



Plug-In Electric Vehicle Opportunity For Austin Energy

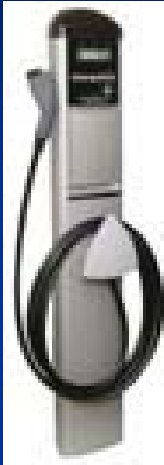
Presented to: RMC

August 17th 2010





The Perfect Storm



- **Economics**
Cheap oil is running out
- **Environmental**
Pressure to curb transportation pollutants
- **National Security**
Pressure to curb dependence on foreign oil



Plug-In Partners was a national grass-roots initiative to demonstrate to automakers that a market for Plug-In Hybrid Electric Vehicles (PHEV) exists today.

- Initiated January 2006
- Successfully completed October 2008



Plug-ins are coming to Central Texas

PHEV or EREV

EV or BEV

*Near
Production*



Saturn Vue



BYD Auto F3DM



Chevrolet Volt



Ford Escape



Nissan Leaf



Tesla Model S



Daimler Smart



Mitsubishi iMIEV



Think City



Hyundai i10

*Pre-
Production*



Toyota
Prius



Volvo
V70



Chrysler Town & Country



VW Golf



Audi A1



Subaru
R1e



Dodge
ZEO



Peugeot
iOn



BMW Mini e



Daimler Smart ED



What OEMs are Doing with Specialty Vehicles



Odyne Refuse Truck



Eaton/Ford/EPRI F-550 Super Duty Trouble Truck



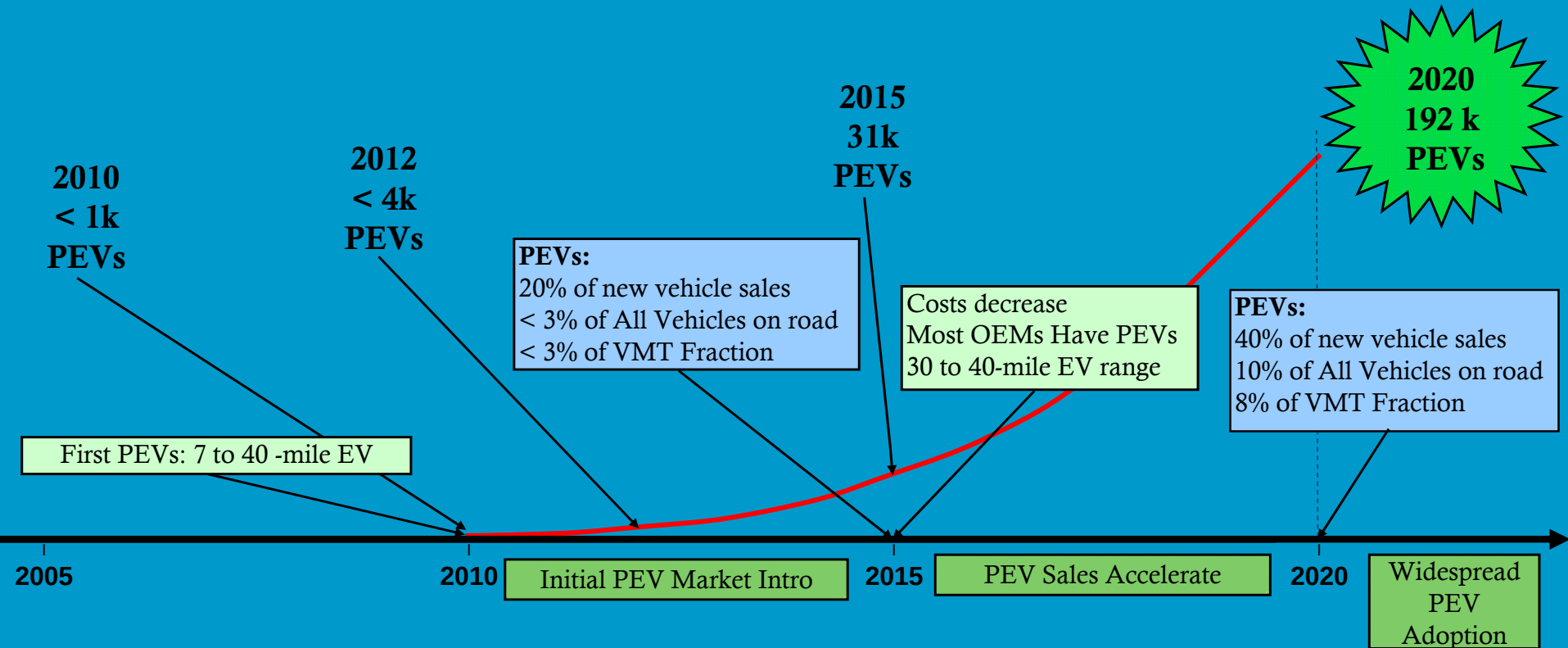
Daimler-Chrysler Dodge Sprinter Cargo Van



