VA Get Ready Team

14 July 2010

"Plug-in Electric Vehicles are Coming…
…is your Region Ready?"

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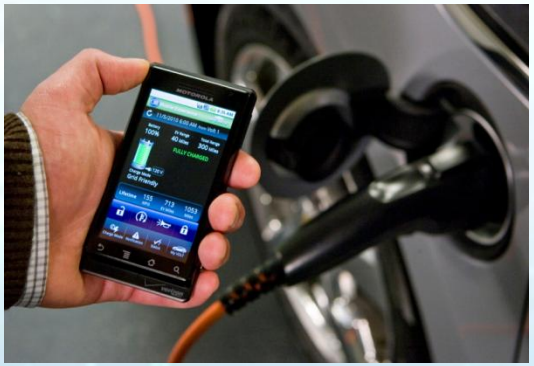
General Motors: Advanced Technology Infrastructure – Chevy Volt Team

Electric Vehicle (with a Range-Extender)
Chevrolet Volt



Launching in November 2010

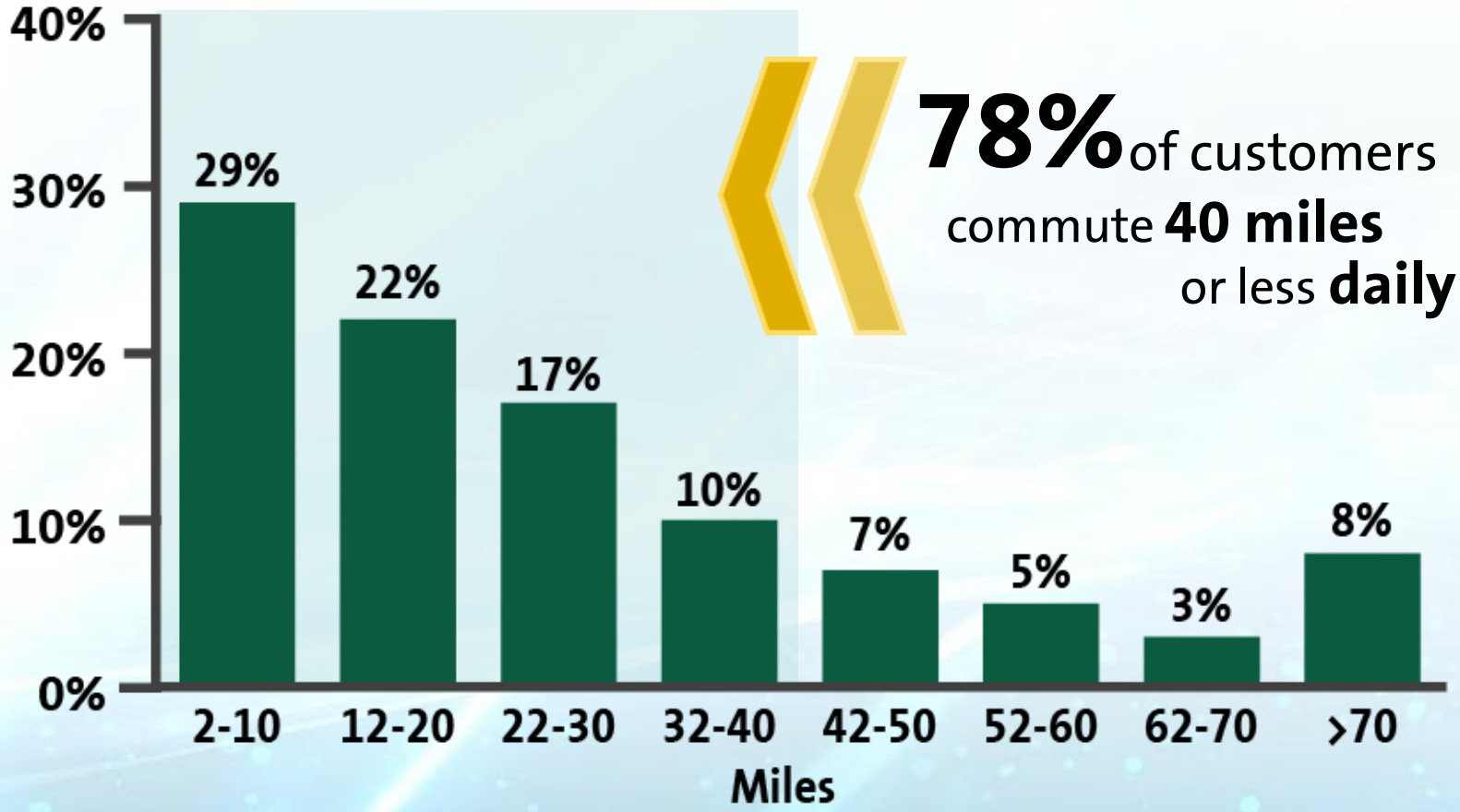
Up to 40 miles
BATTERY
Electric Drive

+

HUNDREDS of miles
EXTENDED RANGE
Driving (Gasoline or E85)

Typical Commute

Why Target 40 Miles? ➡ 40 Miles Is the Key



Based on U.S. Department of Transportation 2003 Omnibus Household Survey

Variations on Electric Vehicles
Electric Vehicle with Extended-Range

PHEV	EREV	Pure EV
Plug-in Hybrid Electric Vehicle	"Extended-Range" Electric Vehicle	Pure Electric Vehicle
•All-electric at low speed/power •Blended elect/gas at higher speed/power •Primary fuel is gasoline supplemented with electricity (typical)	•All-electric for up to 40 miles •Gas generator for +300 miles (extended driving range) •Primary fuel is electricity supplemented with gasoline (Volt)	•All-electric for ~100 miles •Fuel is electricity (typical)

Pre-Production Volt:
Engineering Test Drive – 13 Oct 2009

The first pre-production Chevrolet Volt moves along the assembly line at the Detroit-Hamtramck manufacturing plant -- March 29, 2010

GM/Utility Partners & Volt Retail Market Rollout

- Launch beginning in late 2010
- Nationwide deployment as quickly as feasible
- Initial launch markets announced: California, Michigan, Washington D.C.
- 3 ways Volts arrive in markets: Dealer Sales, Migrations, and a few Demonstrations

Charging and Infrastructure

Six Things We Need to Get Right

- Market analysis
- Technical features
- Customer experience
- Public education
- Public policy
- Advanced features and new opportunities

Plug In Readiness…

- The coordination of all funds, policies and programs either already available or proposed supporting EV infrastructure while leveraging ALL stakeholders in the plug in readiness value chain
- Opportunity to define and build new jobs, workforce training, new educational areas of expertise…a new, energy secure economy

