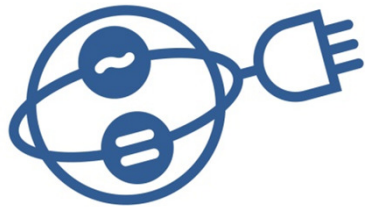




DAIMLER



Combined Charging

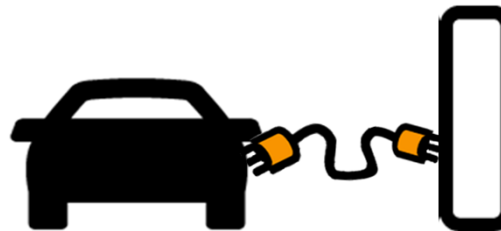
Current status of the Combined Charging System

Meeting with Ishavsveien

November 08, 2011

Dr. Heiko Doerr, Coordination Office Charging Interface

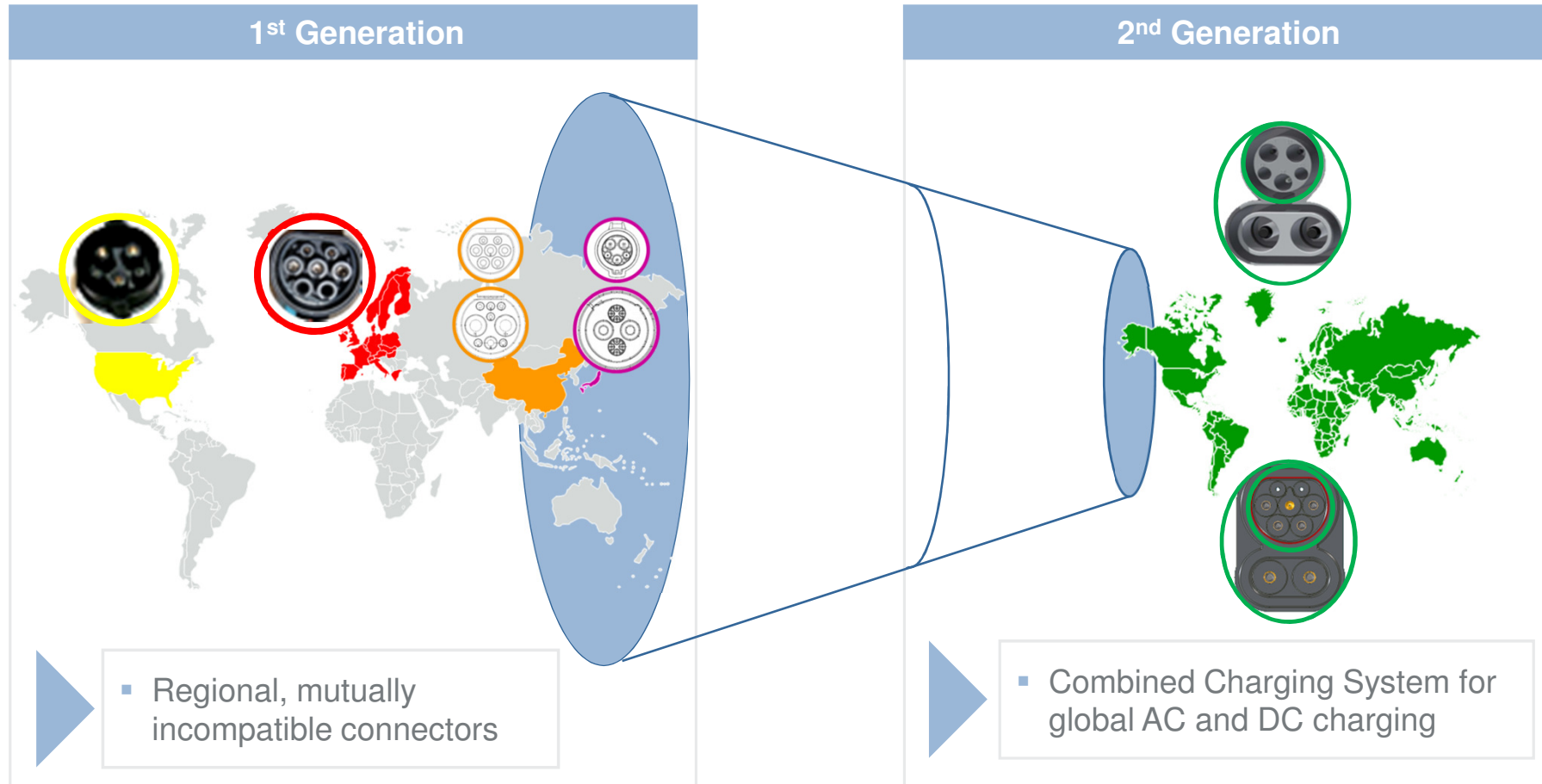
V1.2





Current Status Charging Connectors

Various regional connectors should be migrated into one global solution in the second generation.





