

TMC 23

ANNUAL MEETING & Transportation Technology Exhibition



ADVANCING RELIABILITY

Through Root Cause Analysis

#TMCAnnual23

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- In accordance with TMC Board Policy, all personal phones without a silent feature must be turned off during business sessions.
- If you must use your phone —please leave the room!



ATTENTION PLEASE

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Electric Vehicle Test Procedure Kick-Off Discussion

**Brian Wilson- Sr. Research Technologist
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3/27/2023

Study Group Agenda

- General Discussion
- Call for Volunteers
- Test Procedure for EV Specifics
- Charging Options and Considerations
- How to Compare to Gas/Diesel
- Closing

S.11 EV Testing Procedure

- Existing procedures
- SAE J1711 for Hybrid EVs
- Dyno test measuring Fuel Economy / Emissions



S.11 EV Testing Procedure

- Existing procedures
- SAE J1634 for Battery EVs
- EPA follows procedure to measure energy consumption and range testing (MPG equivalency)



Figure 1. Chassis dyno with EV under test.

S.11 EV Testing Procedure- Nomenclature

- | Measurement | Unit |
|--------------------------------|----------------|
| • Battery Ampere-Hour Capacity | DC Amp Hours |
| • Discharge Energy | DC Watt Hours |
| • DC Discharge Amp-Hours | DC Amp Hours |
| • Power Outlet Voltage | AC Volts (RMS) |
| • AC Recharge Energy | AC Watts Hours |
| • DC Recharge Amp-Hours | DC Amp Hours |
- Electrical measurements made for EV MPG equivalency by US EPA

S.11 EV Testing Procedure

- Topics for Consideration
- How to measure battery regen from;
- Braking
- Solar panels
- Coasting downhill with speed control

S.11 EV Testing Procedure

- Topics for Consideration
- Accessory motors must be operated the same for both vehicles
- A/C motor
- Power steering motor (driver affects)
- Water pump load
- Electric heater load



S.11 EV Testing Procedure

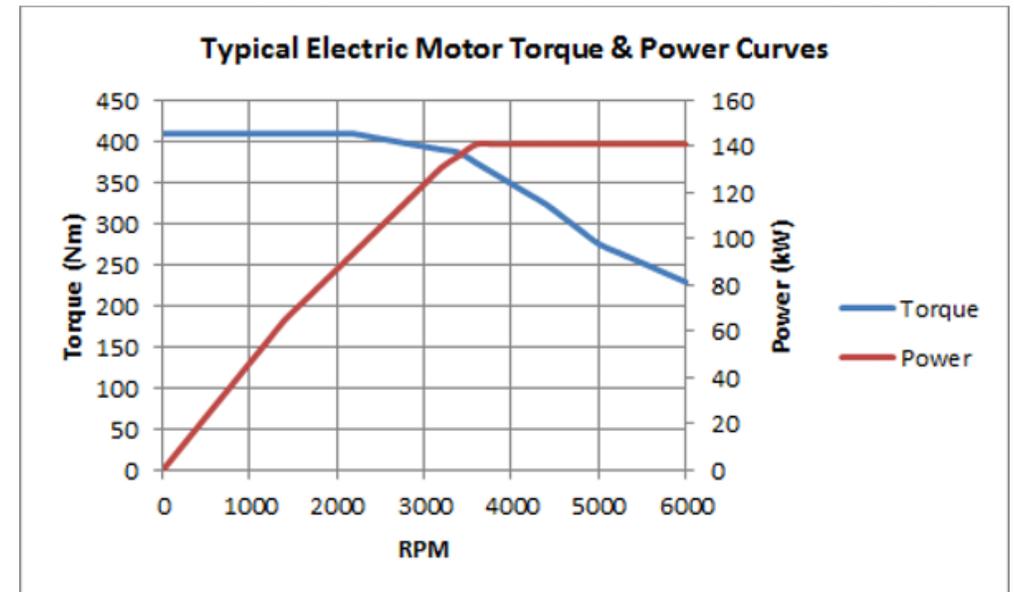
- Topics for Consideration
- Battery charge level at SOT, how to measure
- Test route- Brake application affects re-gen
- Re-Gen capability on one vehicle may be much more efficient than other vehicle.

S.11 EV Testing Procedure

- Topics for Consideration
- Battery condition throughout test.
- Degradation begins at first charge
- Degradation is affected by use / abuse
- Degradation is affected by time

S.11 EV Testing Procedure

- Topics for Consideration
- What portions of previous fuel economy procedures apply equally to EVs and Hybrids
- Tires
- Weather
- Drive cycle
- Driver skill



S.11 EV Testing Procedure

- Topics for Consideration
- Are battery differences enough to show one vehicle is more efficient?
- Same with drive motors?
- The GRID...?

S.11 EV Testing Procedure

- We are at phase 1 of this new and exciting S.11 procedure
- Please sign up to be a part of the development

S.11 EV Testing Procedure

- Open discussion on this RP Development

Questions? Comments?

S.11 EV Testing Procedure

- Closing Comments

Thank you!!!!

- Please sign **volunteer sheet for this update.** These are **your** procedures and **your** participation is always welcome!
- Email- Brian.Wilson@SwRI.org

Constructive Comments Are Always Appreciated!

TMC welcomes your comments, but please make certain that they are constructive and appropriate before you turn in your evaluation sheet!

Thank You for Your Cooperation!

save the date

TMC23 FALL MEETING

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TMD24

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