

**Beyond Oil:  
The Sustainable Communities Initiative**

**Industry Enablers for  
Electrification**

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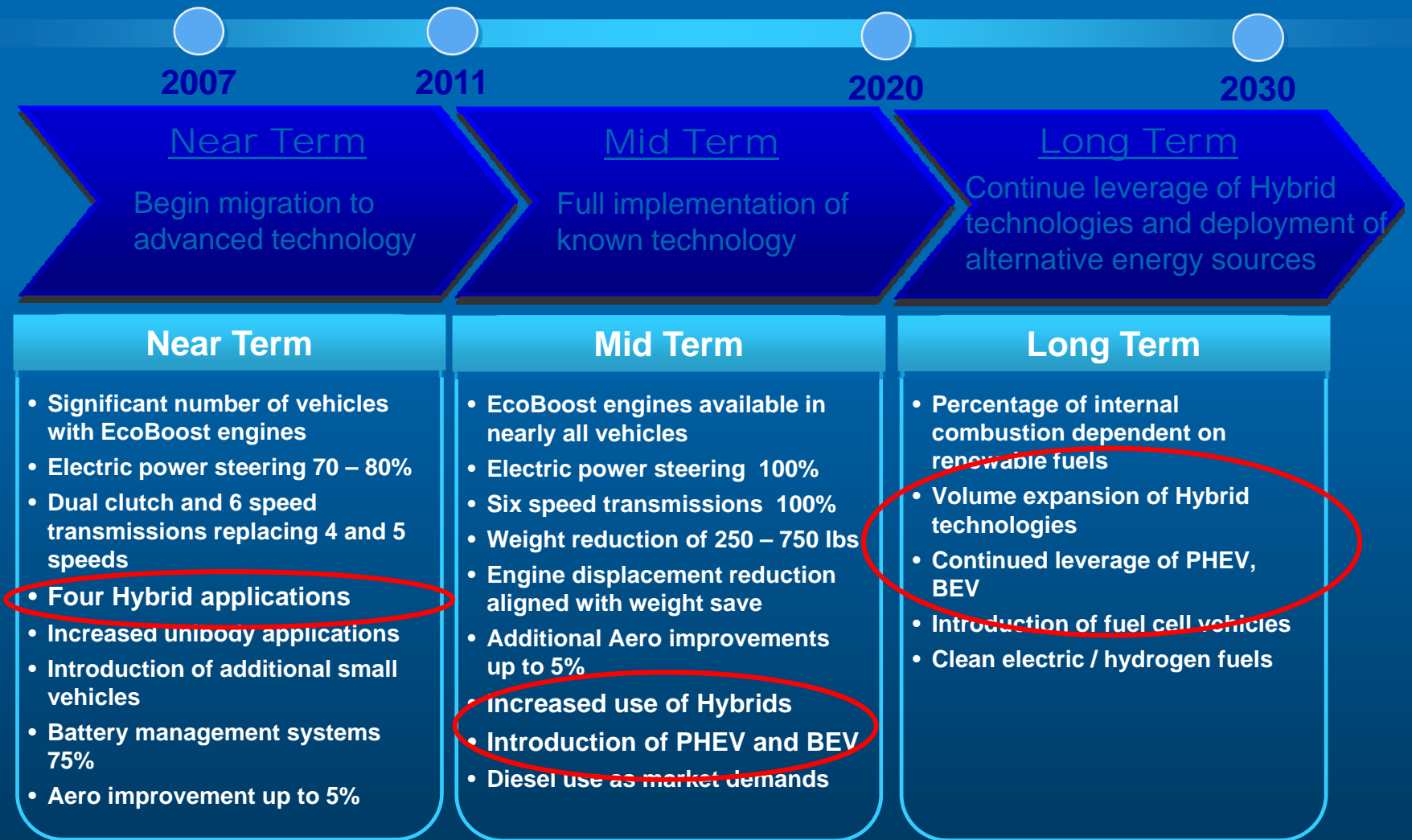


# Agenda

- **Ford Approach to Electrification & Upcoming Products**
- **Industry BEV Vehicle Projections**
- **BEV Simple Payback Model**
- **Enablers for Electrification**
  - **Charge Point Standards**
  - **Infrastructure Segments & Deployment**
  - **Government Grants & Incentives**
  - **Utility Partnership & V2G**
  - **Fast Charge – Reality?**
  - **Smart Meter Standards & Deployment**
- **Conclusions**