Charging Power Levels

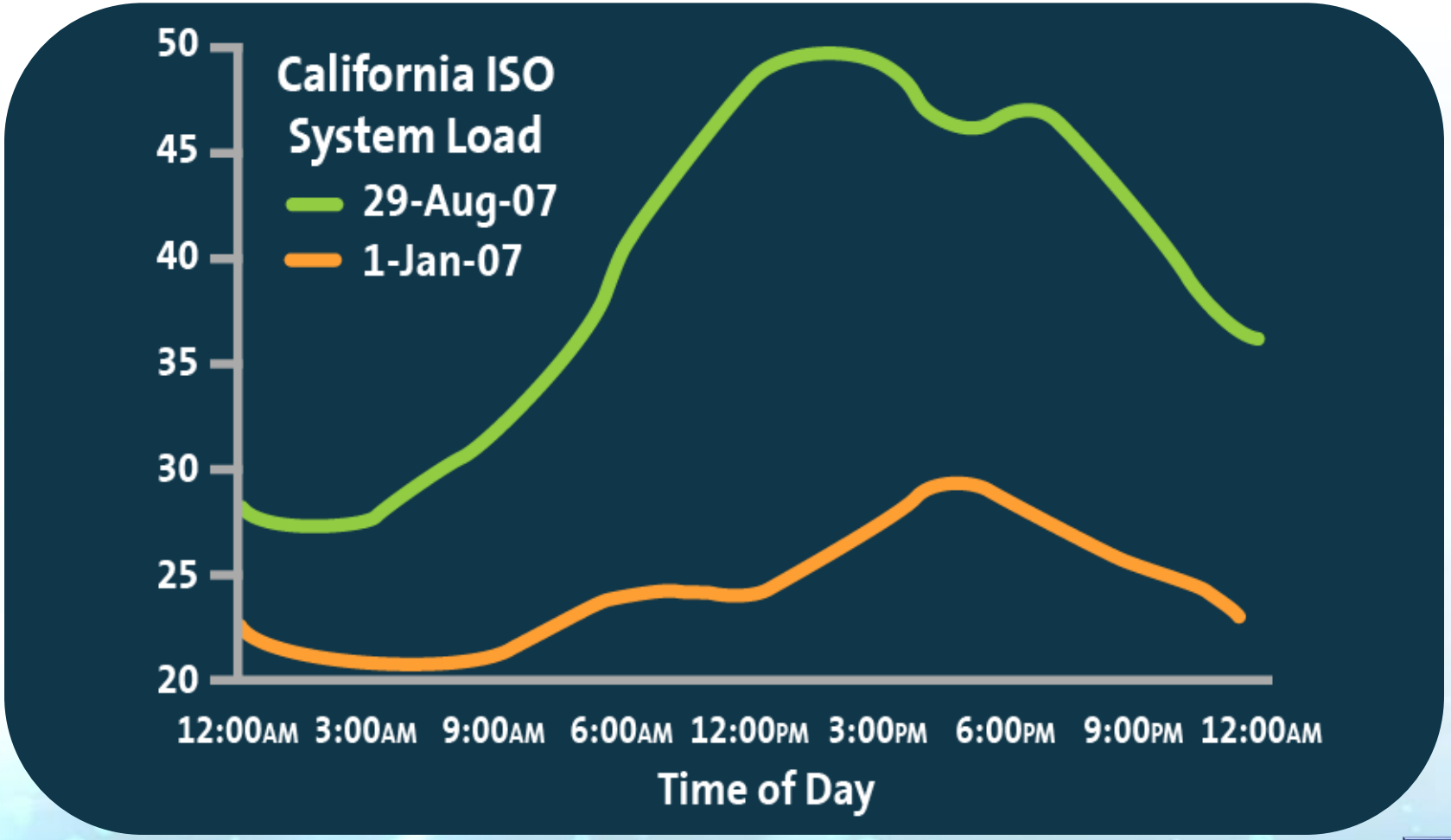
- 120V (1.2 kW) charging (15amp min, 20amp rec.)
  - Plugs into standard household outlet
  - Full charge in about eight hours (temperature dependent)
  - No additional equipment or installation typically required
  - Charge cord standard with the vehicle in NA
- 240V (3.3 kW) charging (20amp min, 40amp rec.)
  - Full charge in about three hours
  - Efficient and enables more opportunity to drive electrically
  - Will usually require a one-time investment to upgrade garage with dedicated 240V circuit
- **Charger and control logic onboard the vehicle**

