



THE CHEVROLET

VOLT

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2011 Volt — Born and Built in U.S.

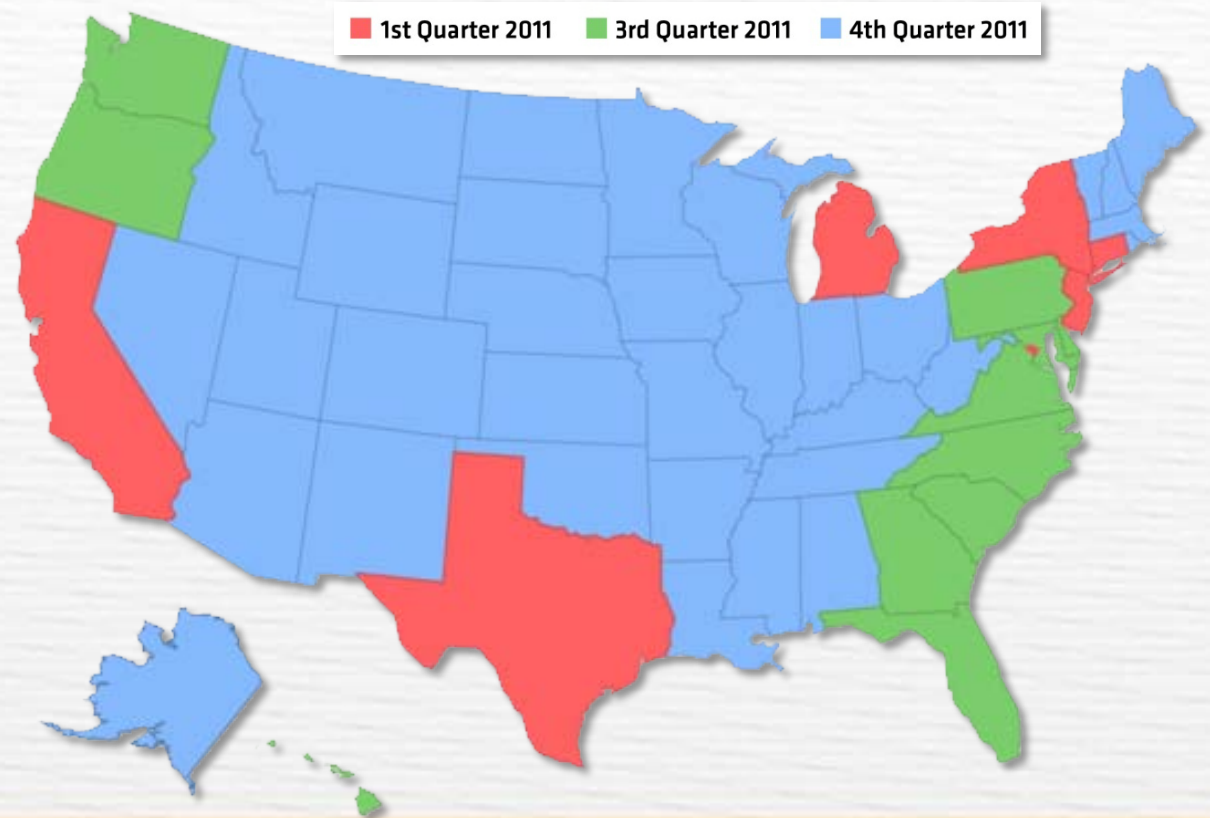
- GM invested more than \$700 million in eight Michigan plants for Volt production
- Key facilities
 - Detroit-Hamtramck Assembly
Investment of \$336 million
 - Brownstown Battery Assembly
Investment of \$43 million
 - GM Global Battery System Lab
Investment of \$33 million