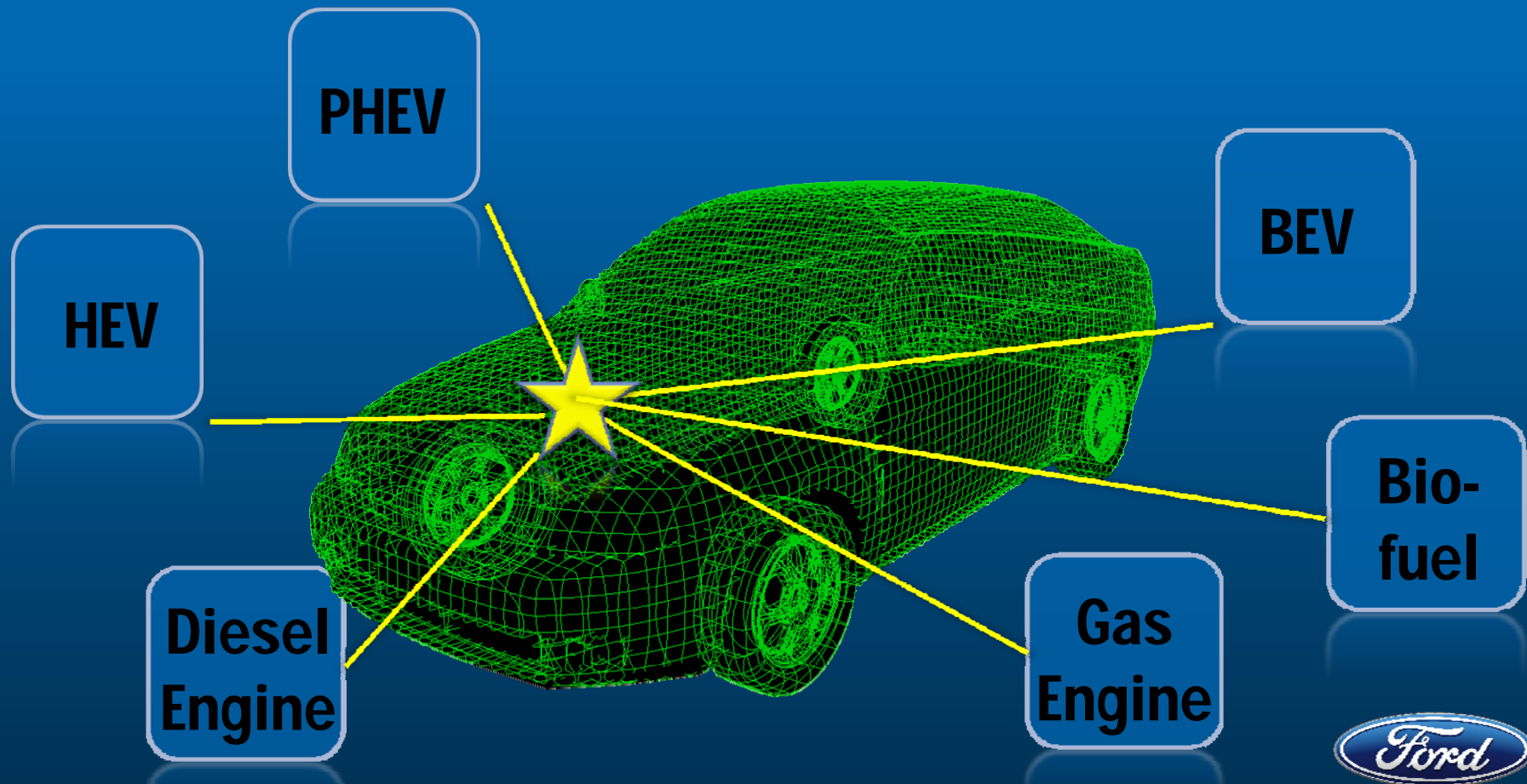


# Blueprint for Sustainability – Electrification Focus



# Leveraging Global Platforms

Plug & Play into High Volume Platforms with Global Reach



# Electrification Strategy – Family of Electrified Vehicles

## Electric Powered Vehicles by 2012 Include:

- Full Battery Electric Transit Connect Commercial Van in 2010
- Full Battery Electric Focus in 2011
- Next Generation Hybrid Vehicles Including Plug-In Version in 2012

