EV Everywhere Workshop
July 26, 2012

BATTERIES

Breakout Session #1 – Discussion of Performance Targets and Barriers

Comments on the Achievability of the Targets

- Reasonable for EV100 and EV300, Power/energy does not box well for PHEV40
- Need to look at whole system view of EV300 (utilization is not high)
- EV100 has much better utilization
- Target needs to capture external conditions (consumer and infrastructure)
- Capture Secondary use of batteries
- EV100 **Primary** Vehicle, felt not practical?

Barriers Interfering with Reaching the Targets

- Regulatory polices , different and not uniform?
- Lack of internal sensing
- Cell utilization What is achievable
- Fast charging EV100 & EV300
- Safety (high energy vs safe)
- Lack of access to data and computation power at cost (on board)
- Financing with right business model
- Lack of Standardization/Harmonization of cells or modules
    - Cell focus now vs pack integration

Breakout Session #2 – Discussion of Breakthroughs and Research Needs to Overcome Barriers and Reach Performance Targets

Technology Breakthroughs Needed

- Get rid of battery thermal management system - Need chemistry stable at high temp (good at low T)
- Low cost power electronics for hybridized (ucap + high E battery) systems
- Standardize set of cells and modules
- Cheaper lighter conductors (non-copper)
- Different business models (trailers with engine or battery for long drives)

"Out-of-the-Box" Ideas

- High voltage packs> 600V Packs (getting rid of high current components)
- Cars driven on Low voltage (1- cell) Distributed battery that can go anywhere
- Bi-polar cells/pack configuration
- Chemistries that do not need balancing Standard battery bay for drop in

Research Suggestions

- Chemistries that operate at warm temp (60-80C) Reduce order models; Integrated models
- Investigate advanced BOS approaches to reduce volume and cost
- Increasing cell utilization through advanced sensing and adaptive control
- Integrated models that can answer the question of optimum cell (many small vs few large)
- Integration of all sensing in cell package getting of low voltage sensing wires
- Dynamic predictive pack models & Route optimizations

Breakout Session #2 – Discussion of Breakthroughs and Research Needs to Overcome Barriers and Reach Performance Targets

Research Suggestions

- Bi-polar cells/pack configuration (Industry)
- Chemistries that do not need balancing (Gov)
- Chemistries that operate at warm temp (60-80C) (Gov)
- Investigate advanced BOS approaches to reduce volume and cost (Gov/Indust)
- Increasing cell utilization through advanced sensing and adaptive control (Gov/Ind)
- Integrated models that can answer the question of optimum cell (many small vs few large)(Gov/Ind)
- Integration of all sensing in cell package getting of low voltage sensing wires (
- Dynamic predictive pack models & Route optimizations.
- Low cost power electronics for hybridized (ucap + high E battery) systems
- Identify Optimum right voltage from system level (Battery, PEEM,
- Standard Mono block Components – Regularity agencies, battery and car companies, unbiased third party
- Identify Standard cells from cost perspective - Leverage analysis
- Automatic self discharge for safety
- Reduce order models; Integrated models
- How can we use the existing high volume production 18650?

Breakout Session #3 – Discussion of Action Plans and Next Steps

Comments Regarding the Other Technical Areas Being Discussed

- Need serviceable reversible joints
- Repeatable low impedance low cost, reliable joints
- Need to know more about advanced technologies to decide on Pack design and optimization
- Develop technologies with pack design/vehicle level in mind

Next Steps for Reaching Targets (including roles for DOE and industry, e.g., lead or support)

- Project that investigate advanced BOS approaches to reduce volume and cost, and improve safety
- Identify Optimum voltage from system level (Battery, PEEM, vehicle) to decrease cost, improve safety and performance
- Increasing cell utilization through advanced sensing and adaptive control (Gov/Ind)
- Distributed battery that can go anywhere (Industry)