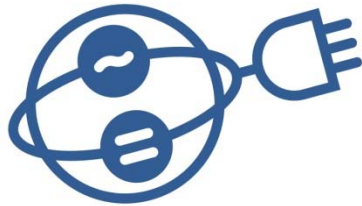




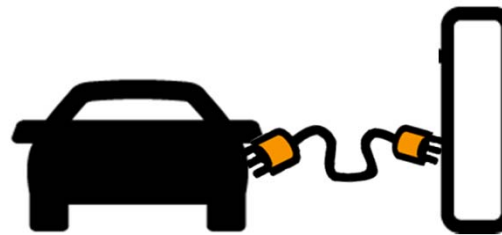
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Combined Charging the universal charging system

North American Standardization Efforts

Michael Tinskey, Ford Motor Company



Combined Charging System Builds off of AC Standards (SAE J1772 or IEC 62196-1 “Type” 1 for North America)



SAE J1772 supports all infrastructure scenarios in North America



- J1772 applicable for
 - charging modes AC Level1, Level 2
- J1772 is proven
 - introduced to the market
 - accepted by all major OEM's and EVSE suppliers
- “AC Core” – 5 Pins US (single phase power)
-- 7 Pins EU (three phase power)

- SAE standardizes AC and DC charging systems and is replicated in international standardization

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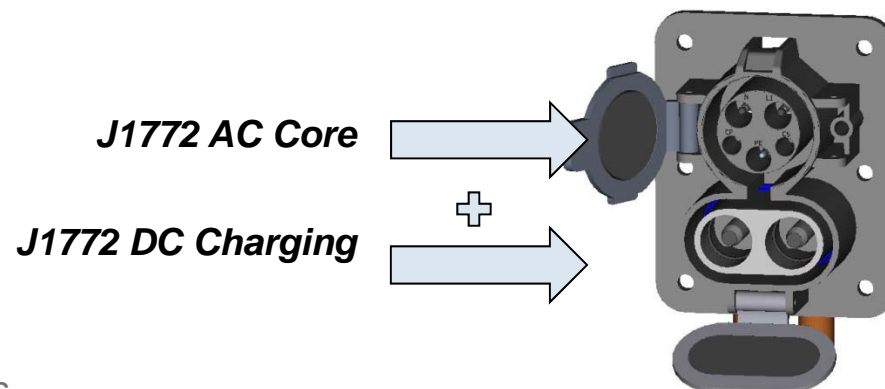


Combined Charging System Benefits.



Optimized for the customer use experience and value equation

- J1772 DC provides fastest Charging Time compared to existing systems on the market.
- Integrates all charging scenarios into one vehicle inlet connector.
- Designed with extensive collaboration to optimizes customer ease of use and ergonomics
- Lowest vehicle complexity/cost
- Future of fast charging – supported by nearly all manufacturers for use in US and EU
- Most capable, broad band communications for full interoperable with future smart grid applications – identical communication, electrical systems, charge controllers, safety mechanisms, and sheet metal footprint for vehicles to be sold in US and EU.
- Clear market signal facilitates growth of public charging infrastructure.



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North American Standards Organization: SAE



- SAE **standards** body determines US standards
- SAE has chosen the Combined Charging System as its fast charging standard
- The combined charging standards have been developed in collaboration with hundreds of participants: Automotive OEM, technology companies, EVSE manufacturers, US National labs, utility companies and others.
- SAE combined charging standards will be finalized in July 2012 and charging stations will be available end of 2012/Early 2013.

Strategic Assessment of existing Charging Systems

Main bodies have adopted the Combined Charging System as charging technology.



- All members of the European Association of Automotive Manufacturers ACEA support the Combined Charging System for Europe:



- BMW, DAF, Daimler, Fiat, Ford of Europe, General Motors Europe, Hyundai Motor Europe, Jaguar Land Rover, MAN, Porsche, PSA, Renault, Scania, Toyota Motor Europe, Volkswagen, Volvo Cars, and AB Volvo.

SAE *International*®

- SAE has developed the Combined Charging System in the U.S.
- The Combined Charging System is the US solution for electric vehicle charging – from AC charging to ultra-fast DC charging.
- Nearly all global automotive companies support the Combined Charging System including US manufactures Chrysler Group LLC, Ford Motor Company, and General Motors.

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EU and US Harmonization: Transatlantic Economic Council



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