Electric Vehicle Policies, Fleet, and Infrastructure: Synthesis

Prepared for
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Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WSDOT staff. Online and print sources may include newspaper and periodical articles, NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs and related academic and industry research. Internet hyperlinks in the TSRs are active at the time of publication, but host server changes can make them obsolete.

Request for Synthesis

The request from the Public Private Partnerships Office is for information related to the following:

Electric Vehicle Policies and Electric Vehicle Fleet

- Governmental incentives to encourage investment in electric vehicles and infrastructure;
- Laws regulating type and use of electric vehicles on state highways;
- Transportation tax policies related to electric vehicles;
- HOV lane access for electric vehicles;
- Electric vehicle purchase orders and bulk pricing; and
- Coordinated procurement for EVs with suppliers and other examples

Electric Vehicle Infrastructure

- Lease of state land for electric charging stations;
- Electric charging stations at rest areas and DOT maintenance facilities;
- Consistent interstate way-finder signage;
- Parking and ADA policies as applied to EV charging stations;
- Agreements with power companies/public utilities for EV charging stations;
- Public/private partnerships with EV charge station providers to fund infrastructure;
- Technology standards and data collection for electric vehicles

Databases Searched

- TRID - A Transportation Research Database at the Transportation Research Board (TRB)
- Research in Progress (RiP) – A Database of Current Transportation Research at TRB
- Previous Synthesis Reports on WSDOT Research Website
- Google
- Wisconsin DOT Transportation Synthesis Reports

- Federal Transit Administration (FTA) website
- Federal Highway Administration (FHWA) website
- International Transportation and other Research Websites

Contents

Synthesis Topics

US Governmental incentives and policies for investment in electric vehicles and infrastructure

State Electric Vehicle Incentives

National Conference of State Legislatures (NCSL), September 2011

The National Conference of State Legislatures has released a report that highlights the incentives that 27 states and the District of Columbia offer to promote electric vehicles (EVs). According to the NCSL, 13 states currently have pending legislation relating to incentives. These incentives include high-occupancy vehicle lane exemptions for EVs as well as monetary incentives, such as tax exemptions or credits and registration fee reductions, emission test exemptions, and parking incentives.
http://www.ncsl.org/default.aspx?TabId=19324

State and Federal Incentives
Plug In America, 2011

This website includes a chart of state and federal incentive such as the rate, rebate or tax income benefit, sales tax exemption, conversions, carpool lane access, and infrastructure incentives in use.
http://www.pluginamerica.org/incentives

US Department of Energy: Federal and State Incentives and Laws
USDOE Energy Efficiency & Renewable Energy Website, 2011

This section allows you to browse and search a database of federal and state laws and incentives related to alternative fuels and vehicles, air quality, fuel efficiency, and other transportation-related topics.
http://www.afdc.energy.gov/afdc/laws/

Government Incentives Required
Clean Car Options.com website, 2011

The Poultry Problem: Government incentives will undoubtedly be required to initiate any new alternative vehicle transportation system. Energy suppliers will not install new fuel systems until there are many cars on the road, and automobile companies will not produce large numbers of alternative vehicles until the fueling infrastructure is in place....the "poultry" or "chicken and egg" problem. Government incentives or subsidies will most likely be required for both the fueling infrastructure and for buying down the incremental cost of alternative vehicles.

Summary of fueling infrastructure investments required: The model calculates total government incentives required for hydrogen infrastructure to support fuel cell electric vehicles (FCEVs) and the necessary public charging outlets to support battery electric vehicles (BEVs) [Note: previous versions of this table were based on the assumption that the initial hydrogen fueling stations used on-site steam methane reformers; however, it is less expensive to install mobile refuelers, or stations based on storing liquid hydrogen. although these options result in higher hydrogen costs, they do reduce the initial capital investments necessary to jump-start the new fueling infrastructures. This table summarizes the results: along with a summary of the government incentives required to buy-down the cost of alternative vehicles.
http://www.cleancaroptions.com/html/government_incentives_required.html

Recovery Act Awards for Electric Drive Vehicle Battery and Component Manufacturing Initiative
Office of Energy Efficiency and Renewable Energy Website (EERE) Website; 2010

The EERE site offers a variety of resources and news about the Office of Energy Efficiency and Renewable Energy. This page contains a list of Award Winners for Recovery Act funds in 2010.
http://www1.eere.energy.gov/recovery/pdfs/battery_awardee_list.pdf

Policy options for electric vehicle charging infrastructure in C40 cities
For Stephen Crolius, Director – Transportation, Clinton Climate Initiative; Alfred Wiederer & Ronald Philip (MPP '10) , Advisor, Prof. Jose Gomez-Ibanez, Harvard Kennedy School; May 2010

Executive Summary: This Policy Analysis Exercise seeks to make policy recommendations to the Clinton Climate Initiative (CCI), on the deployment of electric vehicle (EV) charging infrastructure in C40 cities - a group of the world's largest cities, which have committed to take action on climate change by reducing

greenhouse gases, including from the transport fleet. The C40 Electric Vehicle Network (C40 EVN) is a C40 initiative to facilitate the successful introduction of EVs through collective municipal actions including planning and deployment of charging infrastructure, streamlining permitting processes associated with charging infrastructure, providing monetary and non-monetary incentives and mobilizing demand for EVs in city fleets.

CCI had requested us to undertake analysis and make recommendations on the deployment of EV charging infrastructure in C40 cities. This analysis included understanding potential barriers (policy, technological, economic, etc) to the deployment of EV charging infrastructure, understanding how various cities were approaching the issue, and the policy levers that cities could employ in increasing the viability of EV charging infrastructure. Based on this research, we have made a series of recommendations on policy actions that cities can take to increase the deployment of EV charging infrastructure.
http://www.innovations.harvard.edu/cache/documents/11089/1108934.pdf

Plug-in Electric Vehicles: A Practical Plan for Progress
The Report of an Expert Panel; School of Public and Environmental Affairs at Indiana University; February 2011
Executive Summary: . . .This report examines public policies toward PEVs, taking into account the promise and limitations of PEVs, recent improvements in battery technology, market dynamics, and the proliferation of policies around the world that promote the use of PEVs. Our focus is primarily near term (i.e., 2011-25), recognizing that the transportation electrification process will evolve in stages based on the learning that occurs in the years and decades ahead. The report represents the views of the Transport Electrification Panel (TEP), a group of experts from multiple disciplines and organizations commissioned by the Indiana University School of Public and Environmental Affairs (IU SPEA). A team of graduate students and faculty from IU SPEA support TEP's work, but the findings and recommendations in this report are strictly those of TEP.
http://www.indiana.edu/~spea/pubs/TEP_combined.pdf

State Clean Energy Financing Guidebook
National Governors Association (NGA), January 2011
To help states consider innovative clean energy program financing options that maximize state resources, the NGA Center released the *State Clean Energy Financing Guidebook*. The Guidebook helps states consider three important elements of a clean energy financing program: sources of capital including bonds, state revenues, and private capital.
The report suggests states explore specific approaches, including:

- Establishing revolving loan funds to recycle funds in the state's economy;
- Developing utility on –bill financing programs to marry repayment with the source of savings;
- Creating linked deposit or loan purchase programs, which help leverage private capital;
- Pooling state building upgrades to support tax-exempt bond financing; and
- Using energy savings performance contracting or power purchase agreements for state buildings.

The Guidebook also provides case studies from five states – Illinois, Oregon, Pennsylvania, Texas, and Washington – that have successfully implemented innovative financing programs.
http://www.nga.org/cms/home/nga-center-for-best-practices/center-publications/page-eet-publications/col2-content/main-content-list/state-clean-energy-financing-gui.html

Taking Charge: Establishing California Leadership in the Plug-in Electric Vehicle Marketplace
By Ryan W. McCarthy, Thomas S. Turrentine, Kevin A. Nesbitt, Joshua M. Cunningham, and Josh Boone; Plug-in Hybrid & Electrical Vehicle Research Center, Institute of Transportation Studies, UC Davis; Prepared for the California Plug-in Electric Vehicle Collaborative; December 2010

Abstract:
A new industry is blooming in response to energy and environmental needs and economic opportunities. California is Taking Charge, establishing its leadership in the plug-in electric vehicle marketplace.

California's long history of cultural and technological innovation, particularly around automotive lifestyles, makes it well suited to lead a transition to electric-drive transportation and plug-in electric vehicles. With an eager consumer base, ongoing technology and policy leadership, and a clean electricity grid, the state is well-positioned to provide a leading example of successful plug-in electric vehicle (PEV) market growth for other regions to follow. Such a transition can help bring energy security, air quality, climate change, public health, and economic benefits to California. PEV technology is already enhancing California's competitiveness in the global marketplace and providing for the state's sustainable growth in the 21st Century.

The state has an opportunity to continue demonstrating cultural leadership and capitalize on the coming PEV market. It has the economic, political, social, and technological wherewithal to shape the market, affect desired outcomes, and position itself as an economic center for PEV industries. Developing a sustained market for PEVs in California will take concerted effort. Multiple stakeholders are already working to create a strong foundation for the PEV market. This plan leverages their ongoing and extensive activities and recommends new actions that require their coordination. Their collaboration will help California Take Charge in the global transition to PEVs.

This plan aspires to facilitate PEV market growth so that, by the end of the decade, the annual sale of hundreds of thousands of PEVs in California and the market contributes significantly to California's ongoing economic, energy, and environmental policy objectives. Its strategic focus intends to solidify California as a technological, manufacturing, economic, and policy leader that benefits from — and shapes — the global PEV market for decades to come.
http://pubs.its.ucdavis.edu/publication_detail.php?id=1436

Electrification Roadmap: Revolutionizing Transportation and Achieving Energy Security
Electrification Coalition, WA DC; November 2009
This comprehensive report outlines a vision for a fully integrated electric drive network in the United States.