Transit Connect BEV 2010



Focus BEV 2011

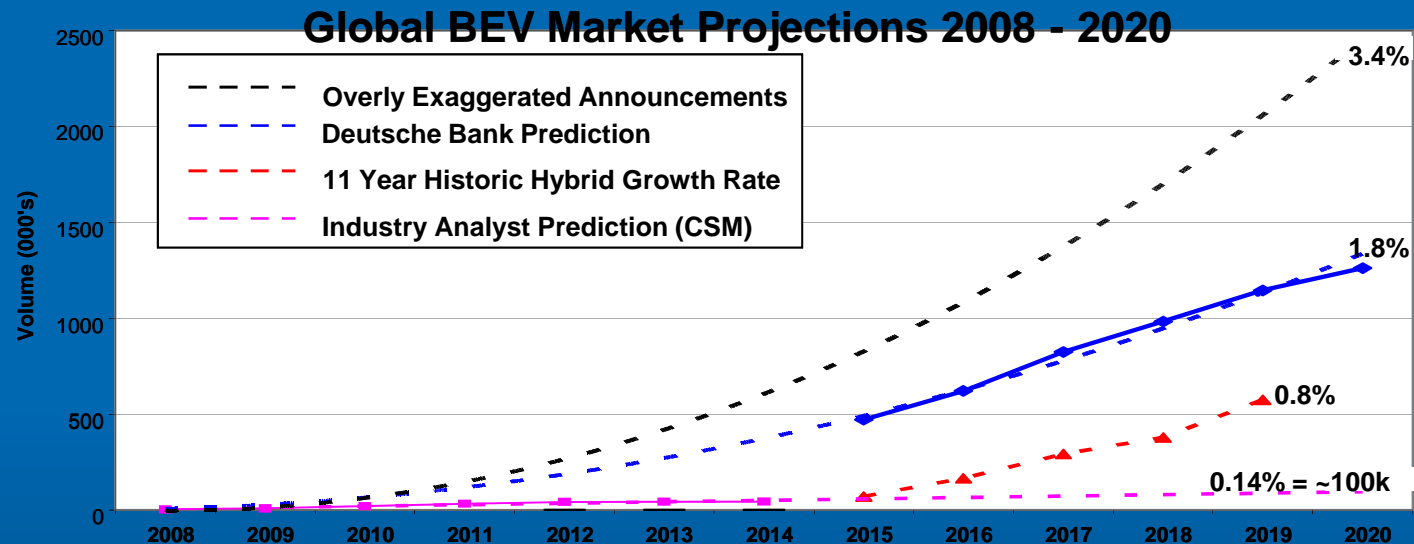


# Fuel Efficiency Solutions Affordable for Millions of Customers

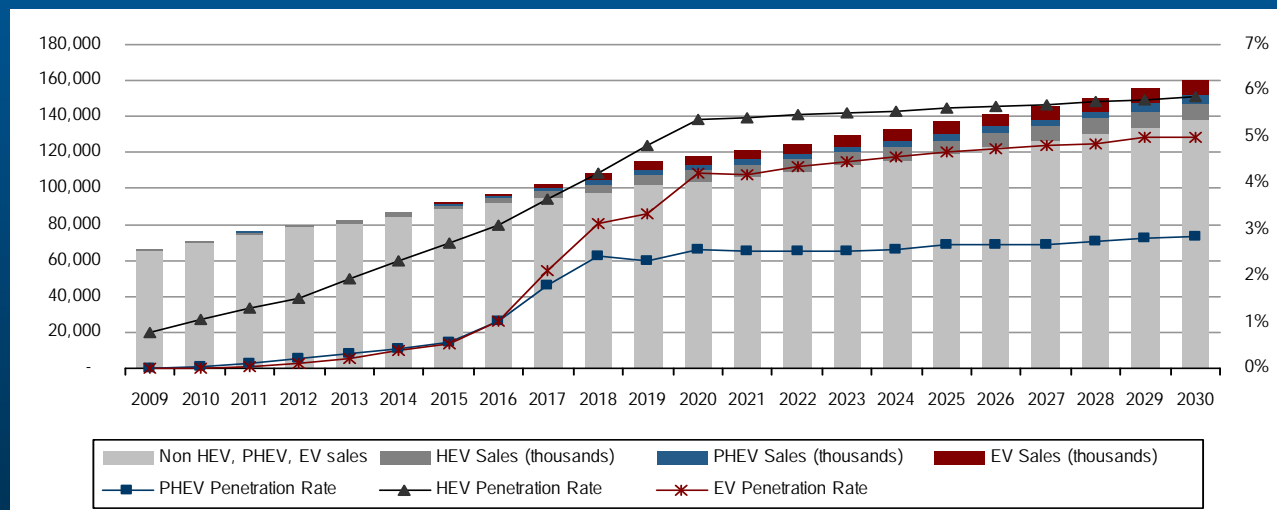




# Volume Predictions for BEV's Vary Significantly



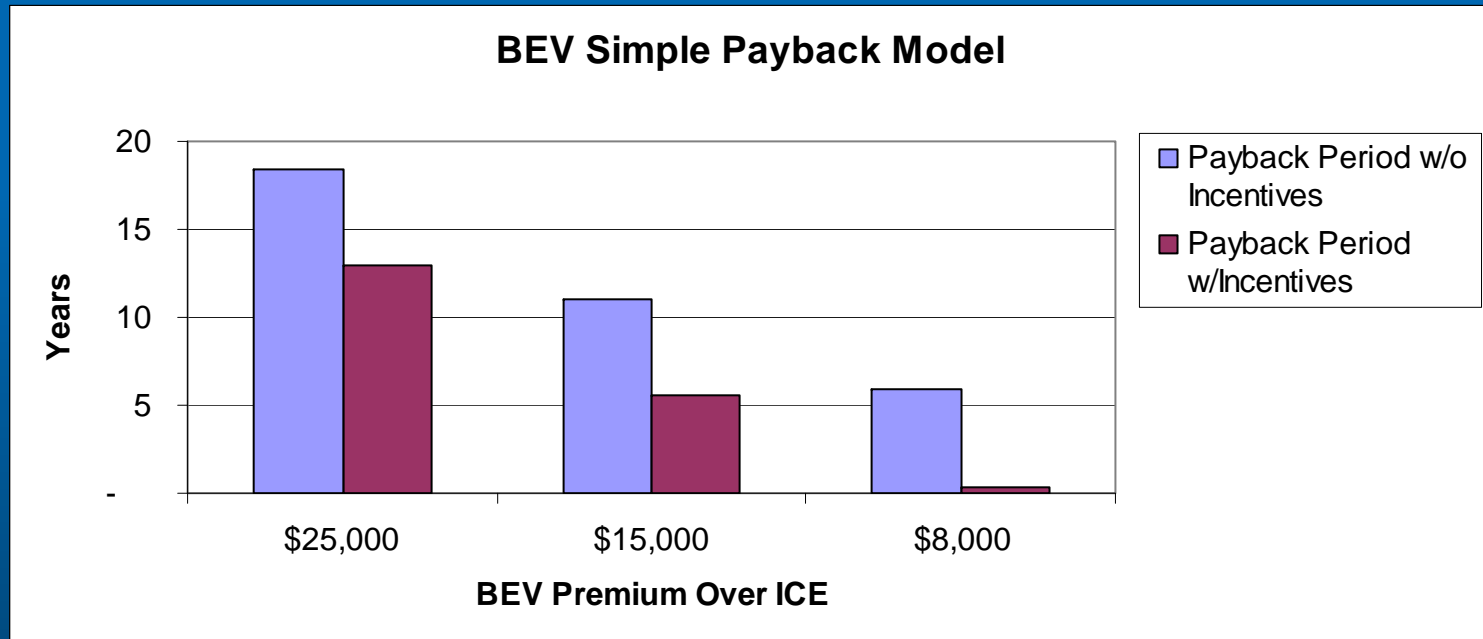
As with any new technology, volume estimates for BEV's will be dependant on a multitude of factors – not the least of which is pricing, policy, incentives, technology progression, gasoline prices, etc.



