Reincarnation and Evolution of the Electric Vehicle

SAE PEV Communication Task Force Status
Major Documents and Functions

- J2836™ - Use Cases
- J2847 – Corresponding Requirements (to use cases)
- J2931 – Communication Requirements
- J2953 - Interoperability
Summation of SAE Communication Standards

**J2836™ – General info (use cases)**

- Dash 1 – Utility programs *
- **Dash 2 – Off-board charger communications**
- Dash 3 – Reverse Energy Flow
- Dash 4 – Diagnostics
- Dash 5 – Customer and HAN
- Dash 6 – Wireless charging/discharging

**J2931 – Protocol (Requirements)**

- Dash 1 – General Requirements
- Dash 2 – InBand Signaling (control Pilot)
- Dash 3 – NB OFDM PLC over pilot or mains
- Dash 4 – BB OFDM PLC over pilot or mains
- Dash 5 – Security
- Dash 6 – RFID/DSRC (wireless charging)

**J2953 – Interoperability**

- Dash 1 – General Requirements
- Dash 2 – Testing and Cert
- Dash 3 –
- * Published

Rich Scholer - S318 - SAE PEV Communication Task Force Status
Ballot Objectives for Communication Standards

Minimum number of ballot steps expected with objectives:

• **Step 1**: Record as much info into the task force documents on “what we think works” and publish (move beyond committee draft). This allows the document to move towards step 2 for public review, initiating additional comments and viewpoints, while the task force also continues additional testing and early implementation. **Expected time is 1 to 1 ½ years.**

• **Step 2**: Implement step 1 (simulate, model, start pilot production, etc.) so we can verify, correct and update the step 1 version. Re-ballot with updates. **Another year to 1 ½ years.**

• **Step 3**: Final ballot to clean up and include any new items plus delete things that no longer apply. **6 months to a year.**
Status

• J2836/1™ & J2847/1 - Utility (SEP2)
  – Step 2 in process:
    • Continuing to list of updates to match SEP 2.0
    • SAE & SEP 2.0 continuing to harmonize with ISO/IEC JWG 15118 documents

• J2836/2™ & J2847/2 - DC Charging
  – Step 1 complete, in affirmation ballot stage to Hybrid committee

• J2836/3™ & J2847/3 - Reverse Energy Flow
  – J2836/3™ Re-kicked off April, 2011 (monthly meetings)

• J2826/4™ & J2847/4 – Diagnostics
  – J2836/4 Kicked off April, 2011 (monthly meetings)

• J2836/5™ & J2847/5 - Customer to PEV and HAN (& NAN)
  – J2836/5 Kicked off April, 2011 (monthly meetings)
Status (Cont)

• J2931/1 – Communication Requirements
  – Finalizing Requirements, almost ready to re-ballot to task force.
  – Coordinating into EPRI’s test plan and schedule

• J2953/1 – Interoperability
  – Finalizing Approach
  – Prioritizing systems (AC & DC levels)
  – Determining testing methods
Communication Task Force Status
J2836/1™ & J2847/1 Status

In Step 2 but have not re-opened documents

- Continue to liaison with SEP 2.0 TRD & Application spec (utility messages)
  - ZigBee Alliance (SEP 2.0) is addressing the TRD and Application spec public comments

- Coordinating with ISO/IEC JWG
  - ISO/IEC 15118-1 (J2836/1 & /2™) CD ballot
  - ISO/IEC 15118-2 (J2847/1 & /2) CD ballot
  - ISO/IEC 15118-3 (J2931/1) in WD
J2836/2™ & J2847/2 Status

Completing Step 1

• J2836/2™ Affirmation ballot to Hybrid committee
  – Comments are addressed

• J2847/2 – Affirmation ballot to Hybrid committee
  – Comments are addressed
  – Next is MVC ballot, then publish

• EPRI’s Test Plan includes DC charging
J2836/3™ & J2847/3 Status

In Step 1
- J2836/3™
  - Further defining use cases
  - Reviewing Architecture (on-board and off-board conversions)
    - V2G
    - V2H
    - V2L
    - V2V
- J2847/3 – not started
  - Chrysler and TARDAC projects will feed into this and use cases
J2836/4™ & J2847/4 Status
Kickoff in April, 2011

Need to review the categories and determine content in each

• Basic diagnostics
  – Detectable failures for control pilot and detection circuit
  – DC charger/discharger faults

• Optional diagnostics
  – Fault indicators on EVSE
  – Functions displayed in PEV, EVSE and HAN

• Enhanced diagnostics
  – Alerts from VM service centers
  – PEV notifying customers of issues
  – Software upgrades
  – VM specific functions
J2836/5™ & J2847/5 Status

Kickoff in April, 2011

When two networks connect – for 2 seconds

- ESI
  - Smart Meter
  - Or Gateway

- HAN
  - Devices
  - E.g. Tstat

- Consumer Devices
  - E.g. PC

- Utility HAN

- EMS

- Consumer Network

- Internet Access

- Sub-meter

- EVSE

- Electrified Vehicle

J1772™
J2836/5™ & J2847/5 Status

When two networks connect – for 2 seconds

1. Customer to PEV (world #1)
   - Customer interacts 24/7 with PEV while at work, shopping, restaurant, home, etc.
   - Uses tool and medium of choice offered by VM
     - Same medium as VM’s include for other products (Wi-Fi, cell)
     - Customer interaction includes:
       - Select options based on price and energy needs (SOC & time)
       - Starts/ends charge
       - Starts/ends preheat/precool cycles (PEV and/or battery)
       - Views status (SOC)
       - Receives alerts of unplanned events/changes
2. Smart meter to HAN (or EVSE)
   – Utility Interacts 24/7 with HAN (or EVSE)
   – Uses medium of choice (ZigBee, Wi-Fi, PLC)
     • Bridging device in system is expected
     • HAN interaction includes
       – Receives pricing and home load info 24/7
       – Receives planned/unplanned demand response events
       – EMS can make decisions for load based on inputs and customer preferences/presets (e.g. charge PEV vs. run air conditioner)
       – Able to send alert to customer (world #1) for unplanned events and decision points
J2836/5™ & J2847/5 Status

For 2 seconds, the two networks connect

• Green light is displayed
  – No conflicts or changes from PEV to HAN
    • Charge/discharge event commences as planned

• Yellow or Red light is displayed
  – Conflicts exist
    • The price changed
    • DR send to home (HAN), not to PEV and/or was unplanned
    • Customer schedule change
    • Clean energy changed
J2836/5™ & J2847/5 Status

Decisions regarding conflicts

• Price changed
  – Decide on charge/discharge schedule adjustments
• DR send to home (HAN), not to PEV
  – Opt out or accept
• Customer schedule changed
  – Go out to dinner instead of discharging to home
  – Got home later than expected
• Clean energy changed
  – Clouds prevented solar panel from feeding home energy needs
  – Neighbor is out of town and their BEV will feed the NAN, instead of the utility thru the transformer or your PEV, during peak demand
• More . . .
J2836/5™ & J2847/5 Status

What medium(s) will be used, and where will the customer use them?

• Conflicts - doubtful if customer will use PEV or EVSE display screen
  – Standing in the garage or staying in PEV is not seen as desired
  – Type of conflict may be displayed and customer can delay response for action.

• Customer is expected to enter home and use device and medium of choice
  – Device
    • Phone
    • Computer
    • In-Home Display
    • URC
  – Medium
    • Cell
    • Wi-Fi