120V Cordset

240V Charge Station

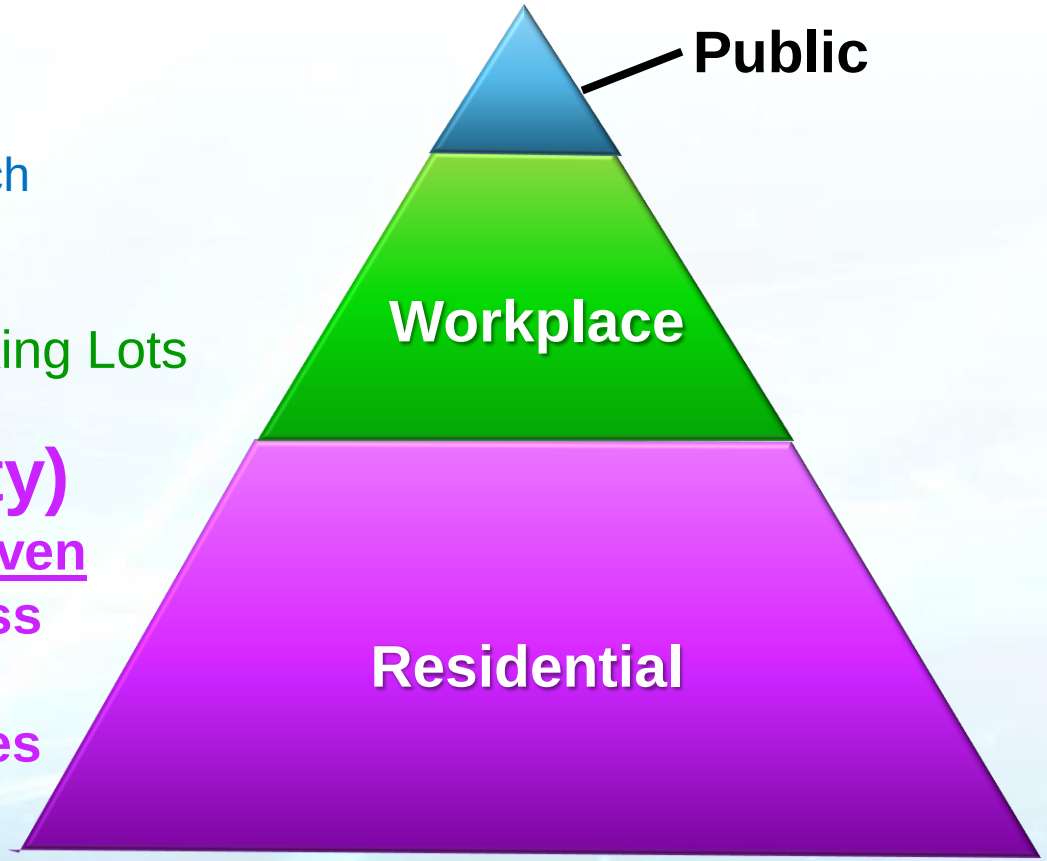
Electric Grid Designed for Peak Demand

Volt Leverages Off-Peak for Charging



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**

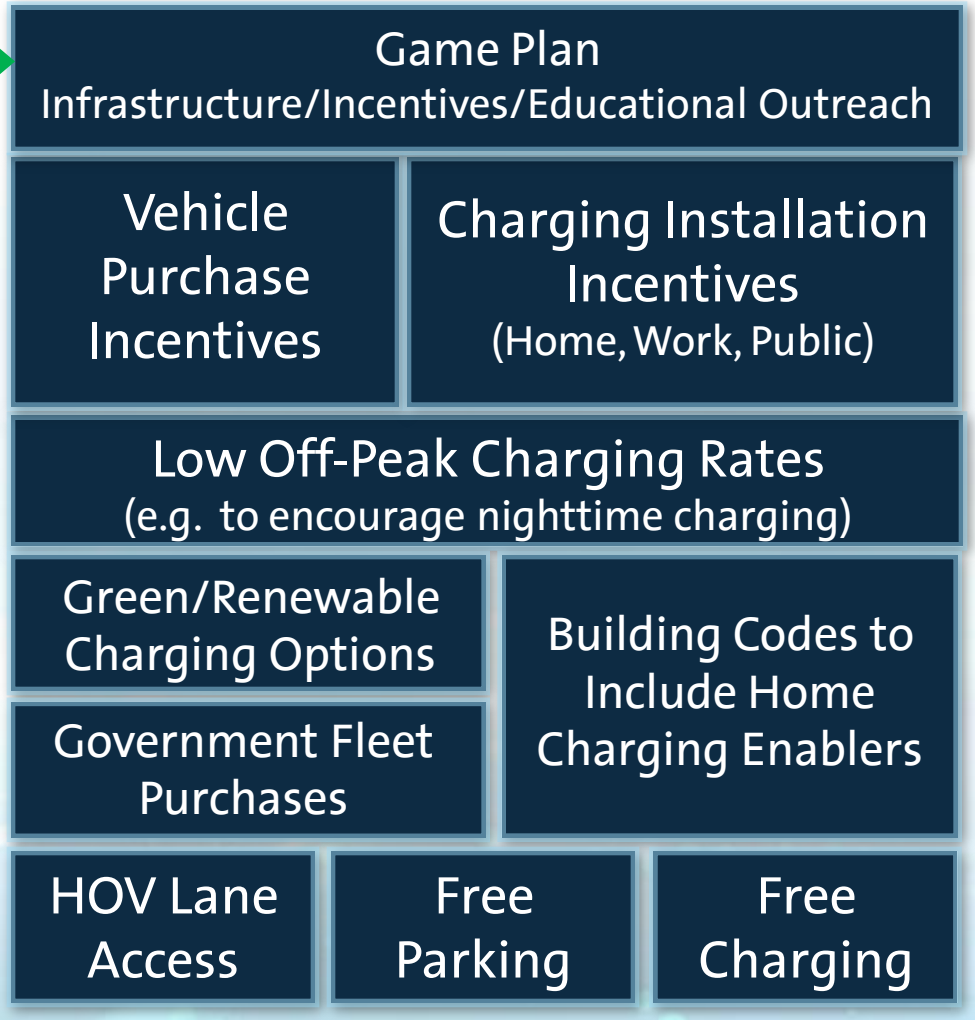


Plug-in Ready Communities

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