Source: Credit Suisse, 2009



# BEV's Will Require Significant Cost Reductions to Become a Realistic Alternative



Assumptions:

12,000 annual miles, Gasoline \$4.00/gallon, Electricity \$0.10/kWh, \$7,500 US Incentive, 28 mpg ICE, 0.3 kwh/mile BEV

Largest Opportunity is from production scale – but there are many other factors that can help clear the way for electrification.



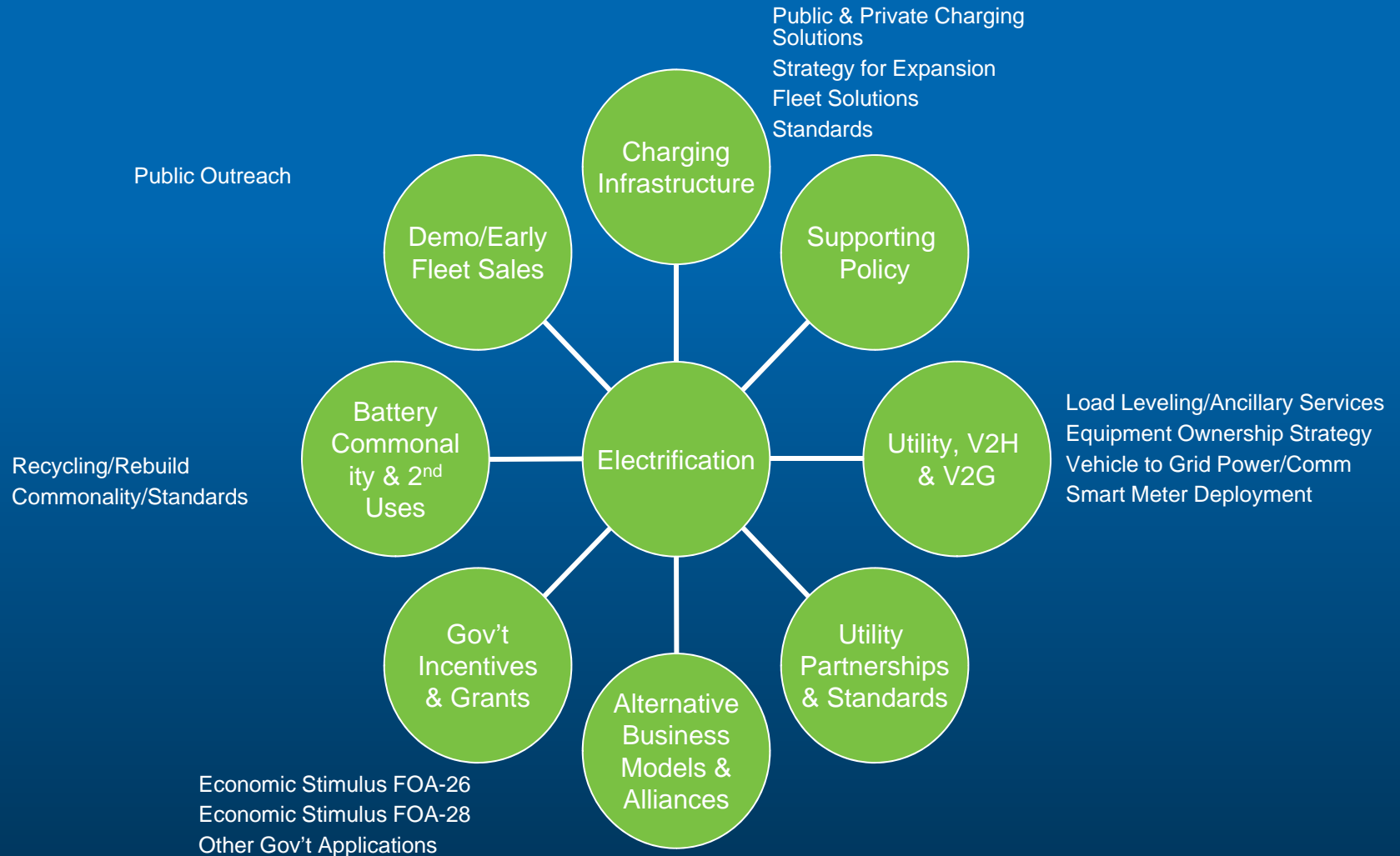


**So How Can We Collectively Give Electric Vehicles The Highest Chance of Success?**



# Electrification Enablers

## “Controllable Success Factors”



# Plug-In Vehicle Charging Standards (North America)

1. Infrastructure Agreed to use SAE J1772 Standard
  - Three Charging Levels Defined
    - Level 1: 110V Standard household outlet (up to 2 kW)
    - Level 2: 220V (up to 19.2 kW) – Electric Vehicle Service Equipment (EVSE) Required
    - Level 3: 440V to DC (up to 86 kW) - Standards not yet finalized.
2. National Electrician Code specifies installation requirements for EVSE.