The Electrification Roadmap examines the challenges facing electrification, including battery technology and cost, infrastructure financing, regulatory requirements, electric power sector interface, and consumer acceptance issues. The Roadmap provides policymakers and business leaders with a framework for overcoming these challenges in order to drive meaningful reductions in U.S. oil dependence.
Download PDF: http://www.electrificationcoalition.org/policy/electrification-roadmap

Policies to Promote Plug-in Hybrid Electric Vehicles for Greenhouse Gas Emissions Reductions and Oil Displacement
2009 Transportation Research Board Annual Meeting Paper #09-3077; 2009

The electric power and transportation sectors represent the largest greenhouse gas (GHG) emissions sources in the United States. A unique opportunity for coupling these systems via plug-in hybrid electric vehicles (PHEVs), which use electricity from the grid to power a portion of travel, could achieve synergistic environmental (GHG emissions reductions) and energy security (petroleum displacement) benefits. About 94% of U.S. households have access to off-street parking at their residence, although this varies by region and between homeowners and renters. We use engineering economic analysis to evaluate the policy actions required for adoption of PHEVs. Based on PHEV size, we find that PHEVs would require a net present value subsidy of $0, $5,500, and $13,000 to be economically competitive for PHEVs with 10, 30, and 50 miles of electric range, respectively. The results are highly sensitive to the battery cost, the price of gasoline, and the battery size and to address the uncertainty of the parameters in the model, the researchers conducted a Monte Carlo analysis. The supply cost curves for both GHG and oil displacement with policy incentives for PHEVs become steep quickly as PHEV battery capacity (and hence premium) are increased. Government policies to support PHEVs should aim to provide a bundle of value to PHEV consumers to compensate for the technology risk and premium, to achieved desired widespread adoption. Depending on the objectives of government policies (GHG reduction, oil displacement, etc.), analysis must be undertaken to improve the effectiveness of incentive policies in the passenger transportation sector.
Order URL: http://pubsindex.trb.org/orderform.html

Where Will EV Chargers be in 2015?
General Electric (GE) Reports, 2011

Head start: In the lead: The U.S. is poised to take the lead in rolling out EV chargers.

In a global push to accelerate adoption of electric vehicles and to build out EV infrastructure on a large scale, GE plans to convert half of its global fleet of cars to EVs by 2015. The purchase of 25,000 EVs for its fleet and for GE's fleet customers, announced today, is the largest single EV commitment ever. With GE's technologies all along the EV chain — from renewable power generation to smart grid transformers to EV chargers — GE estimates that a wide-scale EV transformation will lead to up to $500 million in near-term business for GE.
http://www.gereports.com/in-largest-single-commitment-ge-to-buy-25000-electric-vehicles/

Go Electric Drive: EV Incentives by Zip Code
Go Electric Drive Website Resource Locator, 2011

Find Plug-in Electric resources near you now! Search your zip or postal code then click on the map areas or icons for more information.
http://www.goelectricdrive.com/Incentives.aspx

International Incentives

Europe

Europe's Incentive Plans for Spurring E.V. Sales
By Paul Ockenos, NY Times International, July 29, 2011

European governments are reaching deep into their pockets and plumbing the depths of their imaginations to get electric vehicles out of showrooms and onto the highway. The goals of the individual

countries are mostly similar — carbon-free fleets in pollution-free cities — many different approaches to making it happen are in place.
. . . Currently, 17 of the 27 European Union countries levy carbon dioxide related taxes on passenger cars, and 15 nations offer tax incentives for plug-in vehicles, according the European Automobile Manufacturers' Association.
http://www.nytimes.com/2011/07/31/automobiles/europes-incentive-plans-for-spurring-ev-sales.html

Overview of Tax Incentive for Electric Vehicles in the European Union (EU)
European Automobile Manufacturers' Association Website, 2011

The chart provides EV tax incentives by type and by country in the European Union.
http://www.acea.be/images/uploads/files/20100420_EV_tax_overview.pdf

Energy Efficiency and Renewable Energy (EERE) News
Office of Energy Efficiency and Renewable Energy Website (EERE), 2011

The EERE News site offers a variety of resources and news for media and others who are interested in learning more about the Office of Energy Efficiency and Renewable Energy (EERE). Here you will find press releases, newsletters, speeches, featured stories and links from the EERE home page, and other resources detailing EERE's most recent activities and efforts.
http://apps1.eere.energy.gov/news/index.cfm

International Energy Agency (IEA) and Eight Countries Launch Electric Vehicles Initiative
Energy Efficiency and Renewable Energy News, EERE Network, October 06, 2010

The International Energy Agency (IEA) joined China, France, Germany, Japan, South Africa, Spain, Sweden, and the United States in launching the Electric Vehicles Initiative (EVI) on October 1 at the Paris Motor Show in France. The new initiative will provide a platform for global cooperation on the development and deployment of electric vehicles. The EVI began at the Clean Energy Ministerial held in Washington, D.C., in July 2010; and cemented during IEA's Advanced Vehicle Leadership Forum, a two-day roundtable on electric vehicles (EVs) and plug-in hybrids held at the Paris Motor Show. Countries participating in the EVI have agreed to promote EV demonstrations in urban area and share the results; to share information on EV research and development programs; and to collect and share information on EV deployment targets, best practices, and policies. The participating countries will present detailed plans at Electric Vehicle Symposium-25 in Shenzhen, China, in November, and initial EVI results planned for presentations at the Shanghai Motor Show in April 2011.
http://apps1.eere.energy.gov/news/news_detail.cfm/news_id=16387

France

France May Keep Financial Support for Electric Cars, Figaro Says
By Andrea Rothman; Bloomberg News; September 6, 2011

France is likely to maintain financial support for electric- and hybrid cars as the government seeks to encourage their use, Le Figaro said.
http://www.bloomberg.com/news/2011-09-07/france-may-keep-financial-support-for-electric-cars-figaro-says.html

Belgium

Life Cycle Cost Analysis of Alternative Vehicles and Fuels in Belgium

By Laurence Turcksin, Cathy Macharis, Nele Sergeant, Joeri Van Mierlo; EVS24; Stavanger, Norway, May 13-16, 2009

Abstract: This paper investigated whether the vehicle taxation system in Belgium is stimulating the demand of clean vehicle technologies. The researchers performed a life cycle cost analysis to evaluate the cost-efficiency of several vehicle technologies within the current fiscal system. This life cycle cost was weighted against the environmental performance of each vehicle to discover the market potential of environmental friendly vehicles and to define necessary fiscal regulations. Additionally, the researchers made a comparison of the yearly taxes and external costs (environmental, congestion, accident costs) of each vehicle compared, identifying the strengths and distortions of the Belgian fiscal system with respect to the promotion of clean vehicles. Moreover, the researchers examined whether a new vehicle taxation system, based on the environmental performance of vehicles, would be effective in tackling the current distortions while keeping the good incentives for stimulating the demand of clean vehicle technologies. The basis of the new vehicle taxation system is an environmental rating tool, the so-called Ecoscore. The Ecoscore enables a comparison of the environmental burden caused by vehicles with different drive trains and using different fuels and is in this respect a very appropriate instrument to introduce a technology neutral reform of the fiscal system. By calculating the tax burden of several vehicles within the current and new fiscal system, the assessment is whether this new fiscal system is able to evoke a shift in the composition of the vehicle fleet towards one that is more environmental friendly.
http://www.cars21.com/files/papers/Turcksin-paper.pdf

Norway, Sweden, and Denmark

Electric Vehicle Policies in Norway
Lars Ole Valøen, CTO, Miljø Innovasjon AS; PPP; 2011

Norwegian EV Incentives

– Exempt from non-recurring vehicle fees
– Exempt from sales tax
– Exempt from annual road tax
– Free parking where there is public parking
– EVs permitted in bus and taxi lanes
– Free use of toll roads
– Exempt from taxation for company car benefit tax (from 01.01.2009)

Incentives for EVs in other Nordic Countries: Denmark and Sweden

• Denmark
– Exempt from registration fee (import duty)
• Import duty is higher than in Norway
– Exempt from road toll
• Sweden
– Cash incentives
– Exempt from congestion charges and some parking fees
http://www.emc-mec.ca/files/Electric_Mobility_Canada_2008_open.pdf

Canada

Canada: Ontario government emerging as EV hub

By Beth Buczynski, Electric Vehicle Update, September 28, 2011

With the announcement of a $441 million grant for EV technology, the Canadian state of Ontario is becoming a model example of what it takes to get EVs on the road and users behind the wheel.

The government of Ontario recently announced an investment of C$432 million (US$441 million) to advance the development of electric vehicle technologies. Some C$48.4 million of the total investment will come from the provincial government.
http://analysis.evupdate.com/industry-insight/canada-ontario-government-emerging-ev-hub

Asia

China

China to Subsidize Electric Cars and Hybrids
By Jim Motavalli; *NY Times*; June 2, 2010

The Chinese government appears determined to electrify transportation, and it is putting money in place alongside its rhetoric. To that end, the Chinese Ministry of Finance announced on Tuesday a pilot program in five cities to subsidize the purchase of electric and hybrid cars. It is unclear when the program will begin.
http://wheels.blogs.nytimes.com/2010/06/02/china-to-start-pilot-program-providing-subsidies-for-electric-cars-and-hybrids/

Taxes slashed to cut emissions
ChinaDaily.com; June 6, 2011
Beijing – Electric vehicles will be exempt from annual taxes starting from Jan. 1 next year, according to a draft regulation by China's State Council.
http://www.chinadaily.com.cn/cndy/2011-06/20/content_12731970.htm

Japan

Japan Automobile Research Institute (JARI)
JARI Website, 2011

Japan Automobile Research Institute (JARI), established through the reorganization of the former Automobile High-Speed Proving Ground Foundation in April 1969, engages in general research on automobiles. It started as a public-service corporation of a test-research organization intended to contribute to healthy development of the automotive society. It has since progressed with the development of automobiles in Japan.
http://www.jari.or.jp/english/about-jari/

Fact Sheet: Japanese Government Incentives for the Purchase of Environmentally Friendly Vehicles
Japanese Automobile Manufacturers Association (JAMA), September, 2009

In May 2009, the Japanese Diet passed the "Green" Vehicle Purchasing Promotion

Measures providing incentives designed to promote consumer purchases of new, ecofriendly vehicles in the Japanese market place while at the same time providing a stimulus to auto sales which are lagging as a result of the economic recession. This fact sheet describes these measures and provides the attached chart, which puts them in outline form.
http://jama.org/pdf/FactSheet10-2009-09-24.pdf

For the Next Generation: EV, HEV & FCV: Incentives for EV and HEV's
Japan Automobile Research Institute (JARI); Oct. 2003
Published by the Electric Vehicle Association of the Asia Pacific (EVAAP); 2011

Article describes the national initiative to diffuse clean energy vehicles. Adoption of various approaches, including the establishment of a diffusion goal, subsidies for purchasers and R&D and demonstration programs, tax incentives, regulation and standardization, and public education occurred. However, it is naturally not easy to change an already well established automobile society in spite of its problems. Electric vehicles are still having difficulty gaining wide acceptance and use. It will be necessary to persevere with efforts for the comprehensive introduction of different types of clean vehicles into targeted markets. It is also indispensable to provide wider publicity for clean and sustainable transportation, and to gain more general public support and acceptance.
http://www.evaap.org/pdf/incentive.pdf

Taiwan

Overview of the Taiwan LEV National Program
By Shu Jet P.H., Wang James Han Ying, Lin Chiu Feng, Wang Yung-Miao, Chang Tsu Kun
World Electric Vehicle Journal Vol. 3 - ISSN 2032-6653 - © 2009 AVERE