2011 Chevrolet Volt Availability

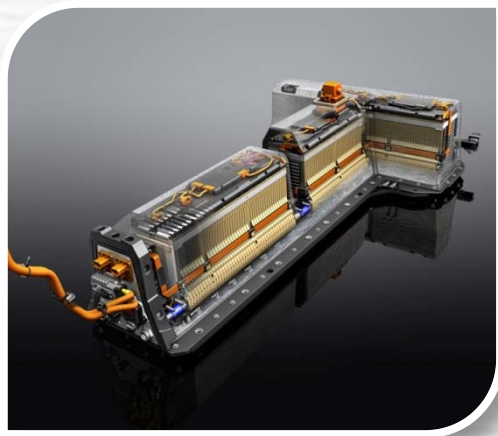
- Volts will be available across the U.S. by the end of this year — six months sooner than originally planned
- Volts have already been delivered to customers in Washington, D.C., California, New York, Connecticut, New Jersey, Michigan and Texas





How Volt Works

- Combines a high-voltage lithium-ion battery pack with an advanced electric drive unit
- **Electric Mode** — Volt can drive initially on electricity for a range of 35 miles*
- **Extended Range Mode** — Gas-powered generator turns on and produces electric energy for hundreds of additional miles of driving range



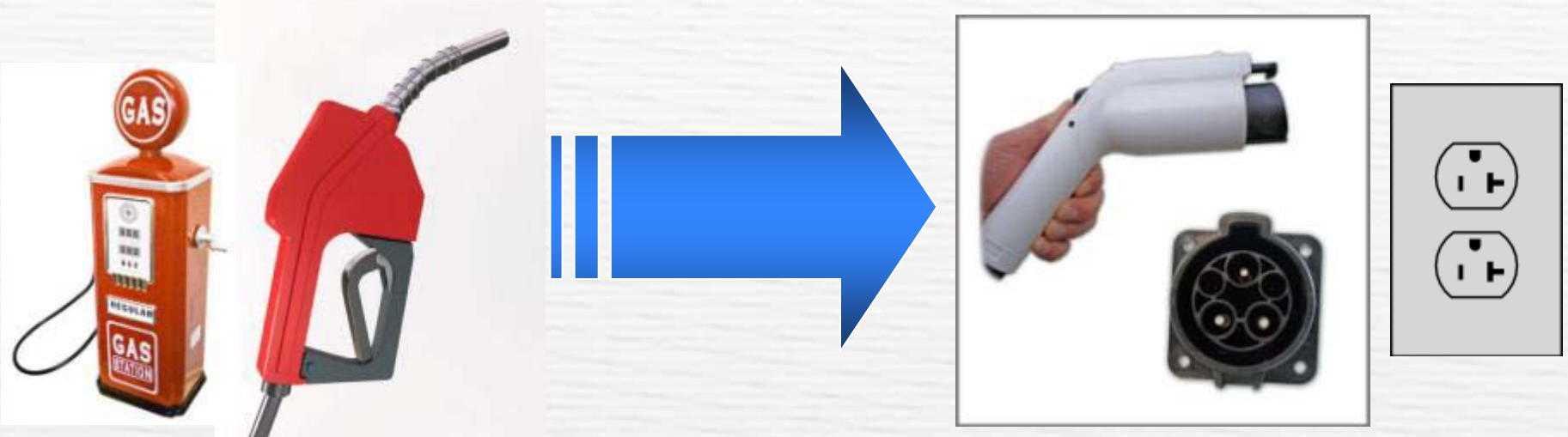
*EPA estimated 35 miles initial range based on 93 MPGe (electric); actual range varies with conditions



EVSE | Fuel Pump of the Future

- EVSE = Electric Vehicle Supply Equipment
- Definition (according to NEC Article 625.2):

Electric Vehicle Supply Equipment. The conductors, including the ungrounded, grounded, and equipment grounding conductors and the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.





Charging the Chevrolet Volt

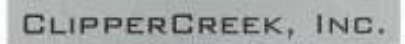
- The Volt plugs into a standard 120v household outlet or a 240v outlet for charging
 - From fully depleted, 10-12 hours of charging using 120v and less than 4 hours with 240v
 - Cost to recharge from empty to full is about \$1.50*



*EPA estimated 35 miles initial range based on 93 MPGe (electric); actual range varies with conditions



Other 3rd-Party Examples





GM/EPRI Utility Collaboration

Includes more than 50 Utilities... many the industry's thought-leaders in electric transportation and grid interaction

