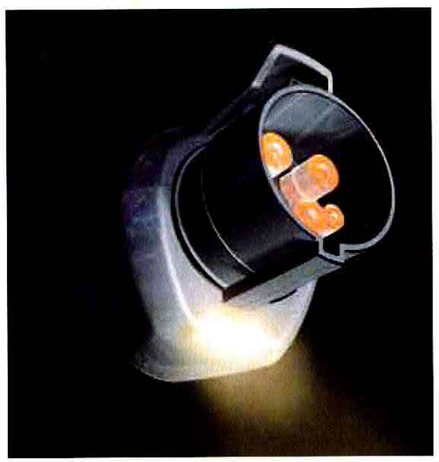
# Defining the Plug-In Readiness Initiative

Austin Energy's PEV Readiness Initiative is a comprehensive planning process to help facilitate the evolution of the PEV market in Austin. Throughout its three-year timeline, Austin Energy will engage with stakeholders ranging from vehicle vendors and property owners to neighboring government entities. Our initiative has five components.

- **A business model component** will examine how PEV charging will impact our grid, and use that to figure out ways to fairly price the electricity they draw.
- **An outreach component** will help get the word out that PEVs are coming, and engage in customer research so that we design a PEV infrastructure and customer support system that truly meets customers' needs.
- **A stakeholder component** will work with vehicle vendors, property owners, and other stakeholders to develop building codes to ensure safe charging; customer support for new PEV owners; and a program to help dealerships prepare themselves and their customers for PEVs.
- **A public charging component** will work with CAMPO and other governmental entities to develop a network of public charging stations.
- **A smart charging and communications infrastructure component** will develop information technology and electrical system tools to ensure customers can consistently and cost-effectively meet their charging needs at home, work, and in public places.

In addition, Austin Energy will ensure that our PEV readiness initiative is open and collaborative by reaching out to the community through public events.



## PEVs are coming. Austin will be ready.


**For more information, contact**

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# Plug-In Vehicles: The Readiness Initiative


***As many as 190,000 plug-in electric vehicles (PEVs) could be on Central Texas roads by 2020. PEVs will bring new choices to drivers and improve our air quality, but they will also present new challenges to our electric and transportation systems.***

***Austin will be ready to meet these challenges. The Austin Energy PEV Readiness Initiative is a three-year effort to work with the community to get our homes, roads, and electric system ready for PEVs. It will take all of us to make it happen.***

### What are plug-in vehicles?

Plug-in electric vehicles (PEVs) are electric or gas-electric cars. They are not low-speed specialty vehicles that look like golf carts. PEVs are full-sized cars designed to meet the needs of real families. Major automakers will start rolling out these models in late 2010. Over the following decade, PEVs could transform the way we fuel our transportation system. Plug-in electric vehicles come in two forms:

**Plug-In Hybrid Vehicles (PHEVs)** are similar to today's hybrid vehicles, but with bigger batteries and a plug for charging.

**Battery Electric Vehicles (BEVs)** run off a battery and an electric motor, and use no gasoline at all.

# Plug-In Vehicles:
## The Readiness Initiative

***Over the next three years, Austin Energy and its community and business partners will take the following steps to prepare Austin for PEVs. Our readiness initiative has five components:***

### Business Model

- Investigates ways that PEVs can enhance clean energy technologies.
- Incorporates PEVs into Austin Energy's planning and forecasting.
- Studies potential rate models, rebates, and incentives.

### Outreach and Marketing

- Conducts market research on customer behavior toward PEVs.
- Develops a marketing communications plan to inform the community and stakeholders about the opportunities that PEVs present.
- Makes recommendations for PEV billing systems.

### Stakeholder Issues

- Recommends building code changes to support PEVs.
- Develops a customer support plan for PEV and charging station owners and vendors.
- Creates a partnership with PEV vendors to facilitate rapid installation of home charging infrastructure for new PEV owners.

### Public Charging

- Develops a public charging station network in Central Texas.
- Plans for a demonstration charging station in Downtown Austin.
- Makes recommendations for coordinating PEV charging with public parking.

### Smart Charging and Communication Infrastructure

- Addresses the impacts of PEV charging on the Austin Energy grid and data management systems.
- Considers infrastructure needs for home, workplace, and public charging.
- Develops an approved contractor list for PEV charging station installation.



CONTACT INFORMATION

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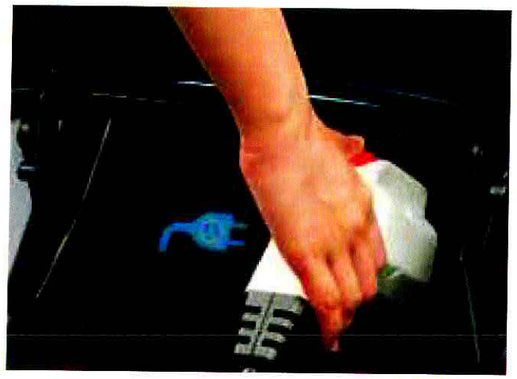


## What will their range be?

Different models of PEVs will have different ranges. PHEVs, the cars with the ability to switch between battery and gas power, will be able to drive about 40 miles before switching over to the gasoline engine. Some BEVs, or totally-battery powered vehicles, could go as many as 100 miles before needing to be recharged. Because U.S. Department of Transportation surveys show that about 80 percent of commuters travel fewer than 50 miles to and from work, PEVs are a real option for most drivers.