Advanced Energy/ International School Bus

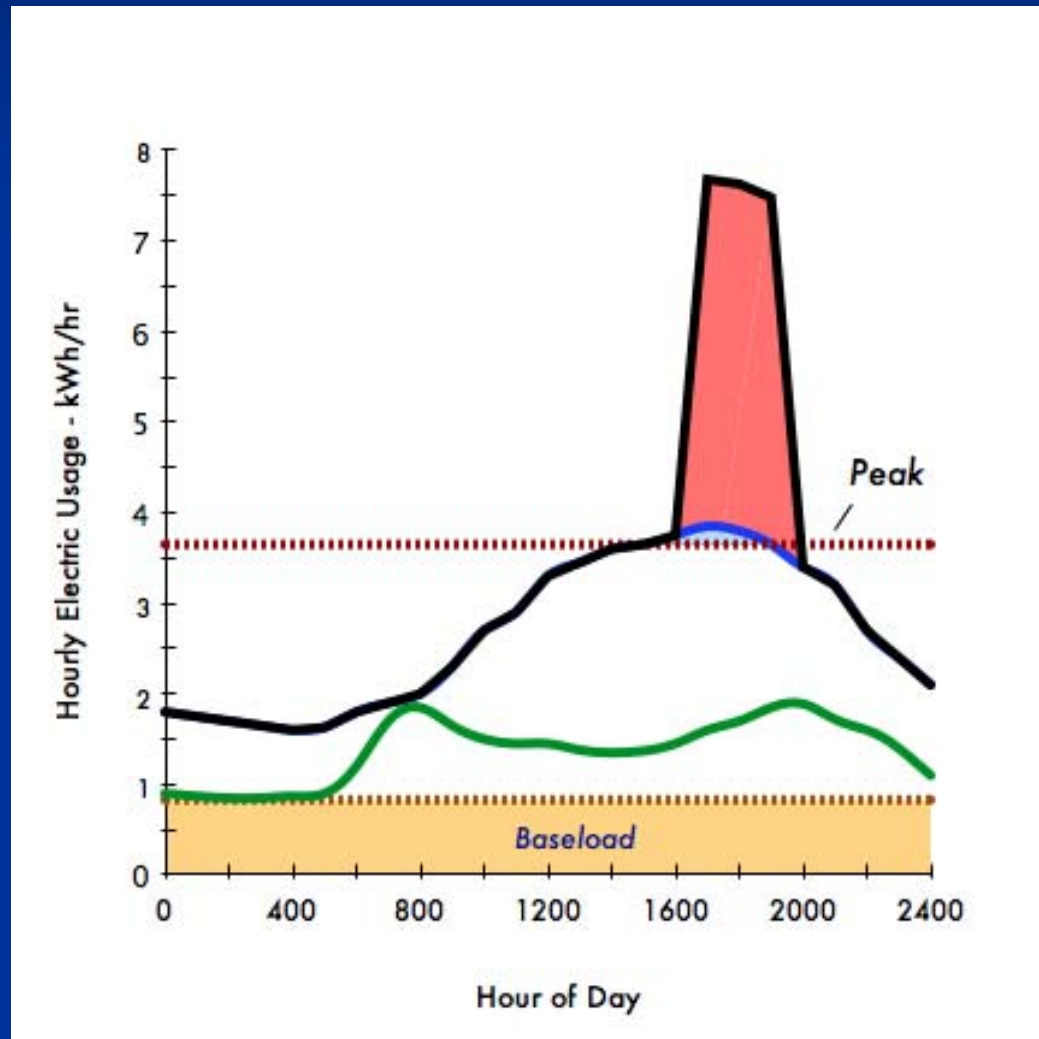


How Many PEVs Do We Prepare For?