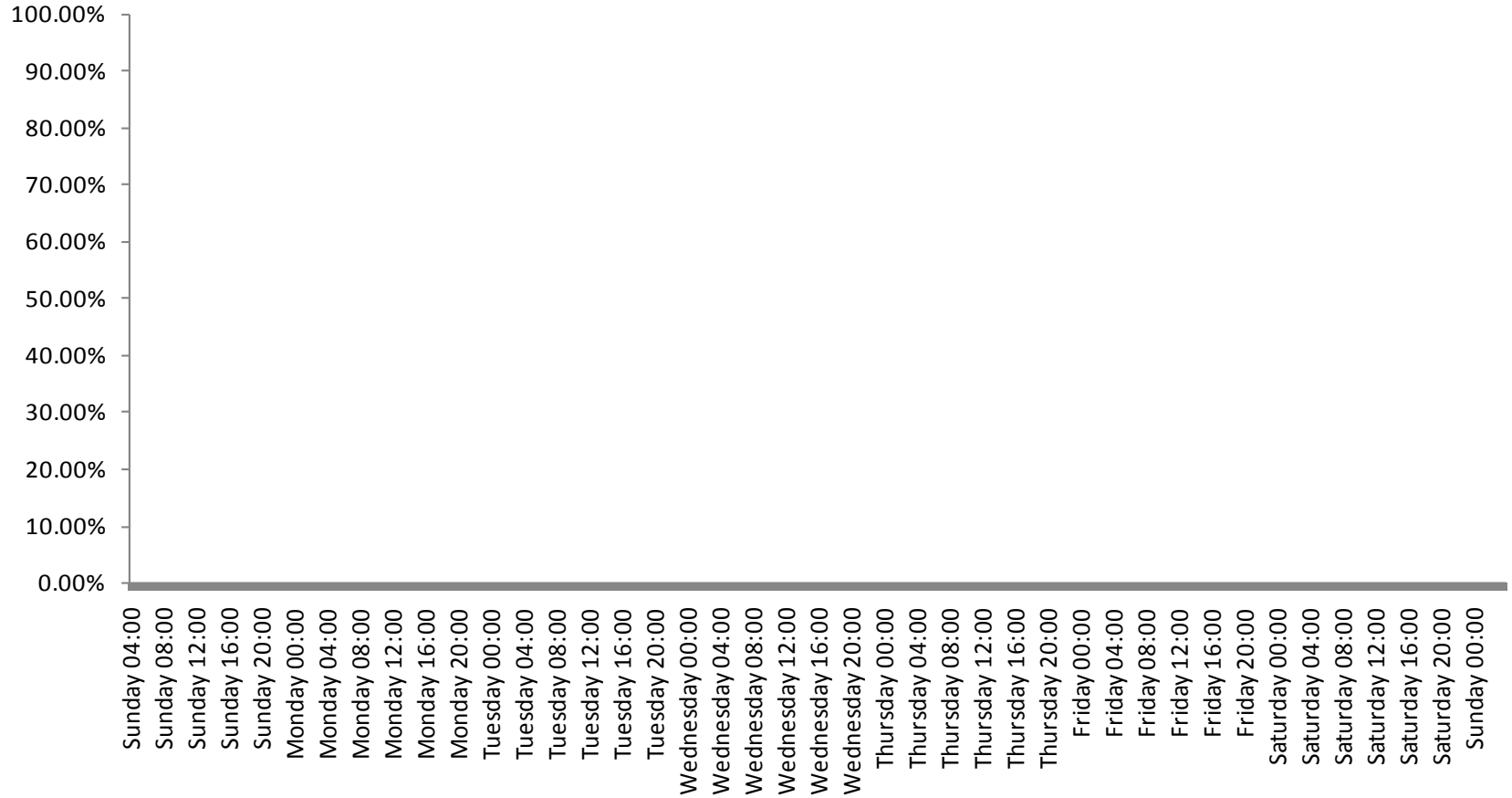




Where Are the Cars?