Abstract: There have more than 14 million units of motorcycle in Taiwan, and the motorcycle's exhaust emission has become one of the causes of air pollution in urban areas. To improve the air quality in urban areas and also seek the business opportunity from the new EV industry, the Taiwanese government starts regulating sales of gasoline motorcycle in 2009 to replace the less competitive 50cc engine motorcycles by e-Scooter of the light electric vehicles (LEV). The government also earmarks NT$1.6 billion (US$49.7 million) over the next four years to subsidize buyers of 2-wheelers electric scooters (2W e-Scooter) with the feature of the advanced Li-Ion battery system. As part of this effort, the Industrial Development Bureau (IDB) of Ministry of Economic Affairs (MOEA) formulated standards for e-Scooter's performance and safety to bring up 8,000 units of 2W e-Scooter in 2009, and to 100,000 by the end of 2012. This is the first phase of the EV national program, and next phase will be focus on the EV fleet promotion driven by the clean zone policy discussed . . . in this in-depth analysis . . .
Download paper

European Market in Electric Vehicles

Impacts of Electric Vehicles – Summary Report
Compiled by: Huib van Essen Bettina Kampman; CE Delft; April 2011
Commissioned by the European Commission
Background: Electric Vehicles (EVs) are a promising technology for drastically reducing the environmental burden of road transport. More than a decade ago, and also more recently advocated by various actors as an important element in reducing emissions of CO2, air pollutants and noise of particularly passenger cars and light commercial vehicles. At the same time, the electric passenger cars in development are not yet competitive with conventional vehicle technology. Costs are still high and battery technology still in development, and there exist many uncertainties with respect to crucial issues such as:

- Battery technology (energy capacity in relation to vehicle range, charging speed, durability, availability, and environmental impacts of materials)
- Well–to-wheel impacts on emissions

- Interaction with electricity generation
- Cost and business case of large scale introduction.

Aim and scope of the study:
For EU policy makers, it is important to get a reliable and independent assessment of the state of the art of these issues in order to develop targeted and appropriate greenhouse gas (GHG) reduction policy for transport. Therefore the Directorate-General for Climate Action (DG CLIMA) commissioned CE Delft, ICF and Ecologic to carry out a study on the potential impacts of large scale market penetration of EVs in the EU, with a focus on passenger cars and light commercial vehicles. This study includes an assessment of both the transport part (e.g. composition of vehicle fleet) and electricity production and provides estimates of the impacts on well-to-wheel GHG emissions, pollutant emissions, other environmental impacts, costs, etc. In this study, three types of EVs are distinguished:

- Full Electric Vehicles (FEVs) that have an electric engine and batteries for energy storage, no internal combustion engine (ICE).
- Plug-in Hybrid Electric Vehicles (PHEVs) that have both an ICE and an electric engine, with a battery charged on the grid.
- Electric Vehicles with a Range Extender (EREVs) that have an electric engine and an ICE used to charge the battery and so extend the vehicle's range. The battery of an EREV charges on the grid.

The results of the study should help the European Commission with developing GHG policy for transport, in particular in the field of EV and in relation to the wider EU transport policy and EU policy for the electricity sector.

Impact Analysis and Policy Recommendations
. . . This research developed three EV scenarios in which the various types of EVs brought onto the market replaced part of the conventional vehicles of the baseline. Key input variables, such as the ones listed above, may lead to different market uptake developments over time of FEVs, PHEVs, and EREVs. . . Main policy implications . . . In the short term, at least over the next five years, EV technology will not reach maturity and needs government support to speed up innovation. In this phase, however, it is important to avoid unfair competition with other types of energy-efficient vehicle and sustainable biofuels. To prepare for the longer term, a consistent overall fiscal and regulatory framework needs development, providing consistent treatment and coverage of EVs and all competing technologies.
http://ec.europa.eu/clima/studies/transport/vehicles/docs/summary_report_en.pdf

Challenges for a European Market for Electric Vehicles
Directorate General for Internal Policies, Policy Department A: Economic and Scientific Policy Industry, Research and Energy, June 2010

Abstract: The introduction of the electric vehicle to European industry is important for many reasons. It will bring new market opportunities and new jobs. At the same time, it would provide better energy efficiency and reduce greenhouse gas emissions. The development of electric vehicle industry requires considerable RTD investments, support for the creation of new markets and new business models but also changes in the mobility behaviour of both individual people and the society as a whole.
http://www.europarl.europa.eu/document/activities/cont/201106/20110629ATT22885/20110629ATT22885EN.pdf

International Energy Outlook (IEO) 2011
US Energy Administration, US Dept. of Energy (DOE); Report Number: DOE/EIA-0484(2011); September 19, 2011.

Highlights: In the IEO2011 Reference case, which does not incorporate prospective legislation or policies that might affect energy markets, world marketed energy consumption grows by 53 percent from 2008 to 2035. Total world energy use rises from 505 quadrillion British thermal units (Btu) in 2008 to 619 quadrillion Btu in 2020 and 770 quadrillion Btu in 2035 (Figure 1). Much of the growth in energy consumption occurs in countries outside the Organization for Economic Cooperation and Development (non-OECD nations) two where demand is driven by strong long-term economic growth. Energy use in non-OECD nations increases by 85 percent in the Reference case, as compared with an increase of 18 percent for the OECD economies.

Although the world continues to recover from the 2008-2009 global recession, the recovery is uneven. In advanced economies, recovery has been slow in comparison with recoveries from past recessions. Unemployment is still high among the advanced economies, and real estate markets and household income growth remain weak. Debt levels in a number of small economies of the European Union—Greece, Ireland, and Portugal—required European Union intervention to avert defaults. Concerns about fiscal sustainability and financial turbulence suggest that economic recovery in the OECD countries . . . not accompanied by the higher growth rates associated with past recoveries. In contrast, growth remains high in many emerging economies, in part driven by strong capital inflows and high commodity prices; however, inflation pressures remain a particular concern, along with the need to rebalance external trade in key developing economies.
http://www.eia.gov/forecasts/ieo/index.cfm

Laws regulating type and use of electric vehicles on state highways

Alternative Fuels and Advanced Vehicles Data Center: Research and Development of Hybrid and Plug-In Electric Vehicles
Research and Development of Hybrid and Plug-In Electric Vehicles

The following organizations are advancing research and development of hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles (EVs).
http://www.afdc.energy.gov/afdc/vehicles/electric_research.html

Transportation tax policies related to electric vehicles

State and National Policies

Oregon, Washington, and Texas Consider Taxing Electric Cars to Compensate For Lost Gas Taxes
AltTransport.com; by Ami Cholia; March 24, 2011

. . . different states are considering creating a tax for electric vehicles to compensate for the loss in revenue that would have typically come in from the use of gas.

Oregon, Washington, and Texas are all about to introduce legislation that would establish Vehicle Miles Traveled taxes for EVs — which means EV drivers would pay based on the number of miles the car travels. The system would largely be tracked by the car's GPS.

Road taxes have always differed from state to state — depending on the class of the vehicle, registration fees, or even weight of the car — so the move isn't particularly out of the ordinary. Currently drivers in Oregon pay 30 cents per gallon gasoline tax, while a Washington resident who drives an internal

combustion engine car for 12,000 miles per year pays an average $204 in state gas taxes. The state gas tax there is 37.5 cents per gallon.
http://alttransport.com/2011/03/oregon-washington-and-texas-consider-taxing-electric-cars-to-compensate-for-lost-gas-taxes/

International Policies

The China New Energy Vehicles Program: Challenges and Opportunities
© 2011 World Bank, in part, and © 2011 PRTM Management Consultants, Inc., April 2011

This report is one of a series developed as part of an ongoing multi-year World Bank initiative focusing on this agenda. While this report focuses on the particular issue of electric vehicles, the overall initiative has supported a number of analytical studies, policy analyses, and pilots that have addressed other aspects of this challenge. Other reports in this series and accessed at the web site for the East Asia transport group at the World Bank (www.worldbank.org/eaptransport).
http://siteresources.worldbank.org/EXTNEWSCHINESE/Resources/3196537-1202098669693/EV_Report_en.pdf

HOV Access for Electric Vehicles

State Laws

The Alternative Fuels and Advanced Vehicles Data Center (AFDC)
From the Incentives and Laws database, AFDC Website, 2011
http://www.afdc.energy.gov/afdc/laws/

Arizona

Alternative Fuel Vehicle (AFV) High Occupancy Vehicle (HOV) Lane Exemption
Dedicated AFVs are permitted to use HOV lanes, regardless of the number of passengers. Qualified vehicles must display AFV special plates or stickers, which are available from the Arizona Department of Transportation Motor Vehicle Division. Recognized alternative fuels are propane, natural gas, electricity, hydrogen, and a blend of hydrogen with propane or natural gas. HOV lane use may become restricted if certain speed criteria are met. (Reference Arizona Revised Statutes 28-337 and 28-2416)

California

High Occupancy Vehicle (HOV) Lane Exemption
Compressed natural gas (CNG), hydrogen, electric, hybrid electric, and plug-in hybrid electric vehicles (PHEV) meeting specified California and federal emissions standards and affixed with a California Department of Motor Vehicles Clean Air Vehicle sticker may use HOV lanes regardless of the number of occupants in the vehicle. White Clean Air Vehicle Stickers, expiring January 1, 2015, are available to an unlimited number of qualifying CNG, hydrogen, and electric vehicles. Yellow Clean Air Vehicle Stickers, expiring July 1, 2011, were issued to a limited number of qualifying hybrid electric vehicles (HEVs). Drivers of qualified HEVs registered to an address in the nine-county San Francisco Bay region must also obtain a Bay Area FasTrak account before using HOV lanes. Beginning January 1, 2012, a new Clean Air Vehicle Sticker will be available for a limited number of qualified PHEVs. This sticker will expire January 1, 2015. For more information about qualified vehicles, see the California Air Resources Board Carpool Lane Use Stickers Web site. (Reference Assembly Bill 1500, 2010; Senate Bill 353, 2010; and California Vehicle Code 5205.5 and 21655.9)

Florida

High Occupancy Vehicle (HOV) Lane Exemption
Drivers may operate Inherently Low Emission Vehicles (ILEV) and hybrid electric vehicles (HEV) in HOV lanes at any time, regardless of the number of passengers, provided that the vehicles are certified and labeled in accordance with federal regulations. All eligible ILEVs and HEVs must comply with the minimum fuel economy standards set forth in Title 23 of the U.S. Code, section 166(f)(3)(B). The vehicle must display a Florida Division of Motor Vehicles issued decal which is renewed annually. Special fees may apply. Vehicles with decals may also use any HOV lane designated as a HOV toll lane without paying the toll. An HEV is defined as a motor vehicle that draws propulsion energy from onboard sources of stored energy comprised of both an internal combustion engine using combustible fuel and a rechargeable energy storage system and meets or exceeds the qualifying California standards for a Low Emission Vehicle. In addition, three-wheeled vehicles are considered ILEVs for the purposes of HOV lane exemption. (Reference Florida Statutes 316.0741)

