



Policies to Accelerate PEV Deployment, Maximize Environmental Benefits, and Protect Grid Integrity

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NRDC's Vehicle Electrification Goal

Accelerate electric vehicle adoption necessary to meet long-term pollution reduction goals, while ensuring the safety and reliability of the grid.

Regional and National Policies Needed:

- ✓ Strong vehicle, fuels and utility standards to ensure PEV deployment and cleaner electricity generation mix
- ✓ Consumer and manufacturing incentives to support early market introduction, develop innovative financing mechanisms to reduce upfront costs as market moves beyond early adopters
- ✓ **Clear, consistent infrastructure and utility policies accelerate PEV introduction, maximize environmental benefits while protecting integrity of grid**

Goals of Infrastructure & Utility Policies

1. Protect safety and reliability of grid

- Distribution system must be capable of handling PEV load
- The costs of integrating Level Two charging into the distribution grid could be 5-25 times greater if done on-peak vs. off-peak

2. Reduce market barriers to PEVs

- Installation process, cost of residential charging infrastructure, and lack of time variant rates, and use of inclining block rates could inhibit consumer adoption

3. Maximize environmental benefits

- The environmental performance of electricity supply varies greatly by location and time of consumption

Key Elements of Infrastructure & Utility Policy

1. Infrastructure Planning and Notification

- What's needed, what can be supported, number and placement of public chargers, mix of home/business/public charging
- Requirement to notify utility of location of vehicle sold or station installed

2. Ability for Utility to Manage Charging

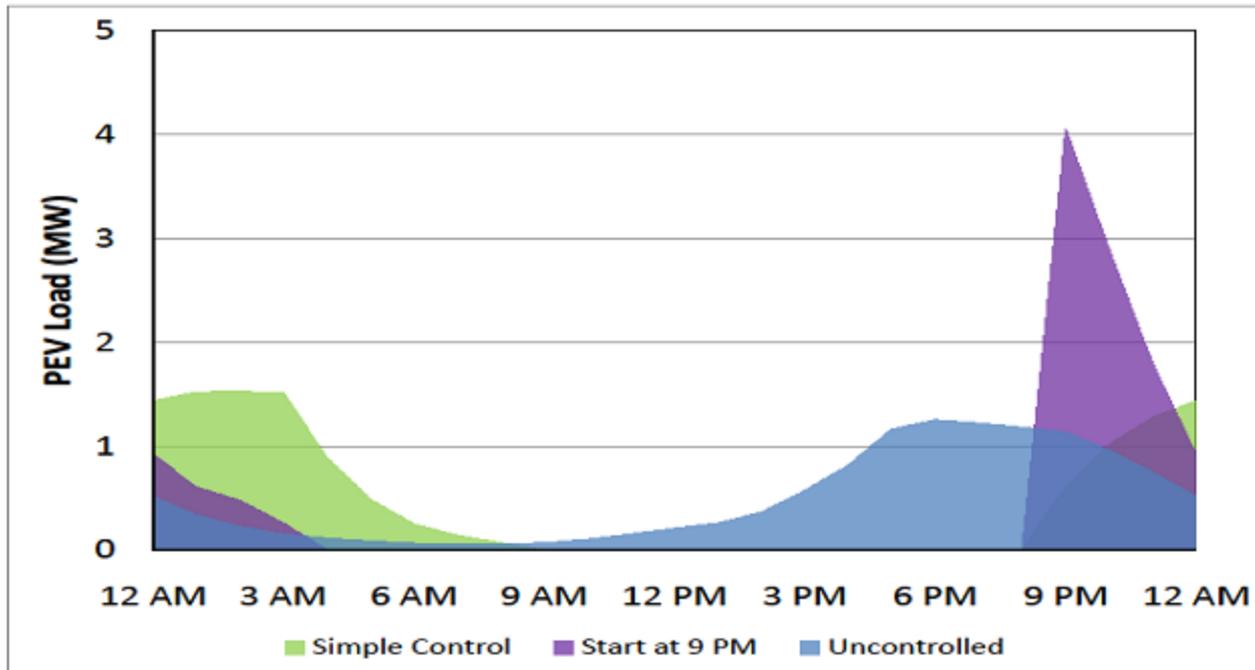
- Avoid charging with no load management capabilities (“dumb charging”)
- Move from passive (using price signals alone) to eventually active load management (smart meters with two-way communication)

3. Policies to ensure greater supply, demand and use of the cleanest possible electricity mix

- Renewable Electricity Standards, purchase of “green electricity”, smart grid enabling dynamic charging on cleanest possible electricity

Need for Managed Charging

Need to minimize uncontrolled charging, need passive controls and move rapidly to active load management



- Simple Control: staggered charging start times during one of seven hours from 9:00pm until 3:00 am
- Start at 9 pm: Basic load management coupled with simple time-of-use rates

MidAmerican Energy, *Initial Assessment of the System Impact of Plug-in Electric Vehicles*, 2010, p.18.