Fleet Distribution during week

■ Home
 ■ Residence
 ■ Work
 ■ School & Church
 ■ Commercial
 ■ Other
 ■ Driving

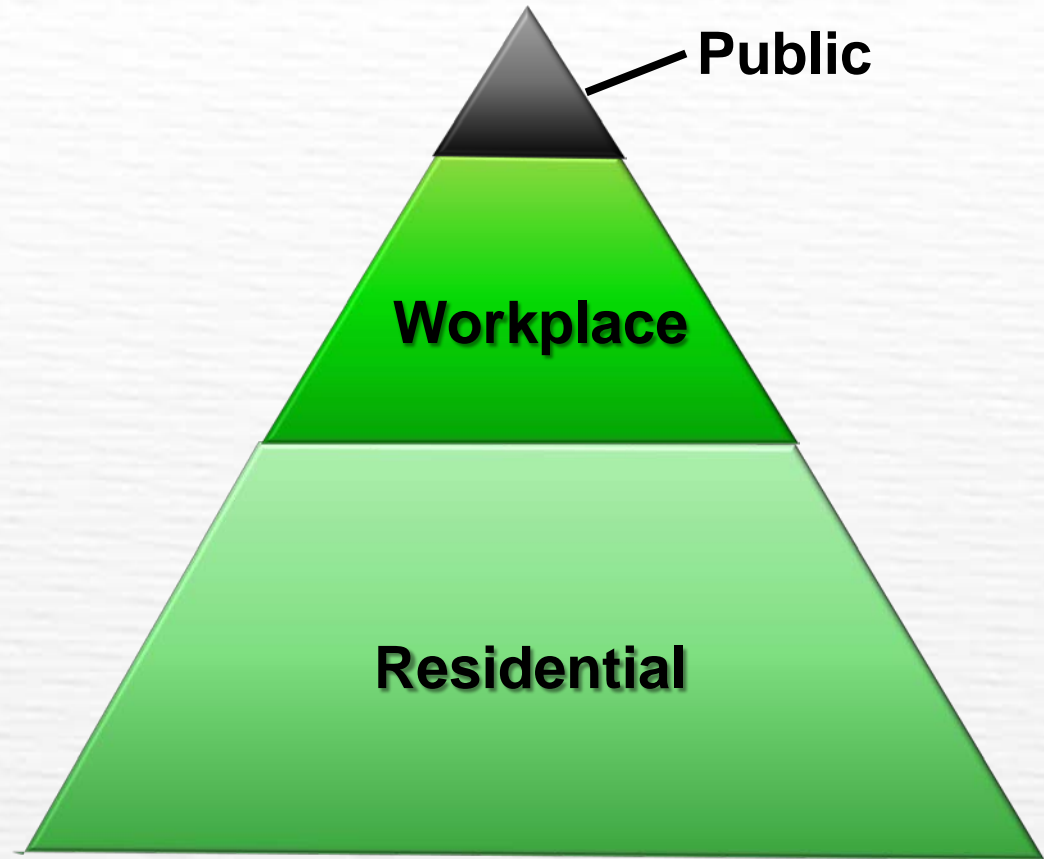


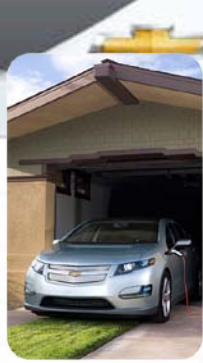
Source of Data - 2001 National Household Travel Survey ; GM Data Analysis (Tate/Savagian) - SAE paper 2009-01-1311



Charging Infrastructure

- Public charging
 - High Visibility
 - Commercial/Retail
 - Public education and outreach
- Workplace
 - Corporate, Municipal Parking Lots
- Residential (majority)
 - Satisfying consumer-driven home installation process
 - Permits, electricians, inspections, meters, rates