Utility Impact from Home Charging *(Illustrative)*





PEV

Charging Station
Level 1 (120V)
Level 2 (240V)
DC/DC

LIGHT DUTY

1. Home Charging	2. Apartment/ Condo Charging	3. COA/AE Fleet Charging
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Residential Program:

AE Owns/Installs the Charging Station

"I want to drive truly zero emissions using Texas Wind"

"I want a fixed price for my transportation fuel"

"I want to drive on the lowest cost energy"

Program Components might include:

- Free installation of Level 2 EVSE
- A.E. has selective control of charging during peak time periods
- A.E. collects data on driver behavior
- Free emergency service
- Free public charging
- \$ X/month subscription fee

10.
Commercial
Fleet

- What
- How will individual distribution feeders be impacted?
- What utility infrastructure is required?
- What communication infrastructure is required?



COA ELECTRIC TRANSPORTATION ROADMAP

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 v

EPRI Projection for PEVs:

CECO Grant
- 38 Prius Conversions

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

OEM Projection:
Increase, Most PEVs in 40-mile EV range

2010

2015

2020

COA Hybrid Fleet Conversion Program

Initial PEV Market Intro

PEV Sales Accelerate

Widespread PEV Adoption

AE RESEARCH w/ CHRYSLER, GM, ERCOT & UT

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

Deploy Test PEV Vehicles

Address Home Energy Consumption & Demand

Energy Choice Based on Consumer Needs



Begin Charging Station Testing

AE NEAR-TERM ELECTRIC

Pecan Street Project (FOA - 36)

Task 1 Solar/Charging Test

Task 2 Residential Charging Test

Task 3 Retail Standards Development

Install First Test Public Charging Station

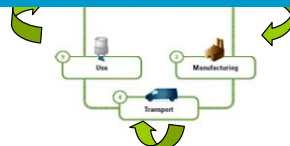
Adopt Best Practices



Publish Market Report

Choose Vendors for Different Charging Station Classes

Finalize EVSE Protocols



DOE Stimulus Grants (FOA -28)

- 2 Volts EREV from GM
- 14 Ram 1500 Crew Cab PHEVs from Chrysler
- 150 Public Charging Stations from Coulomb

Conduct Non-Road Program Starting w/ Bergstrom



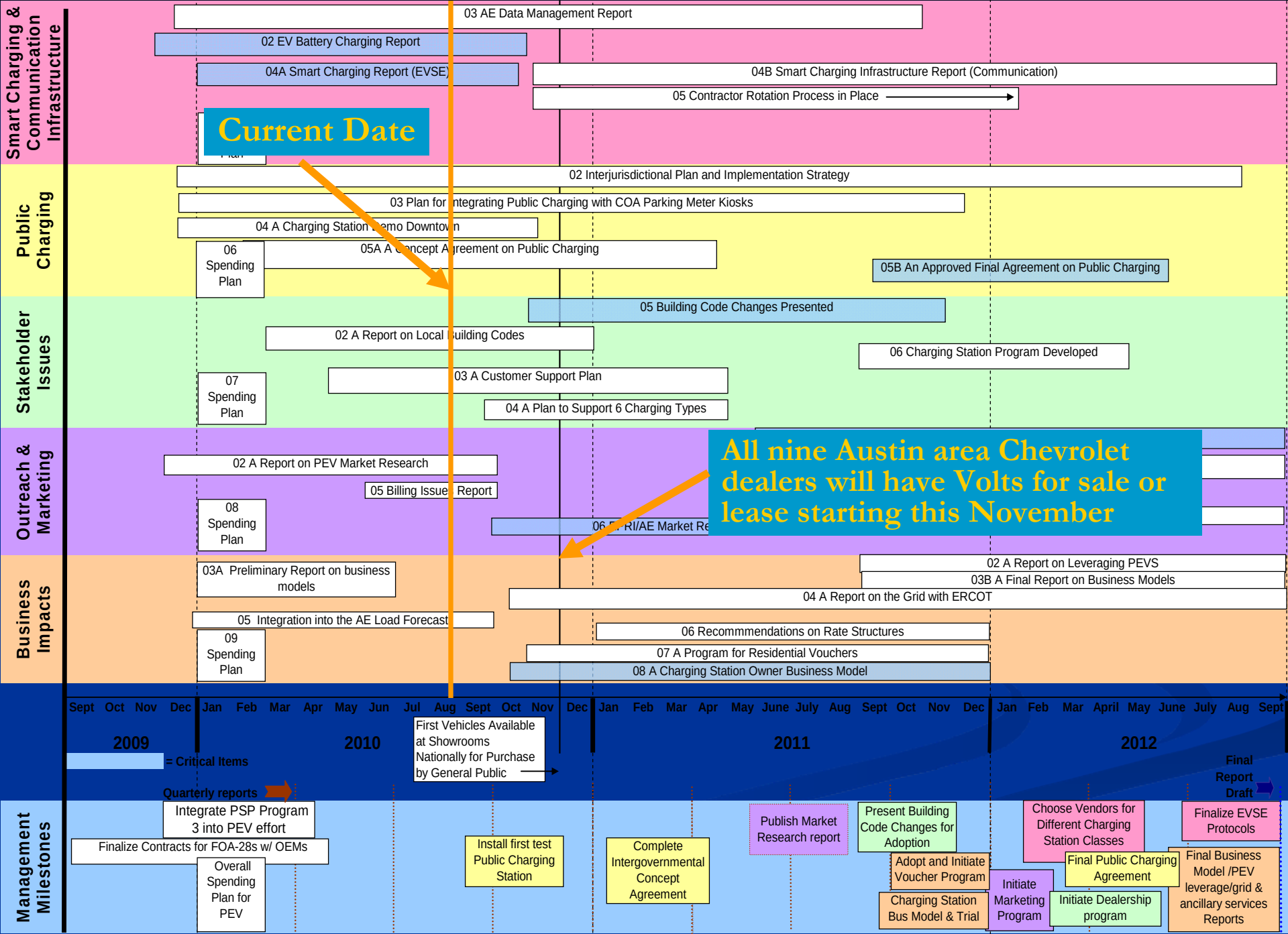
Develop and Implement Ground Support Program



