

# Macroeconomics, Regulations, and Public Policy

Economic and public policy issues with significant role in  
the beneficial development of a viable PHEVs market.

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*Plug-in hybrid vehicles represent an exciting new opportunity to provide both ancillary services to the grid and utilize the power system assets more efficiently. If done right, plug-in hybrid vehicles can enhance the efficiency of the grid by shifting load to off-peak nighttime hours.*

*On the other hand, if everyone plugs in their car at 5 p.m. and there are no economic incentives or communication and control technology to drive different customer behavior, then we could be worse off.*

Terry Boston, President, and CEO of PJM Interconnection, in his July testimony to the U.S. Senate Energy and Natural Resources Committee

The program will examine a myriad of economic and public policy issues that will play a significant role in the beneficial development of a viable plug-in electric vehicle market. Some of the issues examined will include:

- Current regulatory policies that affect EV and PHEV issues, education and recommendations for utility regulation and public policy;
- Pricing and market mechanisms related to EVs and PHEVs including interactive vehicle charging communications, net-metering, emergency back-up generation, dynamic pricing, and load response programs;
- The potential for EVs and PHEVs to increase a utility's load factor, and decrease the overall costs of the utility;
- Interconnection issues necessary to enable easy and economical use of wind, solar, and fuel cell generation by PHEVs.

- If the deployment of PHEVs is going to bring about any of the potential benefits, PHEVs must present a viable business model for:
  - Automakers
  - Utilities
  - Ancillary businesses
  - Others?

- What must PHEVs have to be a viable product in today's and tomorrow's market?
  - Ease of marketability
    - Competitive price point
    - Aesthetic and performance appeal
    - Availability
    - Operational (charging) ease
  - Simple and well articulated battery market cycle
    - Ownership
    - Replacement
    - Accident/repair

- Potential for several new direct and indirect markets.
  - Automakers
    - PHEVs - Fleet, Transit, Consumer
    - Battery market/supply stream
  - Utilities and energy services companies
    - New load
    - Aggregation
    - Battery market/supply stream
  - Ancillary, spin-off, add-on, complimentary
    - Non energy market third party aggregators
    - PHEV charging tie-ins

## PHEVs raise regulatory and technology policy issues

- Utility regulatory issues
  - Are special tariffs necessary? Desirable?
  - Will there be PHEV-specific service standards?
  - Customer of record issues
- Vehicle-to-Grid issues
  - Standards of access
  - Who pays, who gets paid, how much
- Grid-to-Vehicle issues
  - Anytime, anywhere, at any price?

## PHEVs raise regulatory and technology policy issues

- Technology policy issues
  - Standards
    - Charging protocols?
    - Batteries – technical?
    - Batteries – supply and vending cycle and infrastructure?
  - Component/Equipment indifference
    - Do PHEV customers have to have “additional” equipment to charge
  - Metering
  - Location of Intelligence
    - In the car?
    - In the meter?
    - In an interface?
    - All of the above or other?

## Promoting PHEVs and PHEV infrastructure

- Should there be promotional policies?
  - Tax credit programs
  - Carbon credits
- Is a certain amount of accelerated infrastructure development necessary to advance the PHEV diffusion curve?
  - Is the plug at home, enough? For how long?

What if we treat PHEVs the way we treat gasoline tanks and toasters?

### Toasters

I buy a PHEV and plug it in. Period. The utility charges me for the kWh I use. Period. I may have special PHEV charging interface, or I may not – at my choice.

Additional tariff or special PHEV rate would be possible, but not necessary.

If I decided to plug in 10,000 toasters or 500 PHEVs at a single location then I would require additional capacity and different utility tariff/price arrangements would apply.

**The math should be clearly articulated before policymakers ask the question.  
Define the problem (if one exists) before defining the solution.**

## What if we treat PHEVs the way we treat gasoline tanks and toasters?

### Gasoline Tanks

When I drive my car into a Shell filling station, I am a customer of Shell and pay for my purchase at the point of sale. When I later drive into a BP station, I am a customer of BP. Shell has no claim to me as a customer. Likewise, when I fill my PHEV at home, I am a customer of my LDC and when I drive to Grandma's and plug-in (and assuming Grandma is still trying to spoil her grandchildren) I am a customer of Grandma's LDC.

Additional tariff or special PHEV rate would be possible, but not necessary. I may get a special PHEV deal at home, but not at Grandma's place.

What if we treat PHEVs the way we treat gasoline tanks and toasters?

Is there a PHEV scale of deployment beyond which this is no longer small additions to system load, such that there arise a capacity or transmission concern?

Thank you!