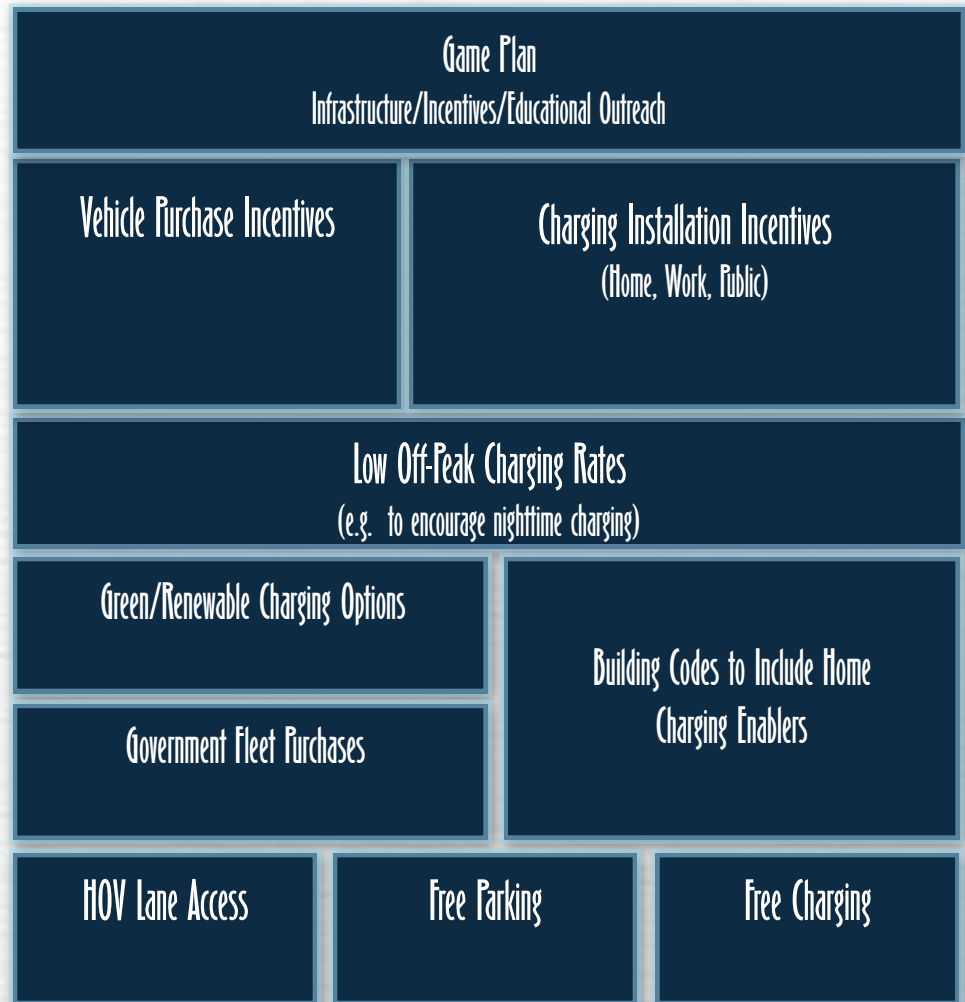
Plug-in Ready Communities

Required Stakeholders

- Dedicated project leader
- State, city, county
- Clean Cities Orgs/AQMD
- DOT
- Utilities (municipal and regional)
- Regulators/public utility commissions
- Permitting and code officials
- Local employers
- Local universities



Desired Enablers





Top Priorities for Overall Utility Support:

- Consumer EV support (24/7 operator for EV charging questions)
- Residential infrastructure assistance
 - Fast, convenient installation process that is affordable (i.e. satisfying)

Home Inspection ➔ EVSE Installation ➔ Meter Installation ➔ Permit/Inspection ➔ Rate Signup

- Utility handles entire home installation process
OR
- Coordination between Utility (meter) and 3rd party installer (EVSE)
- Outreach and leadership in readying regions for plug-in vehicles
 - Key stakeholder outreach
 - City/regional initiative to put enablers in place
 - Consumer education
- Compelling consumer EV rates and easy sign-up process
 - Inform customers of best options, preferred rates, green options
- Policy assistance (e.g. eased permitting, building codes, incentives)



Home Charging Installation GM Teams with SPX

- SPX is required to ensure national coordination of home installation and to provide a program that is integrated with local government and utility company activities, services and programs
 - SPX will ensure a consistent and coordinated customer experience that meets our common objectives (safe, simple, fast, low cost and satisfying experience) on a national basis
 - GM is collaborating with SPX and utilities to frame a direct working relationship around requirements and degree of involvement