Capabilities Needed to Control Charging

1. *Time Variant Rates*

- Time-of-use rates alone may not be sufficient to shift demand off-peak and could create peaks at beginning of off-peak period

2. *Technology to Support Use of Time Variant Rates*

- Simple programmable functionality can be embedded in vehicles or charging equipment.
- Ideally, smart meters that can measure use by time of day
- May need sub-meters to separate out PEV load

3. *Ability for Utility to Actively Manage Charging*

- Two-way communication capability to respond to load managements signals, including dynamic price signals
- Functionality could be in charging equipment, stand alone equipment or in vehicle
- Communication could be through grid or through wireless signals

Basic Load Management is Simple

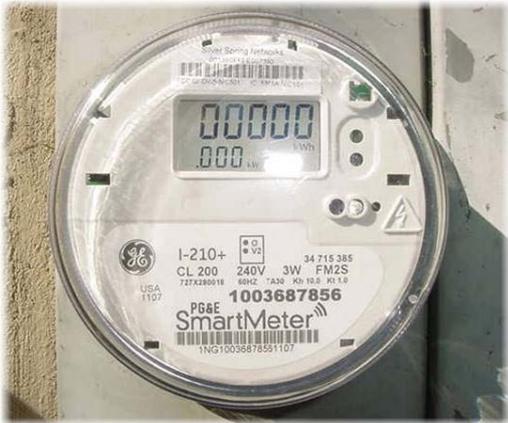
- Simple programmable functionality can be embedded in vehicles or charging equipment.
- Currently available through vehicle smart phone apps and on some of the third party charging equipment.
- If coupled with simple time-of-use (on-peak, partial peak, off-peak, super-off-peak) rates, could be sufficient for the early market.



Image: General Motors – Volt Android App

Image: Hilton Head Area HBA Council for Green Building

Nationwide Smart Meter Penetration is Low



Need to move to smart meters in future to minimize local distribution level impact and maximize environmental benefits.

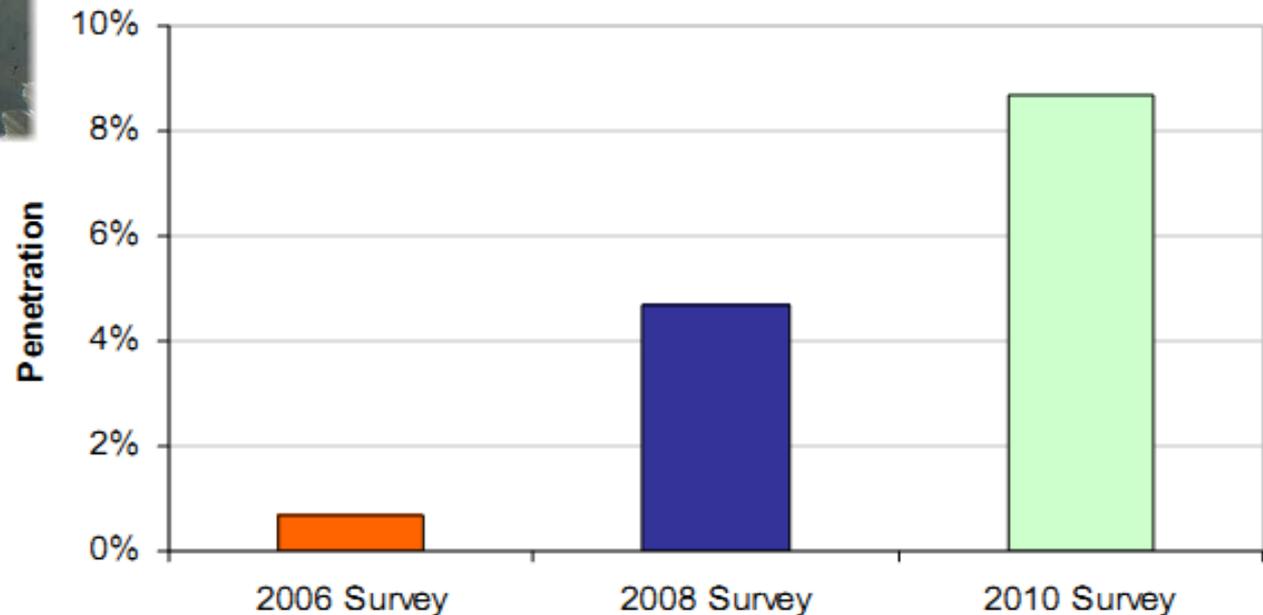


Image: PG&E

Chart: Federal Energy Regulatory Commission, *2010 Assessment of Demand Response and Advanced Metering*