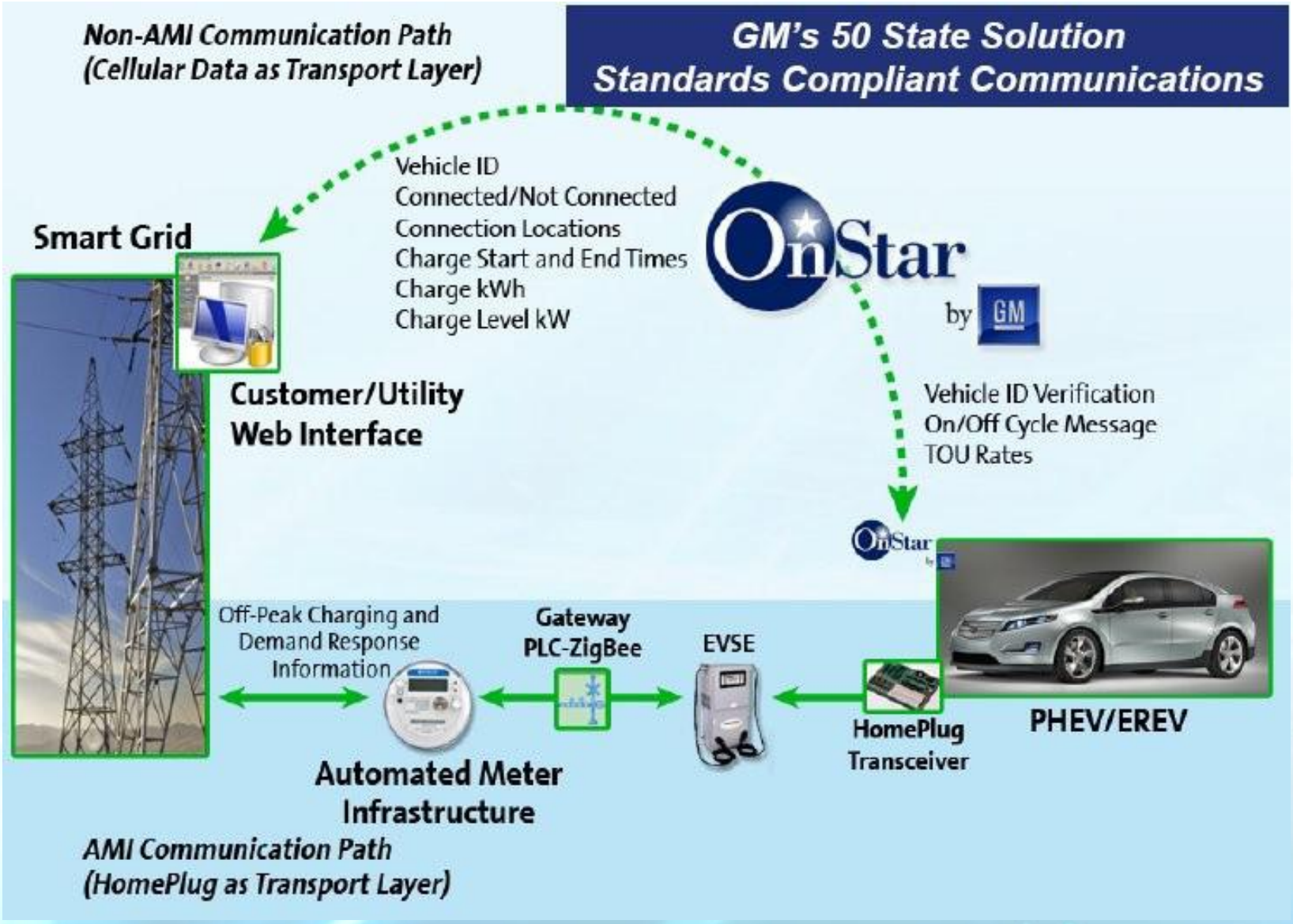
Desired Enablers



Secondary Battery Use – An Emerging Market

- **Community Energy Storage (CES)**
- Distribution Grid Management
- Renewable Energy Storage

V2G - G2V Communication Options



Customer-Facing Applications for VOLT
Customer Benefits Delivered via OnStar, etc.