- **SPX to incorporate 4,400 Coulomb and ECOtality home chargers (DOE Awards)**
 - Applies to specific geographies, including Southern California
 - Charger H/W costs are covered, installation cost reimbursement is location specific
- **SPX will manage the City of Los Angeles (LADWP / ECOtality) Program for customers**



Outreach and Education

Dealer Preparation and Training



12 Cities
6,300 Participants

40+ sessions & 150+ dealers
1,500+ attendees

National Safety Training Program with NFPA

Began November 2010

- Customer driven events at GM Tech Centers in Los Angeles
- Stakeholder outreach to support decision making on infrastructure

Began October 2010

- All markets
www.chevrolet.com
- Technology to SPX execution
- How will new infrastructure impact customer's experience

• GM First Responder Website

<https://www.gmstc.com>

• GM and NFPA partnership for training/education

www.evsafetytraining.org



Contractor & Inspector Outreach

1. This is an ongoing process (there are 40,000 jurisdictions having authority in the U.S.)
2. Many of our utility partners have begun outreach awareness to their local inspectors
3. USCAR (GITT - Grid Interaction Tech Team) and the U.S. DoE (Clean Cities Initiative) are developing a national outreach program with input from relevant stakeholders (including the ICC)
4. GM is also collaborating with NECA, IBEW and IAEI (both nationally and at the local chapter level) to roll-out training to electrical contractors and inspectors (starting with early launch markets)



USCAR



CHRYSLER

UNITED STATES COUNCIL FOR AUTOMOTIVE RESEARCH LLC





Additional Resources | Online PEV Info

www.ProjectGetReady.org



www.GoElectricDrive.com



State Websites:

(e.g.,

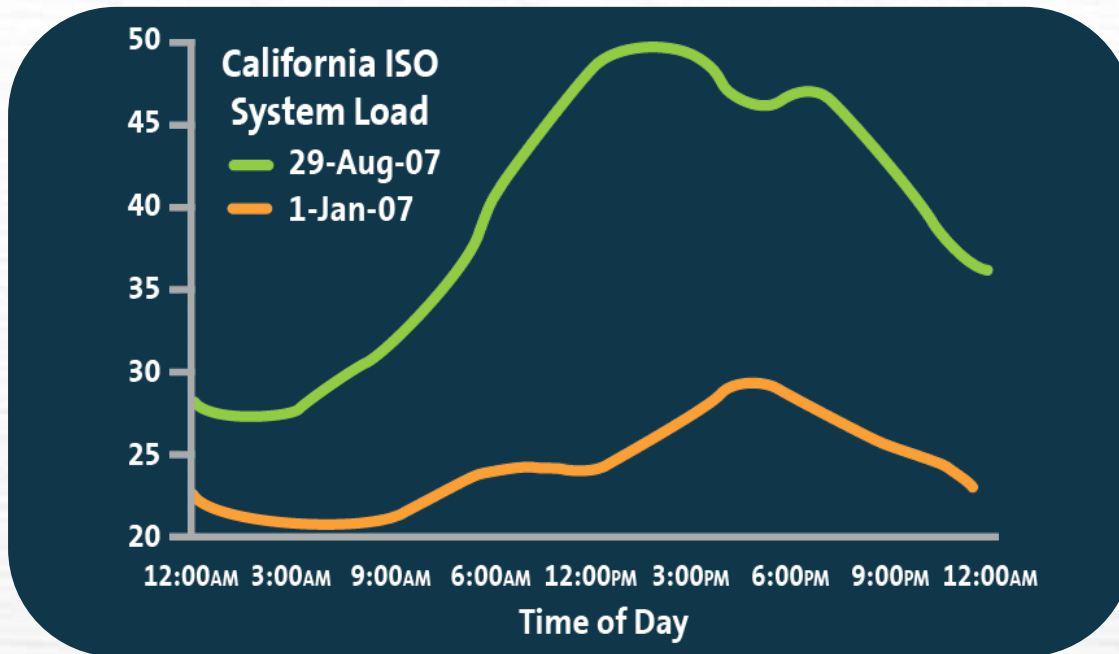
www.PluginMichigan.org)





Electric Grid is Designed for Peak Demand

Consumers encouraged to Charge Off-Peak to form correct charging habits













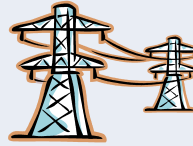

Grid loads are typically highest during the hottest summer afternoons – the remainder of the year the loads are significantly lower at all times of the day; encouraging the correct (off-peak) charging behaviors throughout the year will ensure the correct habits are formed to avoid additional “peak”.