These two standards provide the framework that allow charge stations to be compatible with all plug-in vehicles in North America independent of manufacturer.



Level 1 and Level 2  
J1772 Connector

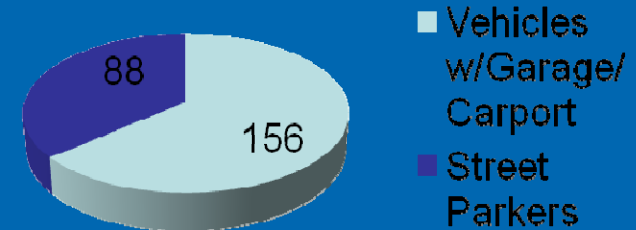


# Support Infrastructure Deployment

## US Census Data (2006)

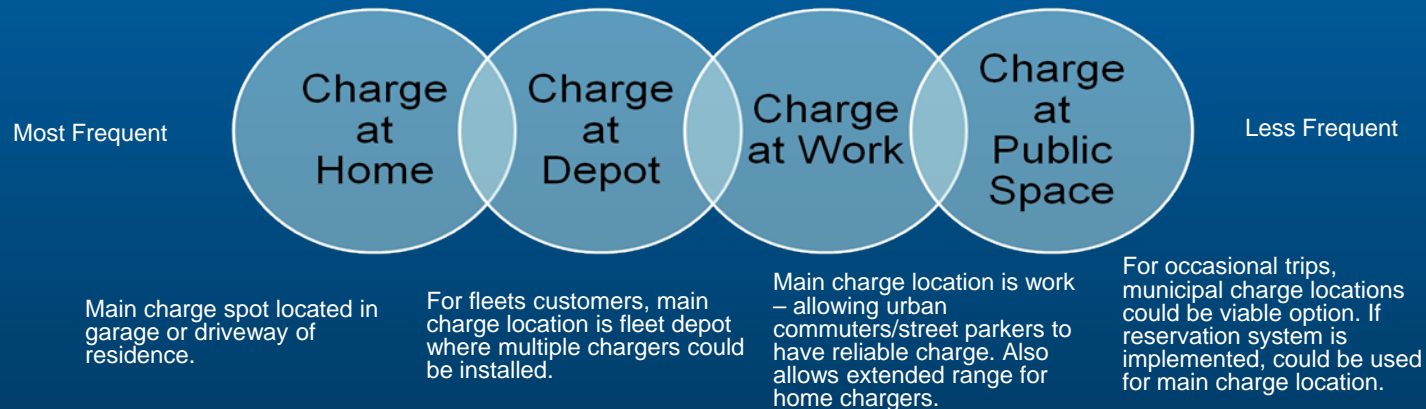
**244M Vehicles**

- There are an estimated 244 million vehicles
- Estimated 109 million occupied housing units
  - 68 million have garages or carports.
  - 11 million are occupied by renters.



There is a significant percentage of drivers that do not park their vehicles in garages/carports - which charging solutions need to address.

## Charging Customer Segments

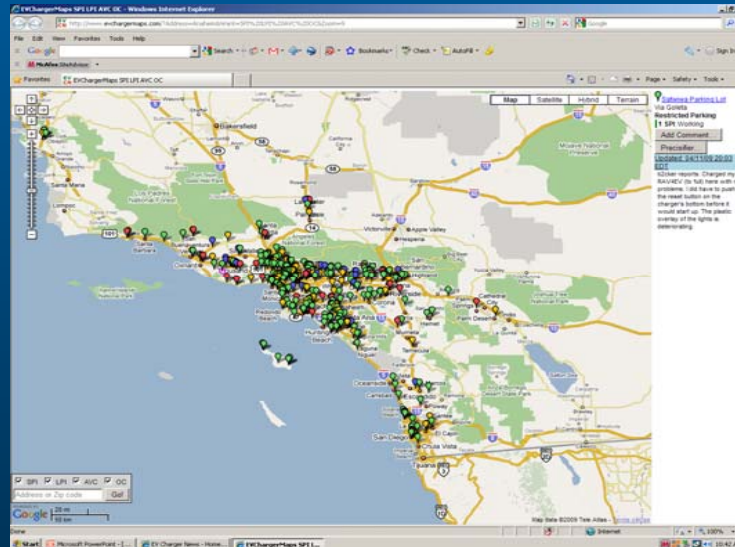


Charging Infrastructure is a key enabler to BEV's – regardless of where they charge their vehicle.

# Support Infrastructure Deployment

- Develop programs with municipalities to help “fast track” permitting process of EVSE in residential markets.
- Encourage public infrastructure developers to develop “reservation” system, “roaming” agreements, and interfaces with utilities (or in the case of utilities – a standard IT platform).
- Develop communication link between charger location/status and vehicle navigation system.