Even Less People on Time-variant Rates

1.1 Million Customers on Time-Variant Electricity Rates

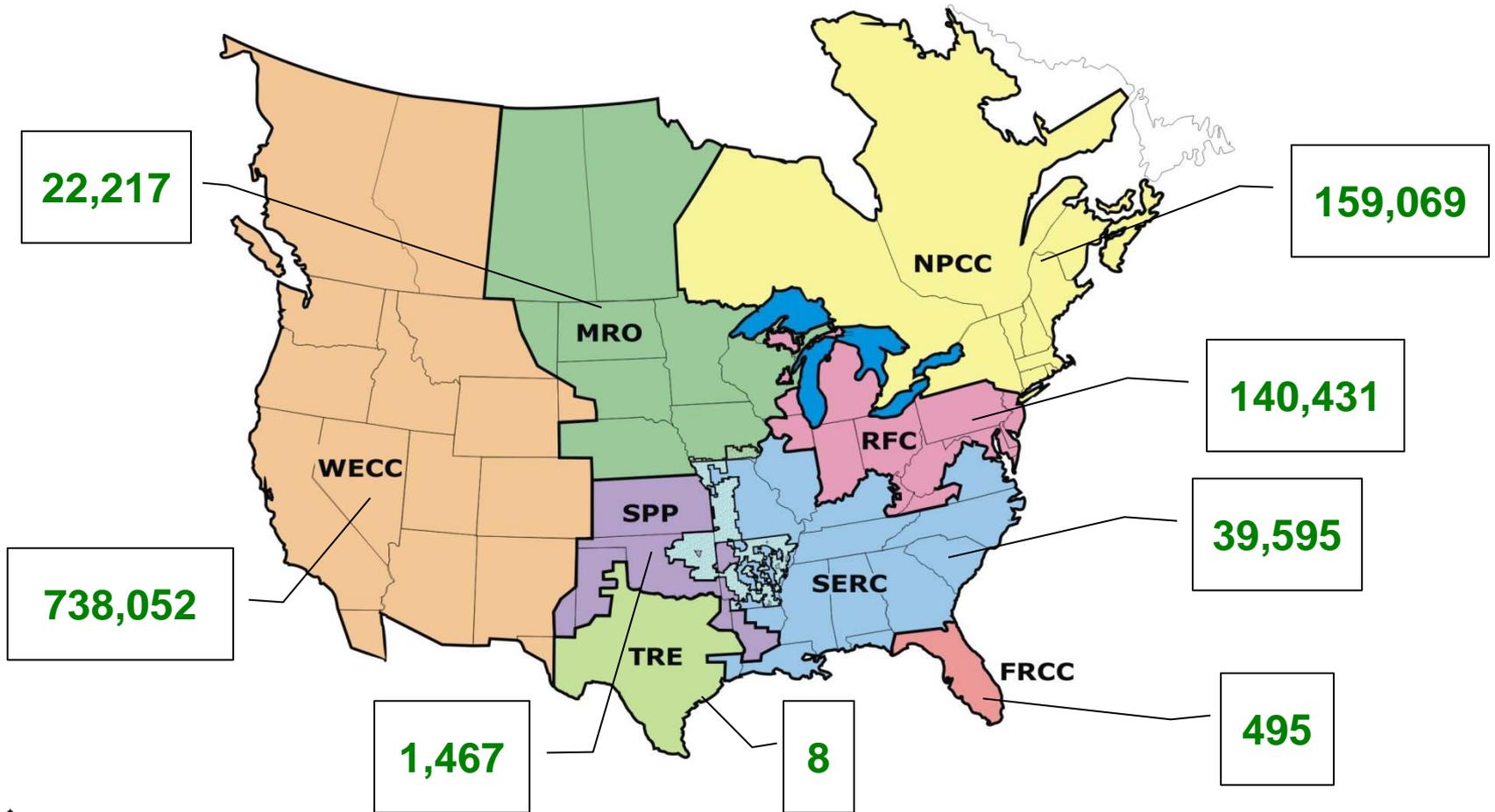


Image: North American Electric Reliability Corporation

Source Data: Federal Energy Regulatory Commission, *2010 Assessment of Demand Response and Advanced Metering*

Truly Smart Charging

Currently, the GM android app only works like a programmable thermostat (requiring you to manually enter in the on-peak and off-peak periods), but it could receive dynamic price signals in the future.



