Interoperable Vehicle Communication Standards
Basic Needs & Background

- Smart Grid is an overlay of power systems infrastructure with advanced communications.
- Reaching far tendrils of infrastructure with communications and smart devices - vehicles, HANs - exponentially increases data, magnifies interoperability and security issues, vehicle standards fall within this larger context.
- Cyber security – a critical, nuanced issue.
- Inter-utility communication, interoperability.
- “Inter” = crosses boundaries, interfaces.
- Open Standards, no proprietary platform requirements.
- Evolutionary – technology cycles differ from regulatory, systems need to adapt.
16 Standards listed for accelerated adoption in Smart Grid Interoperability Standards Framework, Release 1.0

National Institute of Standards (Boulder, participant in Smart Grid City) - $10M from DOE for Smart Grid Standards

Includes OpenHAN, Zigbee/HomePlug, AMI-SEC System Security Requirements

Major step forward

Day earlier Cisco Systems announced end-to-end, IP-based, secure network infrastructure plan . . .
Standards, Alliances, Regulations
Standards for Inter-utility Vehicle Connections

Why Not Charge at Home?

In the US there are 247M Cars but only 54M Garages

Studies say 80% of plug-in car owners want to charge more than once a day

We’re going to need a lot of charging stations
Interoperable Vehicle Communication Needs

- Vehicle Identity – unique IP address, locational awareness, battery SOS, capacity, operator requirements
- Required Information for grid and for operator, missing link for commercial charging, aggregation, roaming, regulatory programs
- Grid is RTO, service aggregator, utilities
Other Uses of Vehicle Communications

- Regulatory Programs including fleet average manufacturer demonstrations, I/M, warranty/recall, state registration, carbon counting and markets, climate inventories, Renewable Energy Portfolios, alternative road and fuel use tax mechanisms...
How could this work?

- Vehicle certification proceeds from Test Group emissions profile, regardless of fuel, EPA/CARB
- On-Board Diagnostic systems monitor control modules for faults, incorporating scannable data for Test Group/VIN, battery management, speed/distance combustion emissions, fuel consumption, etc.
- Federally mandated I/M tests based on interval scanning of OBD – VT annual ‘State Inspection’
- Next iteration of OBD to include wireless/remote retrieval of data – OBD III
- Proposal - fully integrate Electric Drive grid communications w/ existing vehicle control modules
Configure OBD III to communicate BMS, GPS, consumer data

- OnStar already there, now w/ MS Virtual Earth
- Elements of cell phone roaming, satellite radio, programmable home devices, 911 & EPIRB
- Home Area Networks, V2G, V2H, combined storage/renewable, renewable capture
- Compatible with battery architecture standards and business models – Project Better Place
- Might Volt, Nissan, Mitsubishi be incorporating?
- Stay tuned . . .
Big Brother Issues?

- Privacy and security are hot button issues
- But in context of modern life in general?
- Can the discussion be framed in positive terms?
- Is providing vehicle usage data analogous to a Driver’s License? Impaired responsibility?
- Are there reasonable opt-out possibilities?
- What happens in other areas of the world?