KILOWATTHOURS
DE 4696636
2¢ per mile

1/6


Self Serve
359 9/10
REGULAR UNLEADED
369 9/10
PLUS UNLEADED
383 9/10
SUPREME UNLEADED
12¢ per mile

How Does a Chevrolet Volt Compare?

Annual Energy Usage – Electrical Appliances

Home Heating System	3,524 kWh
Central Air Conditioning	2,796 kWh
Refrigerator/Freezer	2,610 kWh
Water Heater	2,552 kWh
VOLT	2,520 KWh
Clothes Dryer	1,079 kWh
Lighting	940 kWh

1 Computer & monitor operating ALL day

1 CHEVY VOLT for annual energy usage

Key Utility/Regulator "Asks"

Consumer Focus: Alleviate hurdles, successfully transition PEVs to early adopters

- **General Q&A**
  - – Consumers - establish 1-800 number, brochure, website (w/ EDTA-NPVI site)
  - – Consumers - simplified rate programs (encourage correct charging behaviors)
  - – Infrastructure installers – establish 1-800 number
- **Residential Charging**
  - – Utility involvement - first option for mitigating grid impacts
  - – Ensure no/low impact (time, convenience, cost) of charging installation (incl. meter if needed, rate program signups)
  - – Facilitate local fast-track permitting/inspection process
- **Rapid utility response** to any local grid issues
  - – Anticipate impacts to local distribution systems

Highest priority near-term focus areas

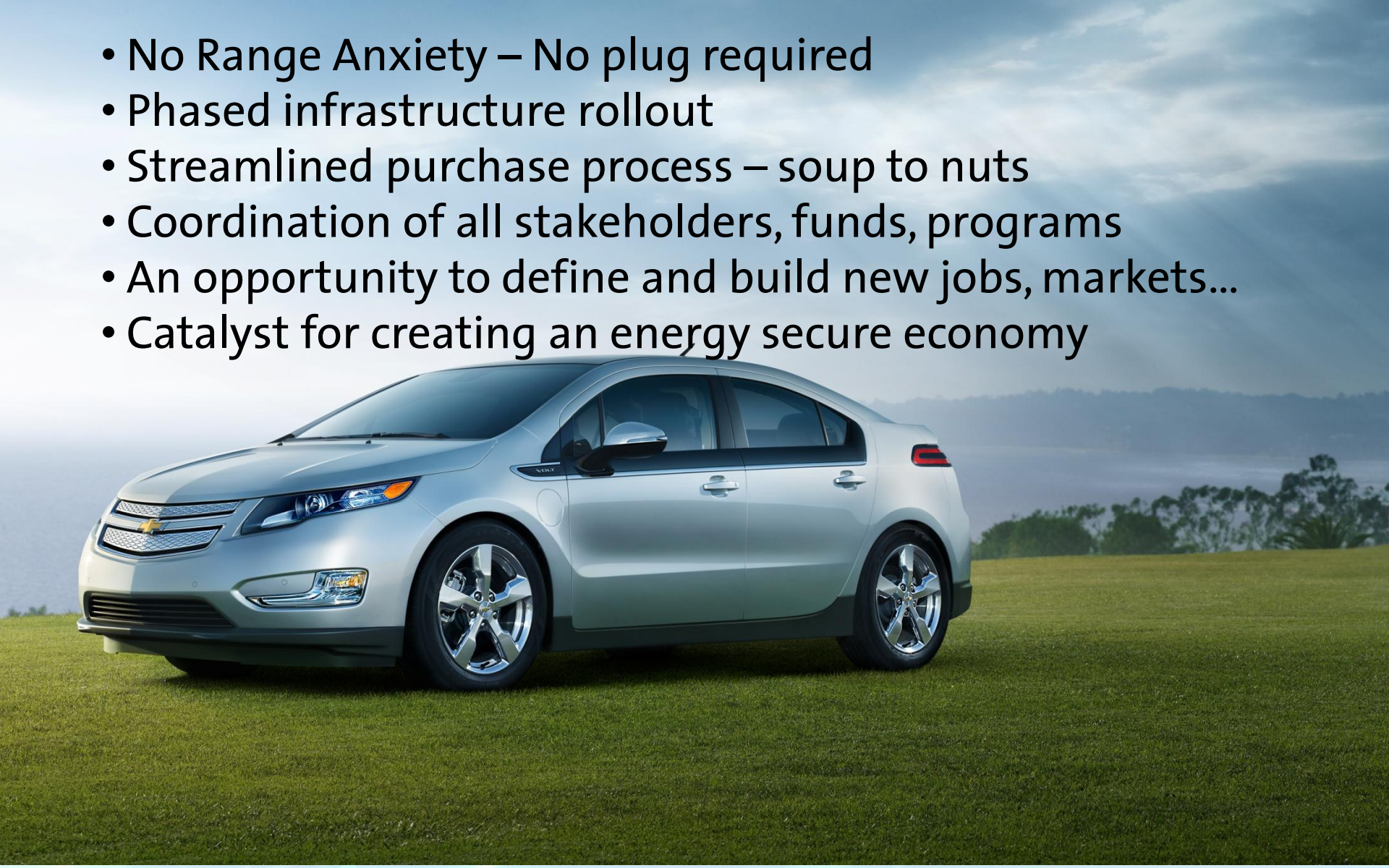
- **Multi-family Residential/Workplace charging** – facilitate
- **Public Charging** - direct utility ownership of nominal backbone
- **EV and Infrastructure incentives** – support credits, waived fees,...