The Coulomb unit is already capable of two-way communication

Towards National Utility PEV Policy

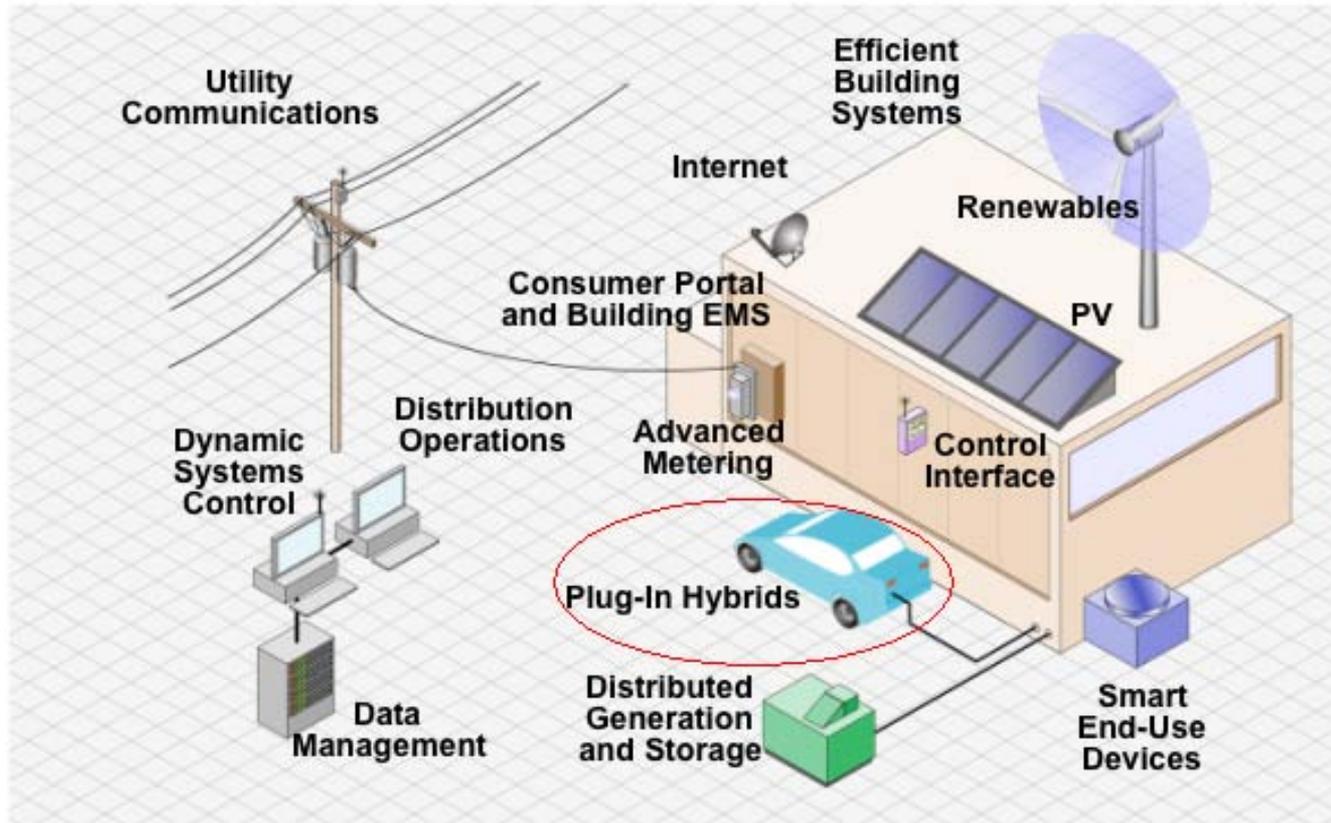
Challenge

- The federal government has no direct authority over state public utilities commissions
- Regulatory environments vary greatly state-by-state

Possible Solutions, Federal Policy

1. Interagency team develop model infrastructure deployment & utility policies (EPA, DOT, DOE, etc.)
2. Develop new or use existing forum for stakeholders to coordinate policy development, for example National Association of Regulatory Utility Commissioners (NARUC)
3. Use FERC leadership to encourage adoption of model policies, similar to their Advanced Meter Infrastructure initiative
4. Adopt new federal legislation that would require development by appropriate federal agencies of model infrastructure policies, coordinate with state regulators, encourage adoption of model policies, etc.

Making the Vision a Reality



Credit: Electric Power Research Institute

Thank You

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For more information regarding NRDC

<http://www.nrdc.org/>