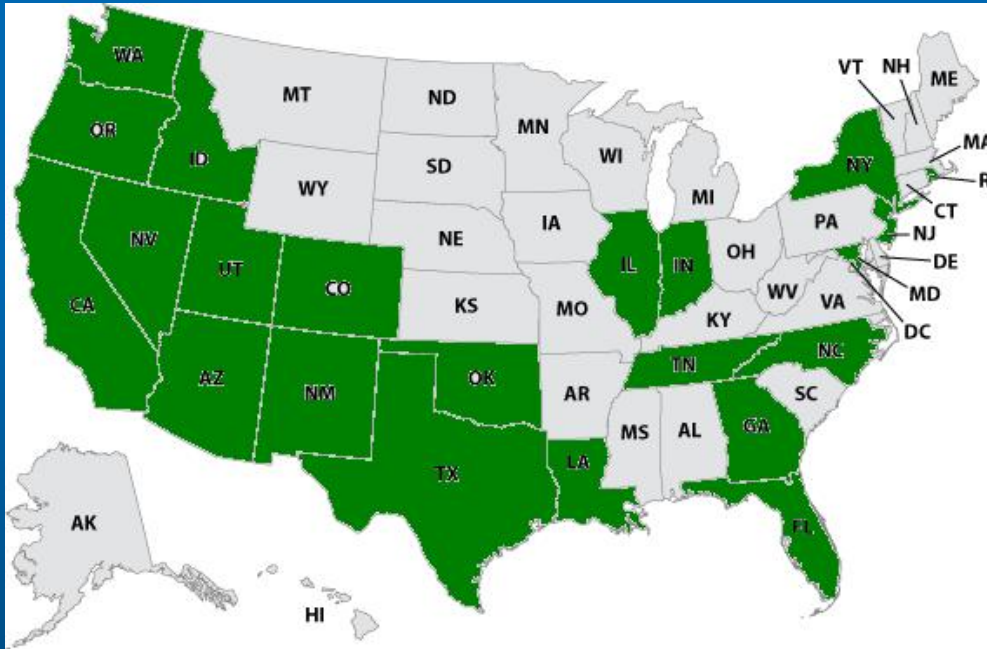
1,500 public chargers currently tracked in U.S. on [www.evchargersmaps.com](http://www.evchargersmaps.com) and some tracked via [www.mychargepoint.net](http://www.mychargepoint.net)