## How will recharging work?

One of the first practical considerations regarding PEVs is how drivers will "fill up" their batteries. Because most drivers will be able to drive to and from home within the range of a typical PEV battery, Austin Energy expects they will find it convenient to do most of their charging at home. Although most PEVs will be able to charge off a regular 110-volt household socket, charging will be much faster through a 220-volt socket with a special PEV plug. This 220-volt socket is similar to what an electric clothes dryer uses, and can be installed by an electrician when people purchase their vehicles.

As the PEV market develops, it is likely that a network of public, commercial, and workplace charging stations will help drivers fill up while they are at work, in the store, or simply parked on a public street. Several companies already manufacture charging stations that could be provided by businesses, employers, utilities, or the public sector, and could allow people to pay for their electricity with a credit card or through a pre-paid account.

## What are the benefits of PEVs?

A major benefit of PEVs is that they are cheaper to drive than gasoline vehicles. It costs about 10 cents per mile to fuel up a gasoline vehicle that gets 30 miles to the gallon with gas prices at three dollars per gallon. PEVs will cost about 2.5 cents per mile, calculated at today's average price of 10 cents per kilowatt-hour.

PEVs are also cleaner than gasoline vehicles. A 2008 Austin Energy study indicated that switching 100,000 vehicles from gasoline to PEVs would reduce nitrous oxide emissions by 95 percent and carbon dioxide by 54 percent. These numbers are based on generating electricity from nuclear, coal, and natural gas sources. As Austin Energy's generation profile gets greener, the difference will be even more dramatic.

Because PEVs will primarily charge their batteries at night, when wind blows the strongest, they allow us to replace foreign oil with West Texas wind as a transportation fuel.

## What do we need to do to prepare?

As with any new technology, no one can accurately predict how soon customers will start driving PEVs. This makes precise planning difficult and has the potential to create a scenario where customers wait for the charging infrastructure to arrive, while the private and public sector wait for customer adoption before investing in the infrastructure. This waiting game could slow down PEV adoption, and keep people in gasoline vehicles longer. On the other hand, PEV adoption could be faster than expected, creating strains on the electricity delivery system, especially if vehicle owners charge their batteries at times of peak demand.

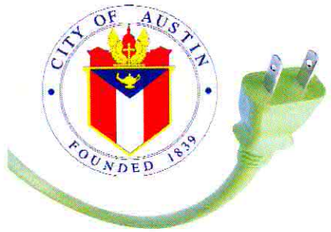
The key to navigating the future of PEVs is preparation. Cities around the country – including Houston, San Antonio, and Dallas-Fort Worth in Texas – are preparing their transportation and electric infrastructures for PEVs. Here in Austin, where Austin Energy helped inspire automakers to take the PEV plunge with a national Plug-In Partners Program, we are well on the way to preparing both the utility and drivers in this region for the vehicles of the future.

# Plug-ins are coming to Central Texas

*Car buyers will soon be able to choose from a wide variety of plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs). Here are some of the models that may be available in Central Texas in the next few years.*

# COA ELECTRIC TRANSPORTATION ROADMAP

Draft Version: 2 Feb 2010



COA programs w/ OEMS (Ford, Chrysler, GM, Nissan,etc.) begin

**OEM Projection:** First PEVs: 7 to 40 - mile EV Range Li Ion Battery

**2012 < 4,000 vehicles**

**EPRI Projection for PEVs:** 20% of New Vehicle Sales <3% of All Vehicles on the Road <3% of VMT Fraction

**2015 - 31,000 vehicles**

**OEM Projection:** Costs Decrease, Most OEMs Have PEVs in Lineup 30 to 40-mile EV range

**Austin Energy Estimate of PEV Deployment from 2010 to 2020**

**2020 - 192,000 Light Duty PEV Vehicles in Austin Service Territory**

**OEM Projection:** 40-mile+ EV Range

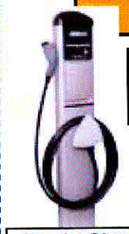
**EPRI Projection for PEVs:** 40% of New Vehicle Sales 10% of All Vehicles on the Road 8% of VMT Fraction

2010 — Initial PEV Market Intro — 2015 — PEV Sales Accelerate — Widespread PEV Adoption — 2020

COA Hybrid Fleet Conversion Program

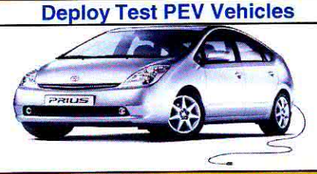
AE RESEARCH w/CHRYSLER, GM, ERCOT & UT

PECAN STREET PROJECT DEMONSTRATION AT MUELLER (Vehicle Integration w/ Smart Grid)