Policy/Strategy to Achieve a Plug-in Ready Region

Note: All PEV incentives should use language similar to that used in the federal tax credit (i.e. fully incentivizes 8kWh EREVs)

Required Stakeholders:	Required Enablers:
• Dedicated Project Leader	Establish a public charging infrastructure plan; Establish a local/state incentives plan; Establish a marketing and educational outreach plan
• State Government	Provide state tax credit for vehicles (>$2,500/16kWh vehicle) and charging equipment and installation at home/multi-family home/workplace/public (up to $3,000/home; $30,000/other site with 10 charge ports) Eliminate state sales tax on vehicle purchase; Commit/fund government fleet purchases (200 vehicles) Note: Point-of-sale consumer incentives more effective than end-of-year tax credits
• City/County Government • Clean Cities Orgs / AQMD	Provide incentives for vehicle purchasers (see above - work with state) and charging equipment and installation (see above - work with state) Install public charging spots in key locations (30 distributed locations; meeting SAE J1772 level 2 (240V) and J2836 standards); refurbish existing charge sites; Establish free parking; Commit/fund government fleet purchases (25 high-profile vehicles)
• DOT	Provide HOV lane access for plug-in vehicles; Eliminate vehicle registration and license fees
• Permitting and Code Officials	Prepare for eased/fast/self-permitting of home/public charging installation; Ensure new home/building codes/major renovations provide for vehicle 240V charging
• Utilities (municipal & regional) • Regulators/Public Utility Commissions	Provide rebate for vehicle purchasers (add'l $2,500/16kWh vehicle); Provide and incentivize home/building charging installation electrical service (i.e. provide no/low cost installation financed thru monthly utility bill); Provide free charging or compelling low-cost EV rates (3-4 cents/kWh); Provide "green" electricity options; Commit/fund commercial fleet purchases (25 high-profile vehicles)
• Large Local Employers (as Early Adopters)	Employers (3 major corporations) provide work-place charging (25 park/charge spots) and employee vehicle purchase incentives (add'l $2,500/vehicle); Commit/fund corporate fleet purchases (25 vehicles)
• Local Universities	Provide campus charging and free parking (10 distributed charging locations); Commit/fund university fleet purchases (5 high-profile vehicles)

- No Range Anxiety – No plug required
- Phased infrastructure rollout
- Streamlined purchase process – soup to nuts
- Coordination of all stakeholders, funds, programs
- An opportunity to define and build new jobs, markets…
- Catalyst for creating an energy secure economy



Thank you!