Georgia

Alternative Fuel Vehicle (AFV) High Occupancy Vehicle (HOV) Lane Exemption
AFVs displaying the proper alternative fuel license plate may use HOV lanes, regardless of the number of passengers. (Reference Georgia Code 32-9-4 and 40-2-76)

Hawaii

Electric Vehicle (EV) High Occupancy Vehicle (HOV) Lane and Parking Fee Exemptions
Qualified EVs affixed with special state-issued EV license plates may use HOV lanes regardless of the number of passengers and are also exempt from parking fees charged by any non-federal governmental authority. (Reference Hawaii Act 290PDF, 1997)

Maryland

Electric Vehicle (EV) High Occupancy Vehicle (HOV) Lane Exemption
Permitted EVs may operate in Maryland HOV lanes regardless of the number of occupants. Qualified EVs must be propelled to a significant extent by an electric motor that draws electricity from a battery with a capacity of at least four kilowatt hours. To operate in HOV lanes, EV owners must obtain a permit from the Maryland Motor Vehicle Administration (MVA). The MVA may charge a permit fee of up to $20 and may issue a limited number of permits. Each year the MVA and the State Highway Administration must report plug-in EV use in HOV lanes to the governor. This exemption expires September 30, 2013. (Reference Maryland Statutes, Transportation Code 25-108)

Will HOV lane access, tax perks spur electric vehicle adoption?
By Larry Dignan, SmartPlanet, May 21, 2010

Maryland Governor Martin O'Malley signed a law designed to get consumers to adopt electric vehicles early. One of the big perks: Access to the high occupancy vehicle (HOV) lane even if you're driving solo. Specifically, the Maryland bill includes the HOV lane perk for three years starting on Oct. 1. In addition, the state is offering a $2,000 excise motor vehicle credit for a purchase of a plug-in electric vehicle. This $2,000 is in addition to the $7,500 federal tax credit. These credits also go for three year starting Oct. 1.
http://www.smartplanet.com/blog/smart-takes/will-hov-lane-access-tax-perks-spur-electric-vehicle-adoption/7227

New Jersey

High Occupancy Vehicle (HOV) Lane Exemption
The New Jersey Turnpike Authority (NJTA) allows alternative fuel vehicles (AFVs) and hybrid electric vehicles (HEVs) to travel in the HOV lanes on the New Jersey Turnpike. Permitted AFVs must operate on electricity, methanol, ethanol, natural gas, propane, hydrogen, coal derived liquid fuels, or fuels derived from biological materials. Any

other federally approved AFVs are also permitted to use the NJTA's HOV lanes. For a complete list of eligible HEVs, see the New Jersey Turnpike Authority Web site.

North Carolina

Plug-In Electric Vehicle High Occupancy Vehicle (HOV) Lane Exemption
Qualified plug-in electric vehicles, dedicated natural gas vehicles, and fuel cell electric vehicles may use North Carolina HOV lanes, regardless of the number of occupants. (Reference House Bill 222, 2011, Senate Bill 194, 2011, and North Carolina General Statutes 20-4.01 and 20-146.2)

Tennessee

High Occupancy Vehicle (HOV) Lane Exemption
The law permits vehicles that the U.S. Environmental Protection Agency defines as Inherently Low Emission Vehicles or Low Emission and Energy-Efficient Vehicles and have gross vehicle weight ratings of 26,000 pounds or less, use of HOV lanes regardless of the number of occupants. Such vehicles must display a Tennessee Department of Revenue decal. (Reference Tennessee Code 55-8-188)

Utah

Alternative Fuel Vehicle Decal and High Occupancy Vehicle (HOV) Lane Exemption
Vehicles operating on propane, compressed natural gas, liquefied natural gas, or electricity are permitted to use HOV lanes, regardless of the number of passengers. As of July 2011, qualified vehicles must display special clean fuel decal issued by the Utah Department of Transportation. (Reference House Bills 24 and 184, 2011 and Utah Code 41-1a-416, 41-1a-418, 41-6a-702, 59-13-102, and 72-6-121)

Other State and Federal Regulations

Alabama

Interagency Alternative Fuels Working Group
The Alabama Legislature urges the Alabama Department of Finance to invite all state agencies, commissions, boards, counties, and municipalities to join an interagency Alternative Fuels Working Group to promote education, research and development, production, and consumption of alternative fuels. (Reference Senate Joint Resolution 16, 2009)

Alternative Fuels Promotion and Information
The Center for Alternative Fuels (Center) promotes alternative fuels as viable energy sources in the state. The Center must assess the current status and development of sources of alternative fuels, ensuring that all alternative fuels sold in the state meet ASTM standards, and act as an information center for alternative fuels and a clearinghouse for available federal grant funding for alternative fuel development. The Center may administer a grant program using income tax check-off program funds from the Alabama Alternative Fuels and Research Development Fund. (Reference Code of Alabama 2-2-90 and 2-2-91)

Alaska

Alternative Fuel Vehicle Acquisition Requirement
The Alaska Department of Transportation and Public Facilities (Department) must evaluate the cost, efficiency, and commercial availability of alternative fuels for automotive purposes every five years, and purchase or convert to vehicles that operate using alternative fuels whenever practical. The Department may participate in joint ventures with public or private partners to foster the availability of alternative fuels for consumers. (Reference Alaska Statutes 44.42.020)

Arizona

Electric Vehicle (EV) Parking Space Regulation
An individual is not allowed to stop, stand, or park a motor vehicle within any parking space specifically designated for parking and charging EVs unless the motor vehicle is an EV and has been issued an alternative fuel vehicle special plate or sticker. A person found responsible for a violation may be subject to a civil penalty of at least $350. (Reference Arizona Revised Statutes 28-876)

Joint Use of Government Fueling Infrastructure
To the extent practical, a state agency or political subdivision that operates an alternative fueling station must allow vehicles other state agencies or political subdivisions own or operate to fuel at the station. Recognized alternative fuels include propane, natural gas, electricity, hydrogen, and a blend of hydrogen with propane or natural gas. (Reference Arizona Revised Statutes 49-572)

Alternative Fuel Vehicle (AFV) Dealers Information Dissemination Requirement
New motor vehicle dealers must make information about AFVs and Arizona-based incentives for purchasing or leasing AFVs available to the public. Recognized alternative fuels include propane, natural gas, electricity, hydrogen, and a blend of hydrogen with propane or natural gas. (Reference Arizona Revised Statutes 28-4414)

California

Electric Vehicle (EV) Charging Infrastructure Promotion - Bay Area, CA
Mayors of San Francisco, San Jose, and Oakland will follow a policy plan to develop and expand the infrastructure needed to promote the use of EVs. Policy steps include: expediting the permit and installation processes for charging outlets; providing incentives for employers and other organizations who install charging infrastructure at the workplace and other parking facilities; developing standard regulations governing EV infrastructure across the region; and establishing programs to purchase EVs for use by city and state employees. The mayors will work with other cities in the Bay Area as well as regional government organizations and private sector partners.

Electric Vehicle (EV) Infrastructure Information Resource
- By July 1, 2011, the California Energy Commission, in consultation with the Public Utilities Commission, must develop and maintain a Web site containing specific links to electrical corporations, local publicly owned electric utilities, and other Web sites that contain information specific to EVs and plug-in hybrid electric vehicles (PHEVs), including the following:
- Resources to help consumers determine if their residences will require utility service upgrades to accommodate EVs and PHEVs;
- Basic charging circuit requirements;
- Utility rate options; and
- Load management techniques.

(Reference Senate Bill 1455, 2010, and California Public Resources Code 25227)

Electric Vehicle (EV) Infrastructure Evaluation
The California Public Utilities Commission (Commission), in consultation with the California Energy Commission, California Air Resources Board, electrical corporations, and the motor vehicle industry, must evaluate policies to develop infrastructure sufficient to overcome barriers to the widespread deployment and use of EVs and plug-in hybrid electric vehicles (PHEVs). By July 1, 2011, the Commission must adopt rules to address the following:
- The impacts on electrical infrastructure and any infrastructure upgrades necessary for widespread use of EVs and PHEVs, including the role and development of public charging infrastructure;
- The impact of EVs and PHEVs on grid stability and the integration of renewable energy resources;
- The technological advances necessary to ensure the widespread use of EVs and PHEVs and what role the state should take to support the development of this technology;
- The existing code and permit requirements that will impact the widespread use of EVs and PHEVs and any recommended changes to existing policies that may be barriers to the widespread use of EVs and PHEVs;

- The role the state should take to ensure that technologies employed in EVs and PHEVs work harmoniously and across service territories; and
- The impact of widespread use of EVs and PHEVs on achieving the state's greenhouse gas emissions reductions goals and renewables portfolio standard program, and what steps should be taken to address the possibility of shifting emissions reductions responsibilities from the transportation sector to the electrical industry.

(Reference California Public Utilities Code 740.2)

Electric Vehicle (EV) Charging Requirements

New EVs and plug-in hybrid electric vehicles (PHEVs) must be equipped with a conductive charger inlet port that meets the specifications contained in Society of Automotive Engineers (SAE) standard J1772. EVs and PHEVs must be equipped with an on-board charger with a minimum output of 3.3 kilovolt amps. These requirements do not apply to EVs and PHEVs that are only capable of Level 1 charging, which has a maximum power of 12 amperes (amps), a branch circuit rating of 15 amps, and continuous power of 1.44 kilowatts. (Reference California Code of Regulations Title 13, Section 1962.2)

State Transportation Plan

The California Department of Transportation (Caltrans) must update the California Transportation Plan (Plan) by December 31, 2015, and every five years thereafter. The Plan must address how the state will achieve maximum feasible emissions reductions, taking into consideration the use of alternative fuels, new vehicle technology, and tailpipe emissions reductions. Caltrans must prepare and submit an interim report to the California Transportation Commission and to the chairs of the Senate and Assembly committees related to transportation, environmental quality, natural resources, and local government by December 31, 2012. Caltrans must consult and coordinate with related state agencies, air quality management districts, public transit operators, and regional transportation planning agencies. Caltrans must also provide an opportunity for general public input. Caltrans must submit a final draft of the Plan to the legislature and governor. (Reference California Government Code 65071-65073)

Zero Emission Vehicle (ZEV) Production Requirements

New passenger cars, light-duty trucks, and medium-duty passenger vehicles are certified as ZEVs if the vehicles produce zero exhaust emissions of any criteria pollutant (or precursor pollutant) under any and all possible operational modes and conditions. Manufacturers with annual sales greater than 60,000 vehicles must produce and deliver for sale in California a minimum percentage of ZEVs for each model year as follows:

Model Year	Minimum ZEV Requirement
2010-2011	11%
2012-2014	12%
2015-2017	14%
2018 and on	16%

Manufacturers with annual sales between 4,501 and 60,000 vehicles may comply with the ZEV requirements through multiple alternative compliance options that include producing low emission vehicles and obtaining ZEV credits. Manufacturers with annual sales of 4,500 vehicles or less are not subject to this regulation.