The Volt has a “smart” delayed charge feature that shifts charging to the load “valley”





EVSE Installation Process

Online Pre-Installation Survey	Home Electrical Site Survey	Permit & Inspection	Standard Installation (240V)	2nd Utility Meter Installation (Optional)	Ready to Charge (240V)
					
 <p>Volt Customer</p>				 <p>Utility Company</p>	 <p>Volt Customer</p>
<ul style="list-style-type: none"> • Customer Completes Online Pre-installation Survey 	<ul style="list-style-type: none"> • SPX contacts customer and schedules home electrical survey • SPX electrical contractor completes home survey and provides options / quotes to customer 	<ul style="list-style-type: none"> • Local SPX certified, trained and licensed electrical contractor secures permit for installation (on behalf of customer) 	<ul style="list-style-type: none"> • SPX schedules and completes installation • SPX schedules electrical inspection • Electrical inspector approves install 	<ul style="list-style-type: none"> • Local electric utility company installs and activates 2nd utility meter (if required) <p>EVSE = Electric Vehicle Supply Equipment</p>	<ul style="list-style-type: none"> • Customer ready to charge Volt at home



Home Charging Installation | Early Learning

Utility Notification

- System augments customers who directly reach out to utilities.
- GM, working closely with utility partners and within its own Privacy Policy, is providing vehicle / address data to the utilities upon request.
 - Process implemented to support grid reliability
 - Executed at SPX registration
 - Opt-out style questionnaire
 - Evaluating both participation rates and grid learning
- Early Learning:
 - Participation is high
 - No major grid concerns identified
 - Limited grid reinforcement improvements are occurring.



Home Charging Installation | Early Learning

Customer Participation

- **Some customers waiting to initiate evaluation / installation of 240V charging**
 - **Waiting for Volt delivery and 120V charging experience**
- **Utility rates, installation costs, and payback period are complex and customer interaction / understanding varies widely**
- **Execution of special programs increases complexity, time and coordination**
 - **Extra legal agreements, process steps, interfaces, phone calls, appointments and paperwork**
 - **Customer education and dealer training**



Home Charging Installation | Early Learning

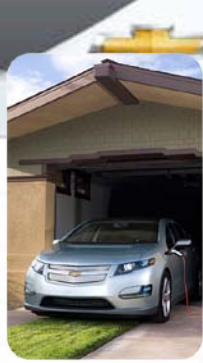
Permitting, Installation, and Inspection

- **Permitting experience varies widely, especially for 2nd (parallel) meters**
 - Range from Online to Plan Check (Site Plan, Line Drawings, Load Calculations)
 - Price of permit could be substantial portion of installation cost (10-20%)
- **Standard Installations (i.e. single meter) typically take 2-4 hours**
 - Non-standard installations can require trenching, service upgrades, etc.
 - Utilities vary on TOU options (2nd Meter, Sub-Meter, Whole House TOU), but also vary on installation requirements for overhead, underground service.
- **Inspectors are learning about EV Charging, EVSEs, Meter Options**
 - While general variability is understood, inspector's request for additional information & visits, interpretation of the rules, and comfort with technology can delay installation approval.



