

# Transportation Electronics Update 8 January, 2021

## Next Steps for Transportation Electronics Technologies

The Transportation Electronics Committee Industry Session is planning a seven-presentation session on the following topics for APEC 2021.

While some of the topics above are still being finalized, we are also working on backups or possible webinars for the session. Topics being investigated are autonomous vehicle technologies, novel dielectrics, solid state batteries and a retrospective on Electric Vehicle Technologies.

Participants January 8 2021

[John@PSMA.com](mailto:John@PSMA.com)

John Horzepa (PSMA Office)

[Joeh@PSMA.com](mailto:Joeh@PSMA.com)

Joe Horzepa (PSMA Office)

[Fernando.Salcedo@ee.doe.gov](mailto:Fernando.Salcedo@ee.doe.gov)

Fernando Salcedo

[Davide.Giacomini@infineon.com](mailto:Davide.Giacomini@infineon.com)

Davide Giacomini

[dennis.stephens@continental-corporation.com](mailto:dennis.stephens@continental-corporation.com)

Dennis Stephens

[Jens.Lemke@wartsila.com](mailto:Jens.Lemke@wartsila.com)

Jens Lemke

[SinghBrijN@johndeere.com](mailto:SinghBrijN@johndeere.com)

Brij N Singh

Session Status as I know it today

1. A summary and status report on R&D projects funded by the Batteries & Electrification program
  - a. Speaker Steven Boyd
  - b. DOE Vehicles Technologies Office of the U.S. Department of Energy
  - c. A This presentation provides a summary and status report on R&D projects funded by the Batteries & Electrification (B&E) program at the Vehicles Technologies Office (VTO) of the U.S. Department of Energy (DOE). B&E research covers electric drive technologies, grid integration, and advanced batteries. The U.S. has had a significant long-term U.S. commitment to this R&D – the FY 2020 budget for which approached ~\$174M. Current research spans a number of topics including high power density electric traction drive systems, medium voltage direct connected DC fast chargers, and advanced batteries. This presentation will discuss current research areas and programs along with recent key accomplishments for each area.
  
2. Presentation on Converters
  - a. Speaker Charles Zhu
  - b. Delta
  - c. This session will explore an ongoing DOE-sponsored program to develop a high-efficiency, medium-voltage-input, solid state transformer (SST)-based 400-kW/1000-V/400-A EV extreme fast charger. The charger will boost charging power levels to charging speeds of 3-C, or above, and achieve a 180-mile charge within 10 minutes.

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- d. One presentation with two topics  
Local energy storage systems and/or renewable energy integration will mitigate the system's grid impact. The SST will utilize MVAC at 4.8-kV or 13.2-kV to eliminate the line frequency transformer, increasing power density and reducing weight. Combined with SiC MOSFET device, the SST will increase grid-to-vehicle efficiency by 3.5% to industry-leading levels of up to 96.5%.
3. Integrated gate drive for WBG devices
  - a. Speaker Dr Mantooth
  - b. University of Arkansas
  - c. Need Abstract
  - d. Thomas to follow up
  - e. Ozark Integrated Circuits
4. A presentation on battery and battery pack systems or EV retrospective or inverters technology
  - a. Speaker John Hayes
  - b. University College Cork
  - c. Need Abstract
  - d. John Hayes to follow up
    - i. which presentation would provide the most technical depth?
  - e. Ralph to Contact John to see where he is at (Prefer Batteries)
5. Novel dielectrics - three possible presentations (4,5,6)
  - a. Speaker TBD
  - b. Affiliation TBD
  - c. Need Abstract
  - d. Thomas Foulkes to follow up
    - i. Perhaps we could pick one cap technology for the session and the others for the cap workshop?
  - e. Kevin O'Conner (4)
  - f. I HAVE DISCUSSED THIS APPLICATION WITH KEVIN – PERHAPS IT IS A BETTER FIT WITH THE CAPACITOR Industry session
    - i. Check with FRED
  - g. High voltage supercapacitor and capacitor dielectric materials company (5)  
Don Derosa accepted need abstract.
  - h. TCPoly (6)
    - i. High thermal conductivity, additive manufacturing materials company  
Which session?  
Matt Smith accepted need abstract.
6. What is the DOE Lab-Embedded Entrepreneurship Programs (LEAP)

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- a. Dan Miller Webinar (8)
  - b. EERE
  - c. Thomas Foulkes to follow up – Possible Webinar or include slides at the end presentations
    - i. Could also be used as a Webinar
7. Nikola – Electrified Trucking
- a. Speaker TBD
  - b. Need Abstract
  - c. Chavonne to Follow up
8. Charging Station Consortium
- a. Speaker TBD
  - b. Chavonne to follow up
9. SCIBREAK – Dr Modeer Resides in Europe
- a. Train application for charger – circuit breaker
  - b. Tom To Follow Up (9?)
10. Three Presentations for APEC 2020 from Japan were not presented Last Year (9, 10, 11)
- a. Use one or more of them for Industry Session
  - b. Possible Webinars

Dr. Eisuke Masada / Railway Technical Research Institute in Japan PE applications in Railway System Ground Facilities (Energy Management System for Urban Network, Energy-efficient Power Supply for High Speed Train, Super Speed Maglev System) Confirmed

Dr. Tetsuo Uzuka / Railway Technical Research Institute in Japan Energy-efficient and alternative fuel Vehicle Drive Systems for Urban, Regional and High Speed Train Confirmed

Dr. Shimizu / New generation Power Electronics and System Research Consortium On the sustainability of battery electric vehicles from a view point of the "Well to Wheel Model" Confirmed

11. The possible contacts for autonomous vehicles to date have not been responsive.

12. 48V converters for automotive applications

- a. Vicor DECLINED