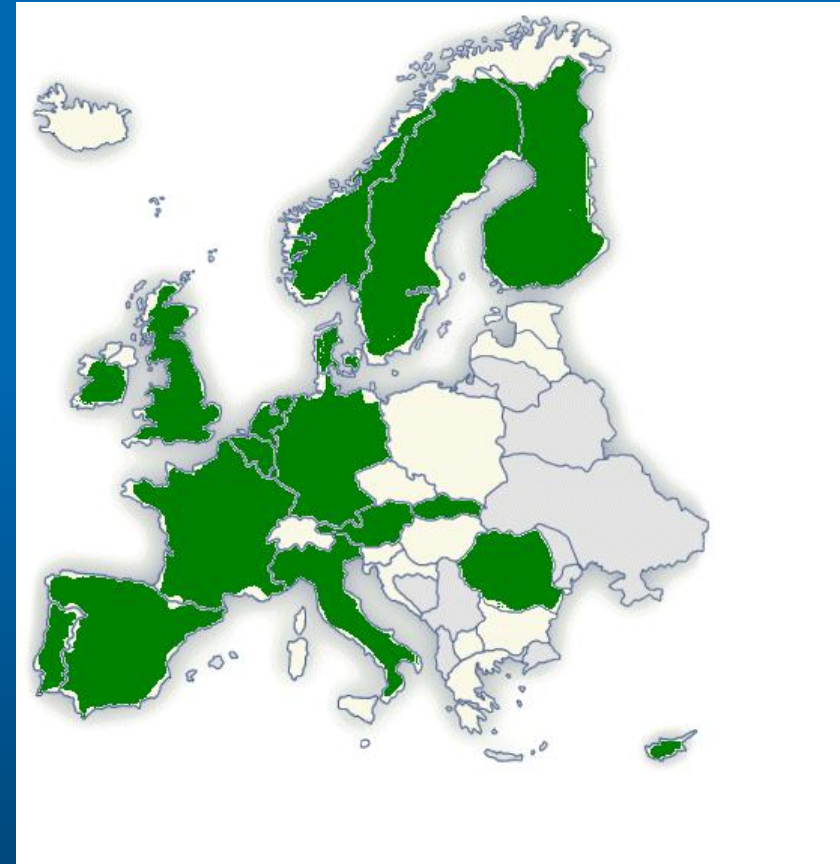
Source: EVChargernews.com



## Incentive Locations

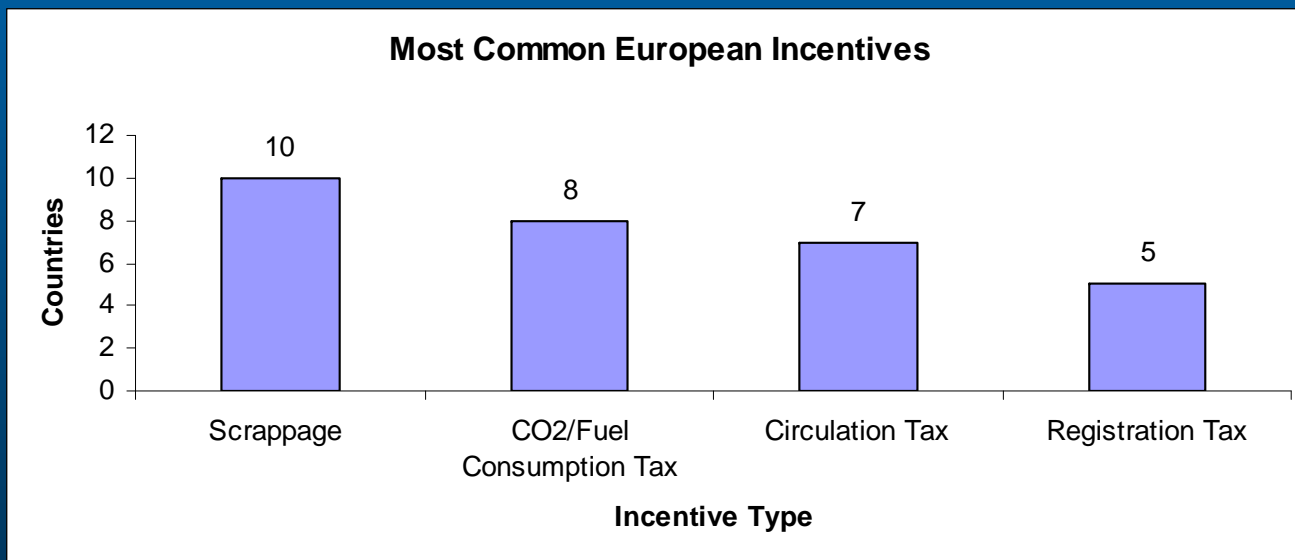
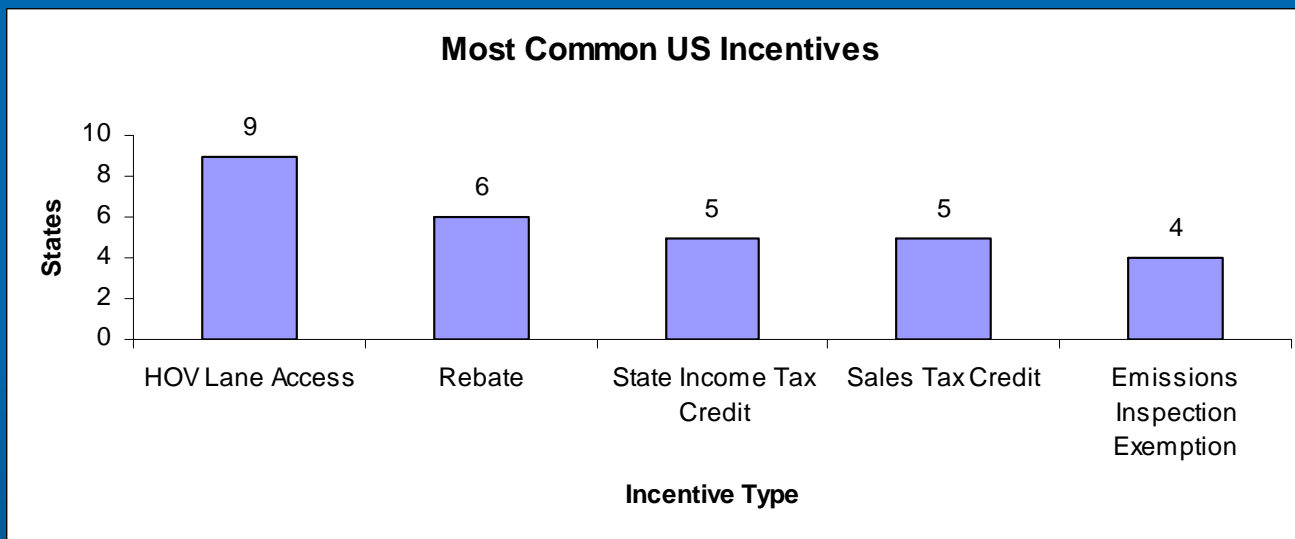


State-level incentive most prevalent on West Coast and Southwest. Increasing numbers in other regions of the country are noticeable.



European incentives dominate Western countries, with no incentives found for Eastern European countries.

# Common Incentives





# Utility/OEM Relationship

## An OEM's Perspective on Vehicle-Grid Relationship

- OEMs and Utilities Must Understand the Other's Business, Processes, Technology, Customers, Government/Legal Environment
- Separation of V2G Hype from Reality
- Support Industry Standards for V2G
- Partner with Utilities and Develop New Value Streams that Could Be Used to Subsidize Electrification Costs.