As of January 2011, the California Air Resources Board is considering changes to the ZEV regulations that focus on plug-in hybrid electric vehicles and ZEVs to encourage commercial market penetration of these vehicles. See the ZEV Program website for more information.

(Reference California Code of Regulations Title 13, Section 1962.1)

Alternative Fuel and Plug-in Hybrid Electric Vehicle Retrofit Regulations

The California Air Resources Board (ARB) prohibits converting a vehicle to operate on an alternative fuel in lieu of the original gasoline or diesel fuel, unless it has evaluated and certified the retrofit system. ARB will issue certification to the manufacturer of the system in the form of an Executive Order once the manufacturer demonstrates compliance with the emissions, warranty, and durability requirements. A manufacturer is defined as a person or company who manufactures or assembles an alternative fuel retrofit system for sale in California; this definition does not include individuals wishing to convert vehicles for personal use. Individuals interested in converting their vehicles to operate on an alternative fuel must ensure that the alternative fuel retrofit systems

used for their vehicles have been ARB certified. For more information, see the ARB Alternative Fuel Retrofit System Web site.

A hybrid electric vehicle that is Model Year 2000 or newer and is a passenger car, light-duty truck, or medium-duty vehicle may be converted to incorporate off-vehicle charging capability if the manufacturer demonstrates compliance with emissions, warranty, and durability requirements. ARB issues certification to the manufacturer and the vehicle must meet California emissions standards for the model year of the original vehicle. (Reference California Code of Regulations Title 13, Section 2030-2032, and California Vehicle Code 27156)

Alternative Fuel and Vehicle Policy Development

The California Energy Commission must prepare and submit an Integrated Energy Policy Report (IEPR) to the governor on a biannual basis. The IEPR provides an overview of major energy trends and issues facing the state, including those related to transportation fuels, technologies, and infrastructure. The IEPR also examines potential effects of alternative fuels use, vehicle efficiency improvements, and shifts in transportation modes on public health and safety, the economy, resources, the environment, and energy security. The primary purpose of the IEPR is to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety. (Reference California Public Resources Code 25302)

Colorado

Alternative Fuel Definition

Alternative fuel is defined as compressed natural gas, propane, ethanol, or any mixture containing 85% or more ethanol (E85) with gasoline or other fuels, electricity, or any other fuels, which may include, but are not limited to, clean diesel and reformulated gasoline, so long as the Colorado Air Quality Control Commission determines that these other fuels result in comparable reductions in carbon monoxide emissions and brown cloud pollutants. Alternative fuel does not include any fuel product that contains or is treated with methyl tertiary butyl ether (MTBE). (Reference Colorado Revised Statutes 25-7-106.8)

Connecticut

Electric Vehicle (EV) Infrastructure Planning

The Connecticut EV Infrastructure Council (Council) must coordinate interagency strategies to prepare for the adoption of EVs, including establishing performance measures for meeting infrastructure, funding, environmental, and regulatory goals. The Council submitted a final report PDF to the Connecticut Legislature providing recommendations on EV infrastructure investment and standardization on September 1, 2010. (Reference Executive Order 34, 2009)

Alternative Fuel Vehicle (AFV) Procurement Preference

In determining the lowest responsible qualified bidder for the award of state contracts, the Connecticut Department of Administrative Services may give a price preference of up to 10% for the purchase of AFVs or for the purchase of vehicles powered by fuel other than a clean alternative fuel plus the conversion equipment to convert the vehicles to dual or dedicated alternative fuel use. For these purposes, alternative fuels include natural gas or electricity used to operate a motor vehicle. (Reference Connecticut General Statutes, 4a-59)

Delaware

State Agency Energy Plan

To improve air quality and reduce operating expenses from state vehicle use, all state agencies must reduce petroleum consumption by 25%, vehicle emissions by 25%, and vehicle miles traveled by 15% by the end of 2012 as compared to Fiscal Year 2008 levels. Ways to achieve this include alternative fuel vehicle acquisition, the use of alternative fuels, and implementation of idle reduction measures. (Reference Executive Order 18, 2010)

Florida

Electric Vehicle (EV) Insurance Regulation
Insurance companies may not impose surcharges on EVs based on factors such as new technology, passenger payload, weight-to-horsepower ratio, and the types of material used to manufacture the vehicle, unless the Florida Office of Insurance Regulation receives actuarial data that determines the surcharges are justified. (Reference Florida Statutes 627.06535)

Hawaii

Plug-in Electric Vehicle (EV) Parking Requirement
All public, private, and government parking facilities that are available for use by the general public and that include at least one hundred parking spaces must designate at least 1% of the spaces specifically for EVs by December 31, 2011. At least one of the parking spaces must be located near the building entrance, and spaces must be clearly marked and equipped with an EV charging unit that meets recognized standards. Owners of multiple parking lots may designate and install an EV charging unit in fewer parking spaces than required in one parking lot, as long as the total number of aggregate spaces for all parking lots is met. The spaces designated for EVs will continue to increase by 1% for each additional 5,000 registered EVs until the percentage reaches 10%. Penalties apply for non-EVs that park in parking spots designated for EVs. (Reference Hawaii Revised Statutes 291-71 and 291-72)

Plug-in Electric Vehicle (EV) Charging System Requirements
A multi-family residential dwelling or townhouse owner may install an EV charging system at a parking stall at the dwelling as long as the system is in compliance with applicable rules and specifications; the system is registered within thirty days of installation; and the homeowner receives consent from the private entity if the system is placed in a common area. Private entities may adopt rules that restrict the placement and use of charging systems, but many not charge a fee for the installation of a vehicle charging system. The owner of a charging system is responsible for any damages resulting from the installation, maintenance, repair, removal, or replacement of the system. A private entity includes any association of homeowners, community association, condominium association, or cooperative. (Reference Hawaii Revised Statutes 196-7.5)

Plug-in Electric Vehicle (EV) Promotion
To achieve Hawaii's transportation efficiency goals and to create jobs, foster economic growth, and reduce greenhouse gas emissions, the Hawaii Senate encourages the promotion of EV use in the state. As a first step, EV charging infrastructure must be developed. In addition, stakeholders should work together to expedite the use of EVs in Hawaii. Additionally, the Hawaii House of Representatives urges the Hawaii Clean Energy Initiative End-Use Efficiency Work Group to address the challenges related to EV charging stations and access to electrical outlets to facilitate the use of EVs and plug-in hybrid electric vehicles. (Reference House Concurrent Resolution 230, 2010, and Senate Concurrent Resolution 126, 2009)

Alternative Fuel Standard Development
The state of Hawaii is responsible for facilitating the development of alternative fuels and supporting the attainment of a statewide alternative fuels standard. The alternative fuels standard will be as follows: alternative fuels will provide 10% of highway fuel use by 2010, 15% by 2015, 20% by 2020, and 30% by 2030. For the purposes of the alternative fuels standard, ethanol produced from cellulosic materials is equivalent to 2.5 gallons of non-cellulosic ethanol. (Reference Hawaii Revised Statutes 196-42)

Illinois

Plug-in Electric Vehicle Promotion and Coordination
The Illinois Electric Vehicle Advisory Council investigates and recommends strategies that the governor and the general assembly may implement to promote the use of plug-in electric vehicles, including potential infrastructure improvements. The governor may appoint an Electric Vehicle Coordinator to act as the point of contact for related policies and activities in the state. (Reference House Bill 2902, 2011)

Alternative Fuel Promotion
The Illinois General Assembly established the Alternate Fuels Commission (Commission) within the Illinois Department of Commerce and Economic Opportunity to identify and recommend strategies to the governor and General Assembly for implementing and promoting the use of alternative fuels and alternative fuel vehicles. The Commission will identify ways to improve stakeholder communication and coordination regarding the research and promotion of alternative fuels. The Commission must issue written reports on their activities and findings on at least an annual basis. (Reference 415 Illinois Compiled Statutes 120/23)

Indiana

Certified Technology Park Designation
The Indiana Economic Development Corporation may designate an area as a certified technology park if it meets certain criteria, including a commitment from at least one business engaged in a high technology activity that creates a significant number of jobs. The establishment of high technology activities and public facilities within a technology park serves a public purpose and benefits the public's general welfare by encouraging investment, job creation and retention, and economic growth and diversity. High technology activities include advanced vehicles technology, which is any technology that involves electric vehicles, hybrid electric vehicles, or alternative fuel vehicles, or components used in the construction of these vehicles. (Reference Indiana Code 36-7-32)

Maine

Plug-In Electric Vehicle Infrastructure Development
Maine has adopted a policy to promote the development, implementation, availability, and use of smart grid technology. The policy includes the goal of integrating advanced electric storage and peak-reduction technologies, such as plug-in electric and hybrid electric vehicles, into the electric system. (Reference Maine Revised Statutes Title 35-A, Section 3143)

Provision for Establishment of Clean Fuel Vehicle Insurance Incentives
An insurer may credit or refund any portion of the premium charged for an insurance policy on a clean fuel vehicle to encourage its policyholders to use clean fuel vehicles, as long as increases in insurance premiums on other vehicles fund these credits or refunds. (Reference Maine Revised Statutes Title 10, Sections 963-A, and Title 24-A, Section 2303-B)

Maryland

Plug-in Electric Vehicle Infrastructure Promotion
The Maryland Electric Vehicle Infrastructure Council (the Council) created effective July 1, 2011, promotes the use of all-electric and plug-in hybrid electric vehicles in the state. Specific responsibilities of the Council include the following:

- Develop an action plan to facilitate successful integration of EVs and PHEVs into the Maryland transportation network;
- Assist in developing and coordinating statewide standards for streamlined permitting and installation of electric vehicle supply equipment;
- Recommend a statewide charging infrastructure plan and incentives to support investment in EVs and PHEVs;
- Develop targeted policies to support fleet purchases of EVs and PHEVs; and
- Encourage local and regional efforts to promote the use of EVs and PHEVs.