Provision of On-Going Consumer Incentives

Work w/ Local Schools to Teach & Certify PEV Mechanics

AE TRANSPORTATION ELECTRIFICATION PROGRAM NEAR-TERM TIMELINE





Austin Energy PEV Initiative

Teams

Business Impacts

Outreach & Marketing

Stakeholder Issues

Public Charging

**Smart Charging &
Communication
Infrastructure**

- **Potential PEV Business Models**
- **Enabling Programs for Incentives & Rebates**
- **Smart Charging Programs & Rate Structures**
- **ERCOT Related Issues**



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Public Charging

**Smart Charging &
Communication
Infrastructure**

- **Communication
& Marketing Plan**

- **Understand
Customer Issues &
Preferences**

- **Billing Issues
Related to PEVs**



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Public Charging

**Smart Charging &
Communication
Infrastructure**

- **PEV Infrastructure/
Interface Issues**
- **Develop Plan for
Customer Support**
- **Charging Station
Program with
Dealerships**



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Public Charging

**Smart Charging &
Communication
Infrastructure**

- **Local and Regional
Public Charging
Plan**
- **Determine Public
Charging Costs**
- **Public Charging
Demonstration**



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- **Grid Impacts of PEV Integration**
- **Infrastructure Requirements**
- **Leverage PEVs with Gen/Load/Storage**
- **Determine Data Management Issues**



To Design the Energy System of the Future the
“Pecan Street Project”

Brings Together:

City of Austin, Austin Energy,
University of Texas, Austin Chamber and Environmental
Defense Fund

And National Corporate Partnerships with:

Dell, GE Energy, IBM, Intel, Oracle, Cisco Systems, Microsoft,
Freescale Semiconductor and GridPoint



Pecan Street Project



Task 1 *Solar/Charging Test*

Research Objectives: Cost and value of solar charging
Evaluate storage with solar including a nighttime charging component



Task 2 *Residential Charging Test*

Research Objectives: Utility operational standards for PEV infrastructure for residential types
Demonstrate PEV charging using townhouse or multi-unit situation



Task 3 *Retail Standards Development*

Research Objectives: Utility operational standards for infrastructure for retail
Test public charging infrastructure in a retail shopping center



Pecan Street Project

Questions to be Answered



- What infrastructure is needed for PEV charging?
 - Hardware
 - Software
 - Communications
- What are the impacts to the grid equipment?
- What PEV programs are needed? (Half of the population lives in multi-family dwellings with no access to outlet for PEV)
 - Incentives
 - Home Wiring for 120V and 240V
 - Charge Management
 - Mobile Issues
- Where should public charging be located and how is it managed?
- What is required to qualify smart charging for grid ancillary services?