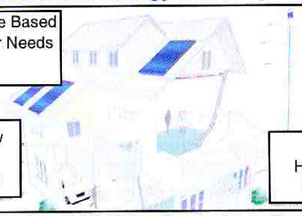
**Begin Charging Station Testing**

**Deploy Test PEV Vehicles**



**Address Home Energy Consumption & Demand**

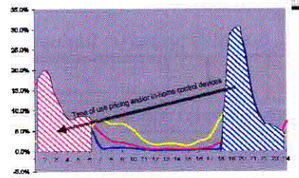
Energy Choice Based on Cunsumer Needs

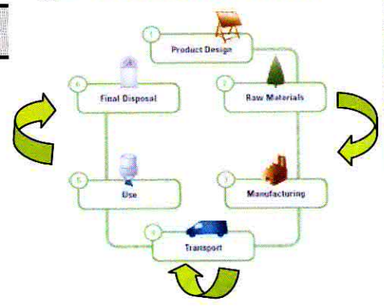


Ultra-Low Carbon Vehicles

Smart Household Controls

**Explore Load Shifting to Reduce Day Time Peaks While Considering Life Cycle Impacts of PEV's**






**Explore Summer V2G w/ PHEV School Buses**

Work w/ AISD to Aggregate Vehicles to Shave Peak Demand

Work w/CMTA and LStar on the Electrification of Mass Transit

**Begin Operation of Urban Rail**

Conduct Non-Road Program Starting w/ Bergstrom

**Develop and Implement Ground Support Program**

Provision of On-Going Consumer Incentives

Work w/ Local Schools to Teach & Certify PEV Mechanics

## AE NEAR-TERM ELECTRIC TRANSPORTATION PROJECT

Install First Test Public Charging Station

Complete Intergovernmental Concept Agreement through CAMPO

Final Public Charging Agreement

Adopt Building Code Changes

Initiate Dealership Program

Adopt and Initiate Voucher Program

Publish Market Research Report

Initiate Marketing Program

Choose Vendors for Different Charging Station Classes

Finalize EVSE Protocols

# AE TRANSPORTATION ELECTRIFICATION PROGRAM NEAR-TERM TIMELINE

Version: 7 Jan 2010

**Smart Charging & Communication Infrastructure**

Lead: Victor Carr

- 03 AE data management report
- 02 EV Battery charging report
- 04A Smart Charging Report (EVSE)
- 04B Smart Charging Infrastructure report (Communication)
- 05 Contractor rotation process in place
- 06 Spending Plan

**Public Charging**

Lead: Rachel May

- 02 interjurisdictional Plan and Implementation strategy
- 03 A plan to integrate public charging with COA parking meter kiosks
- 04 A charging station demo downtown
- 06 Spending Plan
- 05A A concept agreement on public charging
- 05B An approved final agreement on public charging

**Stakeholder Issues**

Lead: Richard Morgan

- 05 Building Code changes presented
- 02 a report on local building codes
- 06 charging station program developed
- 07 Spending Plan
- 03 a customer support plan
- 04 plan to support 6 charging types

**Outreach & Marketing**

Lead: Chris Frye

- 03 communication plan
- 02 a report on PEV market research
- 04 PEV marketing plan
- 05 Billing Issues Report
- 08 Spending Plan
- 06 EPRI/AE market research
- 07 Education Campaign

**Business Impacts**

Lead: Kurt Stogdill

- 02 a report on leveraging PEVS
- 03A Preliminary Report on business models
- 03B a final report on business models
- 04 a report on grid with ERCOT
- 05 Integration into the AE load forecast
- 06 recommmendations on rate structures
- 09 Spending Plan
- 07 a program for residential vouchers
- 08 a charging station owner business model

Sept Oct Nov Dec | Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec | Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec | Jan Feb Mar April May June July Aug Sept

2009 2010 2011 2012

= Critical Items

First Vehicles Available at Showrooms Nationally for Purchase by General Public

**Management Milestones**

Quarterly reports

- Integrate PSP Program 3 into PEV effort
- Finalize Contracts for FOA-28s w/ OEMs
- Leads: Austan Librach & Larry Alford
- Overall Spending Plan for PEV
- Install first test Public Charging Station
- Complete Intergovernmental Concept Agreement
- Publish Market Research report
- Present Building Code Changes for Adoption
- Adopt and Initiate Voucher Program
- Charging Station Bus Model & Trial
- Initiate Marketing Program
- Choose Vendors for Different Charging Station Classes
- Final Public Charging Agreement
- Initiate Dealership program
- Finalize EVSE Protocols
- Final Business Model /PEV leverage/grid & ancillary services Reports
- Final Report Draft

PEV TEAM

PEV PLAN TIMELINE

FINAL 7/28/2010