The Maryland Department of Transportation must provide staff support to the Council with the assistance of the Maryland Energy Administration and the Maryland Public Service Commission. The Council must submit an interim report and recommendations to the governor by January 1, 2012, and a final report and recommendations by December 1, 2012. The Council will remain in place through June 2013. (Reference House Bill 167, 2011)

Provision for Plug-In Electric Vehicle Charging Incentives

By June 30, 2013, the Maryland Public Service Commission (PSC) must establish a pilot program for electric customers to charge all-electric (EVs) and plug-in hybrid electric vehicles (PHEVs) during off-peak hours. The pilot program must include at least two electric companies and provide incentives for residential, commercial, and governmental customers to charge EVs and PHEVs. The incentives should increase the efficiency and reliability of the electric distribution system and lower electricity use at times of high demand. The incentives may include time-of-use pricing, credits on distribution charges, rebates on the cost of charging systems, demand response programs, or other incentives approved by PSC. (Reference Senate Bill 179, 2011, and Maryland Statutes, Public Utilities Code 7-211)

Michigan

Vehicle Research and Development Promotion

Qualified advanced vehicle research and development projects may be eligible for financing under the Local Development Financing Act. A municipality may create a local development financing authority that may borrow against future tax increment financing to pay for public infrastructure improvements that will attract economic development projects. The Michigan Economic Development Corporation (MEDC) may designate all or part of a local development financing authority district as a "certified alternative energy park" to attract businesses engaged in alternative energy projects, including research and development of alternative energy vehicles. MEDC may designate up to ten alternative energy parks through December 31, 2011. (Reference Michigan Compiled Laws 125.2152-125.2162c)

Minnesota

Laws and Regulations

Electric Vehicle Supply Equipment (EVSE) Requirements

Without requiring significant upgrades, EVSE installed in Minnesota must: 1) be able to be used by any make, model, or type of plug-in electric vehicle; 2) comply with state safety standards and standards set by the Society of Automotive Engineers; and 3) be capable of bidirectional charging once electrical utilities achieve a cost-effective ability to draw electricity from plug-in electric vehicles connected to the utility grid. (Reference Minnesota Statutes 325F.185 and 326B.35)

Missouri

Alternative Fuel Promotion

The Missouri Alternative Fuels Commission (Commission) promotes the continued production and use of alternative transportation fuels in Missouri. The Commission submits a report annually to the governor and general assembly and provides recommendations on changes to state law to facilitate the sale and distribution of alternative fuels and alternative fuel vehicles; promotes the development, sale, distribution, and consumption of alternative fuels; promotes the development and use of alternative fuel vehicles and technology that will enhance the use of alternative and renewable transportation fuels; educates consumers about alternative fuels; and develops a long-range plan for the state to reduce consumption of petroleum fuels. (Reference Missouri Revised Statutes 414.420)

Montana

Alternative Fuel Promotion

The state of Montana encourages the use of alternative fuels and fuel blends to the extent that doing so produces environmental and economic benefits to the citizens of Montana. The Montana Legislature recommends several guidelines for the development of a state alternative fuels policy, including the following: 1) encourage the use of self-sufficient markets; 2) any state alternative fuels program should have measurable benefits and state agencies must communicate these benefits to the public; 3) state and local governments are encouraged to set an example with their vehicle fleets by using alternative fuels and fuel blends. The state also encourages alternative fuel and fuel blend production. (Reference Montana Code Annotated 90-4-1011)

Nevada

Funds for School District Alternative Fuel Use

A portion of any penalty assessed for violations of air pollution control laws must be deposited in the county school district fund where the violation occurred. The local air pollution control board must approve expenditures from such a fund, which are limited to education programs on topics relating to air quality; and projects to improve air quality, including purchasing and installing equipment to retrofit school buses to operate on biodiesel, compressed natural gas, or a similar fuel formulated to reduce gasoline and diesel fuel emissions within the school district. (Reference Nevada Revised Statutes 445B.500)

Provision for Establishment of Alternative Fuel Incentives

In conjunction with the Nevada Department of Business and Industry, the Nevada Department of Conservation and Natural Resources may develop and administer a program to provide incentives to encourage alternative fuel use in motor vehicles, specifically by individuals and others not required by state statute to purchase alternative fuel vehicles. (Reference Nevada Revised Statutes 486A.200)

Alternative Fuel Study

The Nevada Legislature proposes to conduct an interim study concerning the production and use of energy in the state. The study will include the use and availability of transportation fuels and related facilities, including alternative fuels and motor vehicle electrification, and a review of the extent and potential for biofuels production in Nevada including biodiesel, ethanol from nonfood sources, algae-based fuel, and other emerging fuel technologies. (Reference Senate Concurrent Resolution 19, 2009)

New Hampshire

Alternative Fuel and Advanced Vehicle Study

The Alternate Fuel Vehicle Study Commission (Commission) studies the existing road and taxation rules associated with alternative fuel and advanced vehicles, including, but not limited to, electric vehicles, hybrid electric vehicles, and any vehicles not powered completely by gasoline engines. Specifically, the Commission will evaluate whether operating restrictions for alternative fuel and advanced vehicles and methods of providing funds for their use on highways should be established. The Commission must report its findings and recommended legislative action to the New Hampshire Legislature by November 1, 2010. (Reference House Bill 1304, 2010)

New Mexico

Alternative Fuel Definition

The definition of an alternative fuel includes natural gas, liquefied petroleum gas, electricity, hydrogen, fuel mixtures containing not less than 85% ethanol or methanol, and fuel mixtures containing not less than 20% vegetable oil, or a water-phased hydrocarbon fuel emulsion in an amount not less than 20% by volume. Biodiesel is defined as a renewable, biodegradable, mono alkyl ester combustible liquid fuel that is derived from agricultural plant oils or animal fats and meets current ASTM biodiesel standards. (Reference New Mexico Statutes 13-1B-2 and 57-19-27)

North Carolina

Plug-In Electric Vehicle Definition

A plug-in electric vehicle is defined as a vehicle that:

- Draws electricity from a battery with a capacity of at least four kilowatt hours and that is capable of being charged from an external source;
- Has not been repowered or otherwise modified from the original equipment manufacturer power train specifications;
- Has a gross vehicle weight rating of 8,500 pounds or less;
- Has a maximum speed capacity of at least 65 miles per hour; and

- Meets applicable requirements in Title 49 of the Code of Federal Regulations, section 571

(Reference House Bill 222, 2011, and North Carolina General Statutes 20-4.01)

Ohio

Alternative Fuel Signage

The Ohio Turnpike Commission allows businesses to place their logos on directional signs within the right-of-way of state turnpikes. An alternative fuel retailer may include a marking or symbol within their logo indicating that it sells one or more types of alternative fuel. Alternative fuels are defined as E85, fuel blends containing at least 20% biodiesel (B20), natural gas, propane, or hydrogen. (Reference Ohio Revised Code 125.831 and 5537.30)

Oklahoma

Laws and Regulations

Access to State Alternative Fueling Stations

The Oklahoma Department of Central Services Fleet Management Division may construct, install, acquire, operate, and provide alternative fueling infrastructure for state agencies and local government use as well as the public in areas of the state where public access to alternative fuel infrastructure is not readily available. The Department of Central Services must discontinue public access to their fueling stations if a privately owned alternative fueling station opens within a five-mile radius. Alternative fuels include natural gas, liquefied petroleum gas (propane), ethanol, methanol, biodiesel, electricity, and hydrogen. (Reference Oklahoma Statutes 74-78)

State Energy Efficiency and Conservation Plans

Each state agency must develop and implement an energy efficiency and conservation plan. As part of its plan, each agency should make every effort to include purchasing preferences for vehicles that use alternative fuel sources, including compressed natural gas, hybrid technology, and biofuels. (Reference Oklahoma Statutes 27A-3-4-106)

Tennessee

Energy Task Force

The Governor's Task Force on Energy Policy is developing a state energy plan to facilitate energy efficiency and the use of alternative and renewable fuels in Tennessee. The energy plan will include a summary of opportunities for the state government to use an energy-efficient approach in purchasing and managing the state vehicle fleet; prospective policies, legislation, and incentives to encourage energy efficiency; possible public-private partnerships to encourage research and development of clean energy technologies; and strategies for expanding the use of alternative and renewable fuels. (Reference Executive Order 54, 2008)

Vermont

Laws and Regulations

Green Workforce Collaborative

The Vermont Workforce Development Council and the Department of Labor will create a Green Workforce Collaborative to develop and promote career training and employment opportunities for Vermont residents in green industry sectors, including the energy-efficient, low emission, and advanced vehicles industry; the mass transit fleet conversion industry; and the biofuels industry. These programs will enhance the economic and environmental vitality of the state and give priority to programs that provide education, training, and other services to target populations. (Reference House Bill 313, 2009)

Alternative Fuel Vehicle (AFV) Promotion

The Vermont Climate Cabinet is responsible for, among other duties, identifying strategies to reduce Vermont's greenhouse gas emissions and dependence on fossil fuel for transportation by encouraging AFVs and more efficient vehicle and mobility choices. (Reference Executive Order PDF 05-11, 2011)

Virginia

Laws and Regulations

Alternative Fuel Vehicle (AFV) and Fueling Infrastructure Loans
The Virginia Board of Education may use funding from the Literary Fund to provide loans to school boards that convert school buses to operate on alternative fuels or construct alternative fueling stations. (Reference Virginia Code 22.1-146)

Authorization for Plug-In Electric Vehicle Charging Rate Incentives
The Virginia State Corporation Commission (SCC) directs public utilities to evaluate time-differentiated rates and other incentives to encourage off-peak all-electric (EV) and plug-in hybrid electric vehicle charging. The SCC may authorize public utilities to conduct pilot programs to determine the feasibility and implications of offering off-peak rates and other incentives. Pilot programs may include voluntary load control options, rate structures with financial incentives, rebates, or other incentives that offset the cost of purchasing or installing electric vehicle supply equipment for users who elect off-peak rate structures. An electric utility that participates in an approved pilot program may be entitled to recover annually the costs of its participation in any pilot program conducted on or after January 1, 2011. (Reference House Bill 2105, 2011, and Virginia Code 56-232.2)

Retail Electric Vehicle (EV) Charging Regulations
Retail EV charging services provided by an individual who is not a public utility, public service corporation, or public service company, do not constitute the retail sale of electricity if the electricity is used solely for transportation purposes and the person providing the EV charging service has procured the electricity from an authorized public utility. The Virginia State Corporation Commission may not set the rates, charges, or fees for retail EV charging services provided by non-utilities. (Reference House Bill 2105, 2011, and Virginia Code 56-1.2 and 56-232.2)

Alternative Fuel Research and Development Funding
The Virginia Universities Clean Energy Development and Economic Stimulus Foundation will identify, obtain, disburse, and administer funding for alternative fuel and related technology research, development, and commercialization. The funds may be distributed as grants, loans, or through other methods. (Reference Virginia Code 23-299 through 23-302)

Alternative Fuel Vehicle (AFV) Tax Reduction
Local governments may reduce personal property taxes paid on AFVs, specifically vehicles that operate using natural gas, liquefied petroleum gas or propane, hydrogen, or electricity, including low-speed vehicles. (Reference Virginia Code 58.1-3506)

