit of the U.S. Department of Energy.
- **Phase** — Classification of an AC circuit, usually single-phase, two wire, three wire, or four wire; or three-phase, three wire, or four wire.
- **PHEV** — Plug-in hybrid electric vehicle (see definitions Chapter in Model Regulations).
- **PSRC** — Puget Sound Regional Council.
- **RCW** — Revised Code of Washington.
- **SAE** — SAE International, formerly the Society of Automotive Engineers.
- **SEPA** — Washington State Environmental Policy Act.
- **TEPCO** — Tokyo Electric Power Company.
- **TOU** — Time of Use, an electricity billing method with rates based upon the time of usage during the day.
- **UTC** — Washington State Utilities and Trade Commission.
- **VMT** — Vehicle Miles Traveled.
- **Volt** — The electrical potential difference or pressure across a one ohm resistance carrying a current of one ampere.
- **Volt Ampere** — A unit of apparent power equal to the mathematical product of a circuit voltage and amperes. Here, apparent power is in contrast to real power. On AC systems the voltage and current will not be in phase if reactive power is being transmitted. Usually abbreviated VA.
- **V2G** — Vehicle-To-Grid, the concept of using electric vehicles as energy storage devices for the electric grid.
- **Watt** — A unit of power equal to the rate of work represented by a current of one ampere under a pressure of one volt.
- **WAC** — Washington Administrative Code.
- **WEVA** — World Electric Vehicle Association, a group with local affiliates including the Seattle and Tacoma Electric Vehicle Associations.
- **WSDOT** — Washington State Department of Transportation.
- **ZEV** — Zero Emission Vehicle.

## Footnotes

- <sup>1</sup> Washington State Legislature, 61<sup>st</sup> Legislature, 2009 Regular Session, Chapter 459, Laws of 2009, *Electric Vehicles*, (07/26/09).
- <sup>2</sup> State of Washington Department of Commerce, State Energy Strategy, update due December 2010, <http://www.commerce.wa.gov/site/1327/default.aspx>.
- <sup>3</sup> State of Washington Department of Commerce, Local Government Division, Growth Management Services, *Keeping Your Comprehensive Plan and Development Regulations Current*, "A Guide to the Periodic Update Process under the Growth Management Act," (April 2010).
- <sup>4</sup> March 22, 2010 Memorandum from Plug In America on Electric Vehicle Infrastructure Code Research.
- <sup>5</sup> March 22, 2010 Memorandum from LightMoves on Local Government Electric Vehicle Infrastructure Phone Interviews.
- <sup>6</sup> RCW 36.70A.130(1)(d).
- <sup>7</sup> RCW 36.70A 130(2)(a).
- <sup>8</sup> RCW 36.70A.130(2)(b).
- <sup>9</sup> RCW 43.21C.031.
- <sup>10</sup> RCW 43.21C.030(2)(c).
- <sup>11</sup> WAC 197-11-704(1).
- <sup>12</sup> The Washington Constitution prohibits state and local governments from giving or loaning public funds to private individuals, companies, or associations. Const. art. VII, §§ 5, 7.
- <sup>13</sup> *Citizens Protecting Resources v. Yakima County*, 152 Wn. App. 914, 920, 219 P.3d 730 (2009) and RCW 40.01.250(1).
- <sup>14</sup> *Washington State Attorney General's Office v. Washington Utilities*, 128 Wn. App. 818, 116 P.3d 1064 (2005).
- <sup>15</sup> See Resource Documents in Section 3.
- <sup>16</sup> *Washington Utilities and Transportation Commission v. Washington Natural Gas Company*, Third Supplemental Order Granting Motion to Dismiss Public Refueling Station Schedule, Docket No. UG-920840 (March 12, 1993).
- <sup>17</sup> WAC 480-100-505 (Adopted February 25, 2010. Commission filed its Adoption Order with the Code Reviser on March 24, 2010. Effective April 24, 2010.).
- <sup>18</sup> eTec, Final *Electric Vehicle Charging Infrastructure Deployment Guidelines for The Central Puget Sound Area* (April 2010). Also See Plug In America, *Charged Up & Ready to Roll*, The Definitive Guide to Plug-In Electric Vehicles, 1<sup>st</sup> Edition (January 2010).
- <sup>19</sup> See sources cited at note 18.
- <sup>20</sup> State of Oregon, Alternative Fuel Vehicle Infrastructure Working Group, *Report of the Alternative Fuel Vehicle Infrastructure Working Group* (January 2010).
- <sup>21</sup> State of Minnesota, Chapter 134-H.F. No. 1250, *An act relating to transportation; regulating electric vehicle infrastructure; amending Minnesota Statutes 2008, sections 16C.137, subdivision 1; 169.011, by adding subdivision; 216B02, subdivision 4; 216B-241, subdivision 9; Laws 2006, chapter 245, section 1; Laws 2008, chapter 287, article 1, section 118; proposing coding for new law in Minnesota Statutes, chapter 325F* (05-21-09).
- <sup>22</sup> City of Davis, California Municipal Code 22.16.0 *Electric Vehicles*.

- <sup>23</sup> May 4, 2010 Memorandum from Plug In America on Web-based Electric Vehicle Consumer Survey.
- <sup>24</sup> U.S. Department of Transportation, *Manual on Uniform Traffic Control Devices for Streets and Highways: 2009 Edition*, <http://mutcd.fhwa.dot.gov/pdfs/2009/mutcd2009edition.pdf> (2009).
- <sup>25</sup> Federal Highway Administration Transportation Pooled Fund Program TPF-5(065) Traffic Control Device (TCD) Consortium <http://www.pooledfund.org/projectdetails.asp?id=281&status=4> (Jan-Mar 2010)



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