Home Charging Installation | Early Learning

- **Average home charging installation costs have ranged widely**
 - Incredible variability between residences (individually and regionally)
 - 2nd meter
 - Higher permitting costs in some locations; permit costs have ranged \$25-\$325
- **Cost is not the only determining factor for customer experience**
 - Multiple, complex options (install, rates) generate doubt in decision-making
 - The amount of time from Registration to Inspection can be 4-6 weeks
- **Major utility programs under way**
 - Austin Energy: Up to \$1500 Rebate on 50% of the EVSE installation costs
 - DTE and Consumers Energy: \$2500 Rebate on EVSE installation (DTE requires 2nd utility meter, CE Program may require a 2nd utility meter depending on electricity rate selected)
 - LADWP: \$2000 Rebate on EVSE installation (requires 2nd utility meter)
 - Other programs under development and expected to launch later this year



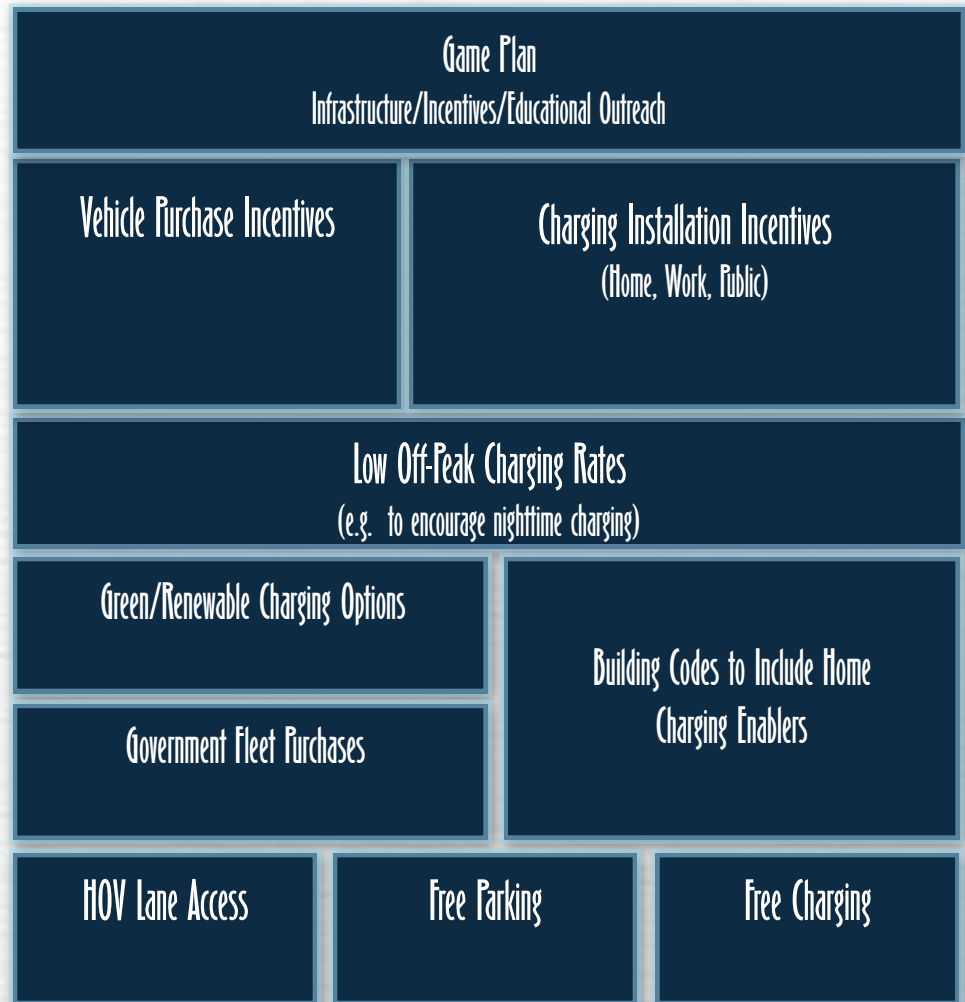
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Popular Mechanics
AUTOMOTIVE EXCELLENCE
Breakthrough Technology Award

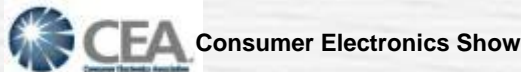


Popular Mechanics

TOP 10 VEHICLES AWARD
TECHNOLOGY



OnStar MyLink
Volt Mobile App



“TOP PRODUCTS” Award

Popular Mechanics
EDITOR'S CHOICE AWARD