Washington

Electric Vehicle (EV) Infrastructure Development
Any regional transportation planning organization containing a county with a population greater than one million must collaborate with state and local governments to promote EV use, invest in EV infrastructure, and seek federal or private funding for these efforts. Collaborative planning efforts may include: 1) developing short- and long-term plans outlining how state, regional, and local governments may construct EV charging locations and ensure that the infrastructure can be electrically supported; 2) supporting public education and training programs on EVs; 3) developing an implementation plan for counties with a population greater than 500,000 to have 10% of public and private parking spaces ready for EV charging by December 31, 2018; and 4) developing model ordinances and guidance for local governments for site assessment and installing EV infrastructure. (Reference Revised Code of Washington 47.80.090)

Electric Vehicle (EV) Charging Infrastructure Availability
Recognizing that it is in the state's interest and to the benefit of the public to encourage the use of EVs to reduce emissions and improve air quality, publicly and privately owned EVs may be charged at state office locations where the vehicles are used for state business, conducting business with the state, or as commuter vehicles. Additionally, contingent upon funding, the state must install electrical outlets suitable for charging EVs in each of the state's

fleet parking and maintenance facilities as well as every state-operated highway rest stop by December 31, 2015. (Reference Revised Code of Washington 43.01.250, 43.19.648, and 47.38.075)

Local Government Electric Vehicle (EV) Charging Infrastructure Requirements
Jurisdictions must develop regulations to allow the use of EV infrastructure and battery charging stations in all areas except critical areas or areas zoned for residential or resource use. This regulation applies to jurisdictions that meet specific location criteria. The Washington Department of Commerce included a model ordinance, development regulations, and guidance for local governments for site assessment and installing EV infrastructure in "Electric Vehicle Infrastructure: A Guide for Local Governments in Washington State." This requirement is contingent upon federal funding. Additionally, cities or municipalities may adopt incentive programs to encourage retrofitting of existing structures capable of charging EVs. (Reference Revised Code of Washington 35.63.126-35.63.127, 35A.63.107, 36.70.695, and 36.70A.695)

Electric Vehicle (EV) Charging and Battery Exchange Station Regulations
State and local governments may lease land for installing, maintaining, and operating EV charging stations or battery exchange stations for up to 50 years. Additionally, the installation of battery charging and exchange stations is categorically exempt from the Washington Environmental Policy Act. (Reference Revised Code of Washington 79.13.100 and 43.21C.410)

Electric Vehicle (EV) Infrastructure Definitions
EV infrastructure is defined as structures, machinery, and equipment necessary and integral to support an EV, including battery charging stations, rapid charging stations, and battery exchange stations. A battery charging station is defined as an electrical component assembly or cluster of component assemblies designed specifically to charge batteries within an EV. A rapid charging station is defined as an industrial grade electrical outlet that allows for faster recharging of EV batteries through higher power levels. A battery exchange station is defined as a fully automated facility that will enable an EV with a swappable battery to enter a drive lane and exchange the depleted battery with a fully charged battery through a fully automated process. Infrastructure must meet or exceed any applicable state building standards, codes, and regulations. (Reference Revised Code of Washington 19.27.540 and 19.28)

Provision for Alternative Fuels Corridor Pilot Projects
The Washington Department of Transportation may enter into partnership agreements with other public and private entities to use land for alternative fuel corridor pilot projects. Minimum requirements apply and these agreements are subject to funding availability. (Reference Revised Code of Washington 47.38.070)

State Agency Coordination to Address Climate Change
The Washington Department of Ecology worked with the Washington Departments of Commerce and Transportation to assess whether California's low carbon fuel standard (LCFS) or other state standards would help Washington meet its greenhouse gas emissions reduction target of 1990 levels by 2020. See the Department of Ecology's LCFS website for information about the assessment. The Department of Transportation must work in consultation with the Departments of Ecology and Commerce and other interest groups to address low or zero emission vehicles. Additionally, the Office of the Governor will work with state agencies to seek funding to implement a project for the electrification of the West Coast interstate highway and associated metropolitan centers and to purchase electric vehicles and install public fueling and/or charging infrastructure for electric and other high-efficiency, zero, or low carbon vehicles. (Reference Executive Order 09-05, 2009)

West Virginia

Alternative Fuels Studies
The Joint Committee on Government and Finance (Committee) must conduct two separate studies related to alternative fuels. The first study must focus on the impact of alternative fuels on West Virginia's economy, specifically the use of alternative fuels in transportation. This report must include input from state agencies and private industry. The second study must investigate the environmental benefits and economic impact of renewable energy utilization, including the use of biofuels in vehicles, and the potential for a state Renewable Energy Act or similar policy. The Committee must report its findings, conclusions, and recommendations to the state legislature

in 2011.It must also draft any regulations necessary to carry out its recommendations. (Reference Senate Concurrent Resolution 38, 2010, and House Concurrent Resolution 87, 2010)

Wisconsin

Alternative Fueling Infrastructure Development
The Wisconsin Department of Administration must pursue, in cooperation with the Department of Agriculture, Trade, and Consumer Protection, the establishment and maintenance of sufficient alternative fueling infrastructure at public retail outlets to meet the public's traveling needs. (Reference Senate Bill 279, 2010, and Wisconsin Statutes 16.956(3) (f))

Federal

Alternative Fuel Definition
The following fuels are defined as alternative fuels by the Energy Policy Act (EPAct) of 1992: pure methanol, ethanol, and other alcohols; blends of 85% or more of alcohol with gasoline; natural gas and liquid fuels domestically produced from natural gas; liquefied petroleum gas (propane); coal-derived liquid fuels; hydrogen; electricity; pure biodiesel (B100); fuels, other than alcohol, derived from biological materials; and P-Series fuels. In addition, the U.S. Department of Energy (DOE) may designate other fuels as alternative fuels, provided that the fuel is substantially nonpetroleum, yields substantial energy security benefits, and offers substantial environmental benefits. For more information about the alternative fuels defined by EPAct 1992 as well as DOE's alternative fuel designation authority, visit the EPAct website. (Reference 42 U.S. Code 13211)

Procurement

London Establishes Framework Electric Vehicle Infrastructure Procurement
Transport for London Press Release, March 26, 2010
Transport for London (TfL) has placed two notices in the Official Journal of the European Union (OJEU) which will create the UK's largest procurement frameworks to date for electric vehicles and electric vehicle charge point infrastructure.
http://www.evworld.com/news.cfm?newsid=23086

Infrastructure

Plug-in Electric Vehicle Infrastructure: A Foundation for Electrified Transportation
National Renewable Energy Laboratory, 2010

Plug-in electric vehicles (PEVs)—which include all-electric vehicles and plug-in hybrid electric vehicles—provide a new opportunity for reducing oil consumption by drawing power from the electric grid. To maximize the benefits of PEVs, the emerging PEV infrastructure—from battery manufacturing to communication and control between the vehicle and the grid—must provide access to clean electricity, satisfy stakeholder expectations, and ensure safety. Currently, codes and standards organizations are collaborating on a PEV infrastructure plan. Establishing a PEV infrastructure framework will create new opportunities for business and job development initiating the move toward electrified transportation. This paper summarizes the components of the PEV infrastructure, challenges and opportunities related to the design and deployment of the infrastructure, and the potential benefits.
http://www.nrel.gov/docs/fy10osti/47951.pdf

Executive Workshops on Strategies and Best Practices for State Departments of Transportation to Support Commercialization of Electric Vehicles (EV) and Infrastructure
Research in Progress; California Department of Transportation; 2011

Several states are targeted to participate or host major transportation electrification projects sponsored by the US Department of Energy: Washington, Oregon, California, Arizona, Texas, Tennessee, Michigan, New York, Florida, Virginia, and the District of Columbia. These states will serve as the test-bed for electric vehicle technologies. At least $400m dollars in public funding has been dedicated to transportation electrification efforts which will roll out in these states within the next 3-6 months. In addition, legislation is pending before Congress that would create a new transportation electrification program to provide grants for up to 15 states to further EV infrastructure. It's imperative that transportation agencies, public officials, and public policies be ready to capitalize on this massive investment. At a minimum, the departments of transportation in the 10 states cited above should immediately collaborate to share information, relevant research, policies and practices to assist other states that are (or will soon be) involved in transportation electrification efforts.
http://rip.trb.org/browse/dproject.asp?n=27741

Plug-in Hybrid Electric Vehicle Charging Infrastructure Review: Final Report
U.S. Department of Energy Vehicle Technologies Program – Advanced Vehicle Testing Activity
Kevin Morrow, Donald Karner, James Francfort; the Idaho National Laboratory is a U.S. Department of Energy National Laboratory Operated by Battelle Energy Alliance, 2008

Plug-in hybrid electric vehicles (PHEVs) are under evaluation by various stake holders to better understand their capability and potential benefits. PHEVs could allow users to significantly improve fuel economy over a standard HEV and in some cases, depending on daily driving requirements and vehicle design, have the ability to eliminate fuel consumption entirely for daily vehicle trips. The cost associated with providing charge infrastructure for PHEVs, along with the additional costs for the on-board power electronics and added battery requirements associated with PHEV technology will be a key factor in the success of PHEVs. This report analyzes the infrastructure requirements for PHEVs in single family residential, multi-family residential and commercial situations. Tabulated costs associated with this infrastructure provide an estimate of the infrastructure costs associated with PHEV deployment.
http://avt.inel.gov/pdf/phev/phevInfrastructureReport08.pdf

Public Utilities

Northeast Utilities Launches Electric Vehicle Charging Station Project
Hartford Courant, May 5, 2011
http://articles.courant.com/2011-05-03/business/hc-electric-vehicle-charging-stations20110503_1_electric-grid-watson-collins-evs

Clark Public Utilities hosts Clark County's first public electric vehicle charging station
Oregonian, Oregonlive.com, Tuesday, July 05, 2011
http://www.oregonlive.com/clark-county/index.ssf/2011/07/clark_public_utilities_hosts_clark_countys_first_public_electric_vehicle_charging_station.html

Public Private Partnerships (PPP's) for Charging Stations

Building Partnerships to Reduce Petroleum Use in Transportation
US Department of Energy, Clean Cities Website, 2011
Clean Cities advances the nation's economic, environmental, and energy security by supporting local actions to reduce petroleum consumption in transportation. A national network of nearly 100 Clean Cities coalitions brings together stakeholders in the public and private sectors to deploy alternative and renewable fuels, idle-reduction measures, fuel economy improvements, and emerging transportation technologies.
http://www1.eere.energy.gov/cleancities/

Oregon Office of Innovative Partnerships and Alternative Funding
Oregon Department of Transportation (ODOT) Innovative Parterships Program (IPP) Electric Vehicle Website, 2011

Electric vehicles are traveling Oregon roads more than ever before. The Oregon Department of Transportation has been involved in planning for their arrival and supports several projects around the state focused on electric vehicles (EVs) and EV infrastructure, including the following:

- The EV Project run by ECOtality aimed at supporting widespread adoption of the technology.
- EV fast charge stations in Southern Oregon, part of the West Coast Green Highway infrastructure building efforts.
- Tiger II Grant for EV infrastructure provides funding for EV fast charging stations in northwest Oregon along key corridors such as Oregon's coast and interior.