**Must Seek WIN-WIN-WIN Solutions for Automotive Consumer, Energy Consumer and Society**



# Key Areas Impacted By Charge Power Level

## 4 Key Areas:

- Utility/Grid
- Charge Station/Building
- Connector/Cable
- Vehicle



Utility/Grid



Building

Charge Station/Building

Charge  
cable

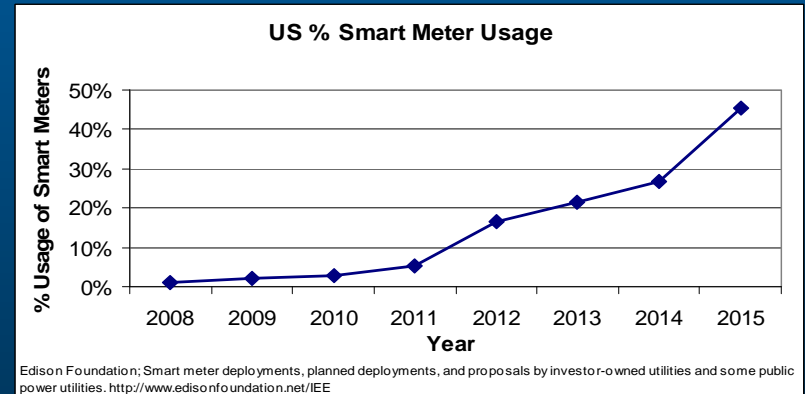
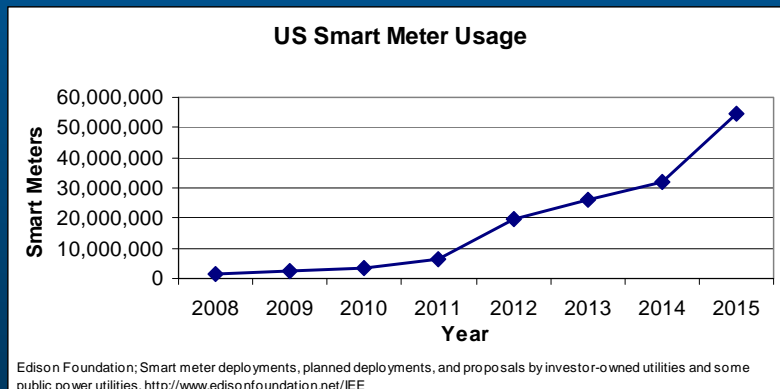


Vehicle

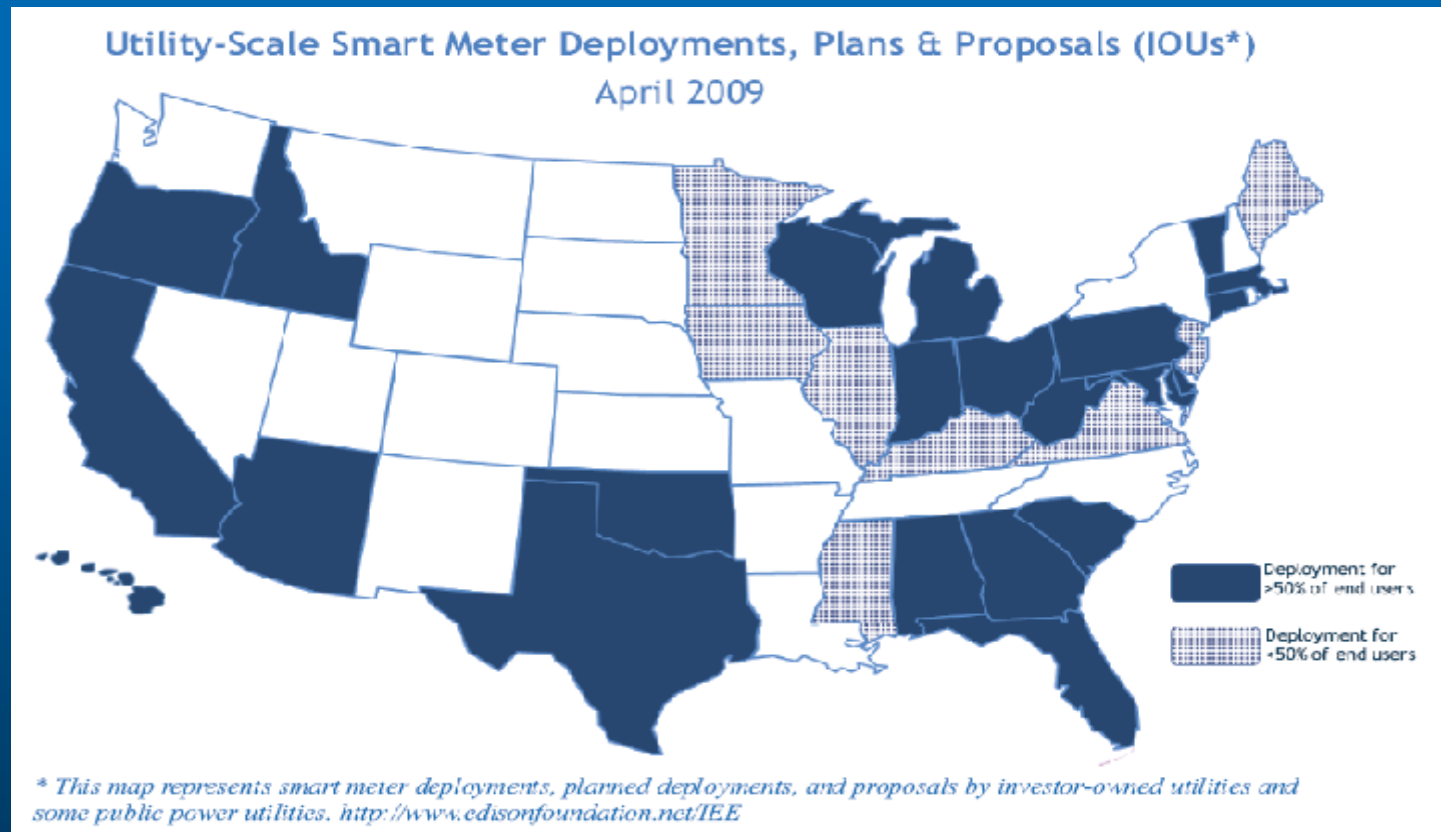


# Support Smart Meter Deployment

- Smart Meters will be a key enabler for solving electric infrastructure constraints and providing increased value to the customers.
- Currently, US rollout includes both PLC and wireless communication mediums. Standards need to be developed nationally, and preferably globally for communication.



# Predicted States with Smart Meter Adoption > 50% by 2015CY



# Conclusion

**Once our customers begin to make the leap into plug-in vehicles, success of electrification will become a team sport.**