These and future projects are helping Oregon create a sustainable transportation system by reducing the states' reliance on imported petroleum and reducing greenhouse gas emissions.
http://www.oregon.gov/ODOT/HWY/OIPP/inn_ev-charging.shtml

Patrick-Murray Administration Awards Electric Vehicle Charging Stations to 25 Cities and Towns
Mass.gov website, Press Release, July 22, 2011
LEXINGTON — Friday, July 22, 2011 – As part of the Patrick-Murray Administration's nation-leading commitment to clean energy, Massachusetts Energy and Environmental Affairs (EEA) Secretary Richard K. Sullivan Jr. today took the Commonwealth's clean energy revolution to Lexington's Battle Green to announce the award of 94 electric vehicle charging stations for 25 cities and towns across the state.
http://www.mass.gov/?pageID=eoeeapressrelease&L=1&L0=Home&sid=Eoeea&b=pressrelease&f=110722-pr-electro-charge&csid=Eoeea

Other

How Consumers Value Fuel Economy: A Literature Review
EPA-420-R-10-008, Assessment and Standards Division, Office of Transportation and Air Quality, U.S. Environmental Protection Agency, by David L. Greene, Oak Ridge National Laboratory, March 2010
Abstract: The extent to which consumers value the expected future fuel savings from fuel economy improvements to new passenger cars and light trucks is a key determinant of the levels of fuel economy achieved in unregulated markets and the effects of regulatory standards on consumers' surplus. This paper reviews 28 recent quantitative analyses of consumers' willingness to pay for automotive fuel economy. Some of the studies estimate discrete choice models with random or fixed coefficients, some are based on aggregate market data while others use disaggregate survey data. Other studies make use

of hedonic price analysis or other methods. Their inferences about willingness to pay span a very broad range with roughly equal numbers finding significant under-valuing, significant over-valuing or approximately valuing the full present value of expected fuel savings over the lifetime of a typical vehicle. Although the methodologies or model formulations of a few of the studies are questionable, there do not appear to be clear associations among methods or data sources and the resulting inferences. The authors suggest that such conflicting results may be attributable to the statistical problems caused by omitted variables, errors in variables and correlated variables, the complexity of consumers' vehicle choice decisions, and the likelihood that the rational economic consumer model does not adequately describe the decision-making of consumers in the real world. Additional, empirical behavioral research appears needed to resolve the issue.
http://www.epa.gov/oms/climate/regulations/420r10008.pdf

Plug-in Electric Vehicles: Literature Review
By Monica Ralston and Nick Nigro; Pew Center on Global Climate Change; July 2011
This paper reviews the current literature on PEVs with a focus on issues and solutions related to vehicle deployment and integration with the U.S. electrical grid. It is a companion to the Pew Center on Global Climate Change's "Plug-in Electric Vehicles Market: State of Play." Material covered in that white paper is not duplicated here. The subjects covered here include vehicles, electricity, the passenger vehicle market, and public policy. This paper relies on the most recent research from government, private business, academia, and research institutions; peer-reviewed literature was used wherever possible. The paper's purpose is to provide a foundation for overcoming some of the major hurdles to PEV deployment in the United States both currently and in the future.
http://www.pewclimate.org/docUploads/PEV-Literature-Review.pdf

Plug-in Electric Vehicles Market: State of Play
By Nick Nigro; Pew Center on Global Climate Change; July 2011
Nearly all major auto companies—as well as several new start-ups—plan to produce plug-in electric vehicles (PEVs) within the next 2 or 3 years. According to transportation experts, the impact of the growing PEV market on the automobile market, electrical grid, and the transportation system could be significant, and will vary both regionally and over time. The introduction of PEVs into the automobile market presents a transformative opportunity for the transportation sector. Wherever these vehicles exist in sufficient numbers, significant technological, economic, and environmental change will occur. This opportunity affects automakers, electricity providers, vehicle charging companies, battery manufacturers, all levels of government and, most importantly, consumers. Deploying PEVs will bring together many of these stakeholders for the first time. This paper outlines the state of play in the PEV market including ongoing deployment projects, expected consumer market demand, and public policies related to PEV deployment.
http://www.pewclimate.org/docUploads/PEV-State-of-Play.pdf

Plug-in Hybrid Electric Vehicle Charging Infrastructure Review
By Kevin Morrow, Donald Karner, James Francfort; Battelle Energy Alliance; November 2008
Prepared for the U.S. Department of Energy
Plug-in hybrid electric vehicles (PHEVs) are under evaluation by the U.S. Department of Energy Vehicle Technologies Program's Advanced Vehicle Testing Activity and other various stakeholders to better understand their capability and potential petroleum reduction benefits. PHEVs could allow users to significantly improve fuel economy over a standard hybrid electric vehicle, and in some cases, depending on daily driving requirements and vehicle design, PHEVs may have the ability to eliminate fuel consumption entirely for daily vehicle trips. The cost associated with providing charging infrastructure

for PHEVs, along with costs for onboard power electronics and the batteries associated with PHEV technology, will be key factors in the success of PHEVs. This report analyzes the infrastructure requirements for PHEVs in single family residential, multi-family residential, and commercial situations. Costs associated with this infrastructure are tabulated, providing an estimate of the infrastructure costs associated with PHEV deployment.
http://avt.inl.gov/pdf/phev/phevInfrastructureReport08.pdf

The EV Project
EV Project Website, 2011
The EV Project is the largest deployment of electric vehicles and charge infrastructure in history.
http://www.theevproject.com/

Presidential Goals for EV's

The President first announced this goal as a candidate in a speech in Lansing, Michigan on August 4, 2008. http://my.barackobama.com/page/community/post/stateupdates/gG5zCW

The President first reiterated the goal as President at a speech in Pomona, California on March 19, 2009. http://www.energy.gov/7067.htm .

Transportation Energy Data Book
US Department of Energy; Edition 30; June 25, 2011
http://cta.ornl.gov/data/index.shtml

Hybrid and Electric Vehicles: the Electric Drive Advances
International Energy Agency (IEA) Hybrid and Electric Vehicle Implementing Agreement, March 2010
http://www.ieahev.org/publications/index.html

Vice President Biden Announces Plan to Put One Million Advanced Technology Vehicles on the Road by 2015
White House Press Release, January 26, 2010
http://www.whitehouse.gov/the-press-office/2011/01/26/vice-president-biden-announces-plan-put-onemillion-advanced-technology

Incidence Rates of Pedestrian and Bicyclist Crashes by Hybrid Electric Passenger Vehicles: An Update
National Highway Traffic Safety Administration; Jingshu Wu, Ph.D., P.E., Rory Austin, Ph.D., Chou-Lin Chen, Ph.D.; October 2011

Abstract
Hybrid electric (HE) passenger vehicles first became available to consumers in 2000, and their numbers as well as their proportion of the passenger vehicle fleet have risen every year since their introduction. Advocacy groups have raised pedestrian safety concerns regarding HE vehicles because a vehicle using the electric motor may be relatively quieter than a vehicle using an internal combustion engine (ICE) and may not emit the sounds that non-motorists rely on for warning as vehicles approach them.

In 2009 the National Highway Traffic Safety Administration released the report "Incidence of Pedestrian and Bicyclist Crashes by Hybrid Electric Passenger Vehicles" with the finding that an HE vehicle was two times more likely to be involved in a pedestrian crash than an ICE vehicle in situations involving low-speed maneuvers (Hanna, 2009). This report aims to update the previous report with more data by

adding additional years of State crash files as well as by increasing the number of States included in the analysis from 12 to 16.
http://www-nrd.nhtsa.dot.gov/Pubs/811526.pdf

Webinars

Webinar: Bringing EVs to Market - Technical Challenges and Business Opportunities
Chairperson: Dr Peter Wells, Director, Centre for Automotive Industry Research,
Cardiff Business School, UK; 2010
http://www.automotiveworld.com/img/webinars/10-03-17_Bringing-EVs-to-Market.pdf

Winning the Future through Innovation: the President's 2012 Budget
The White House.Gov Website; The President's 2012 Budget, 2011
Having emerged from the worst recession in generations, the President has put forward a plan to rebuild our economy and win the future by out-innovating, out-educating, and out-building our global competitors and creating the jobs and industries of tomorrow. But we cannot rebuild our economy and win the future if we pass on a mountain of debt to our children and grandchildren. We must restore fiscal responsibility, and reform our government to make it more effective, efficient, and open to the American people. The President's 2012 Budget is a responsible approach that puts the nation on a path to live within our means so we can invest in our future – by cutting wasteful spending and making tough choices on some things we cannot afford, while keeping the investments we need to grow the economy and create jobs. It targets scarce federal resources to the areas critical to winning the future: education, innovation, clean energy, and infrastructure. And it proposes to reform how Washington does business, putting more federal funding up for competition, cutting waste, and reorganizing government so that it better serves the American people. To spur innovation, the Budget will:

Bring About a Clean Energy Economy and Create the Jobs of the Future.
A global race is underway to develop and manufacture clean energy technologies, and we are competing with other countries that are playing to win. America has the most dynamic economy in the world, but we cannot expect to win the future by standing still. The President is committed to building a new clean energy economy here at home – because the nation that harnesses the power of clean, renewable energy will be the nation that leads the 21st century. A clean energy economy supports job growth, environmental protection, and fiscal health. To help drive this transition, the President has laid out a series of ambitious proposals for the Nation. The 2012 Budget supports clear progress toward achieving these targets, and builds on the historic steps that the Administration has already taken through the Recovery Act, which included over $90 billion in clean energy investments.

The President's proposals include:
Putting One Million Advanced Technology Vehicles on the Road by 2015. In 2008, the President set an ambitious goal of having 1 million advanced technology vehicles on the road by 2015. To reach that goal and become the first in the world to do so, the Budget proposes a new effort to support electric vehicle manufacturing and adoption in the U.S. through new consumer rebates, investments in R&D, and competitive programs to encourage communities that invest in electric vehicle infrastructure. Specifically, the Budget proposes to: transform the existing $7,500 tax credit for electric vehicles into a rebate that will be available to all consumers immediately at the point of sale; advance innovative technologies through new R&D investments, building on Recovery Act investments for technologies like batteries and electric drives – including an over 30% increase in support for vehicle technology R&D and

a new Energy Innovation Hub devoted to improving batteries and energy storage for vehicles and beyond; reward communities that invest in electric vehicle infrastructure through a $200 million http://www.whitehouse.gov/sites/default/files/microsites/ostp/FY12-innovation-fs.pdf