IEC 62196-2 Type 2 for Europe

Type 2 supports all infrastructure scenarios in Europe and meets OEM requirements.



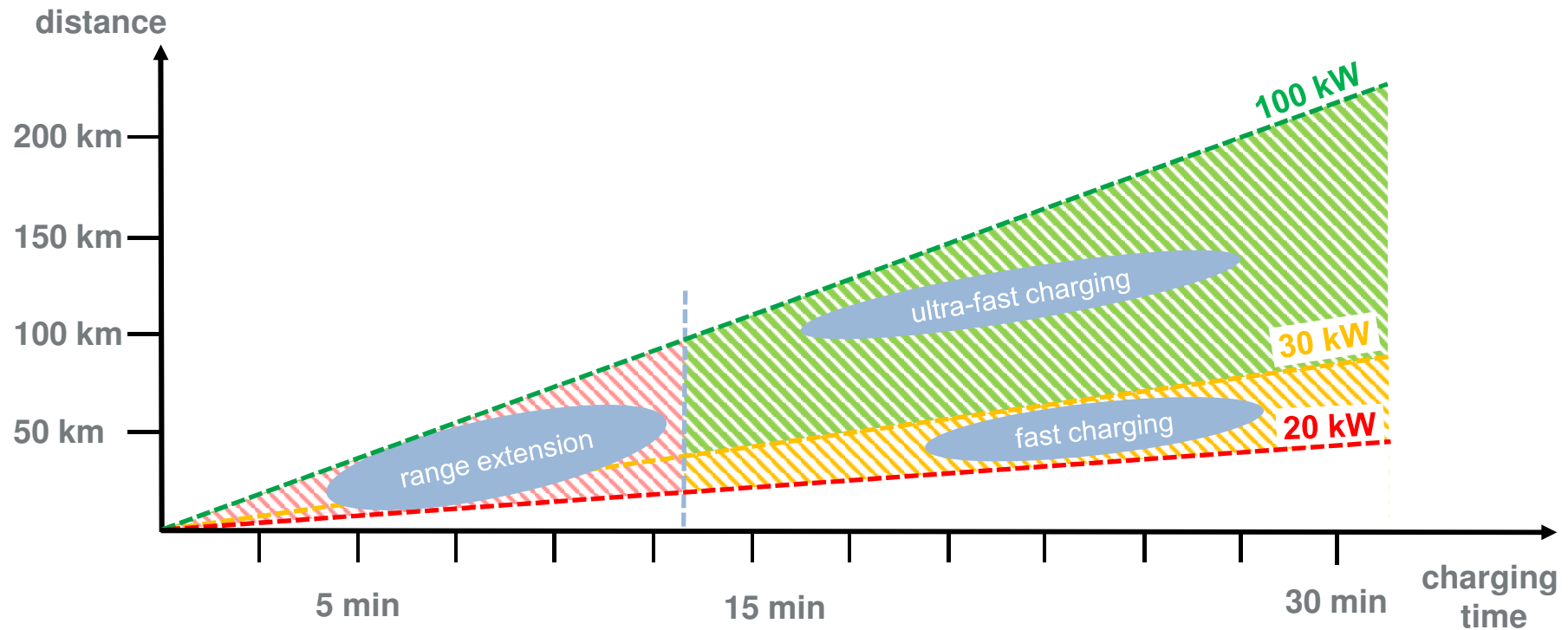
- 1-phase (households):
- 3-phase (households):
- mixed

- Type 2 applicable for
 - charging modes 1, 2, and 3
 - high power AC charging up to 63A
 - DC charging up to 30 kW
- Type 2 at vehicle inlet restricts use of mode 1 by its design/construction
- Type 2 has a lean design without additional mechanical parts
 - Small packaging for vehicle inlet
 - No provision of packaging for mechanical parts
 - Higher robustness and long term durability
- Type 2 shall be used for vehicle and infrastructure
 - Single connector for easy use by customers



Advantages of DC Charging for End Users

DC charging offers a huge comfort for customers and leverages eMobility. DC charging creates new use cases due to its ability to charge faster.

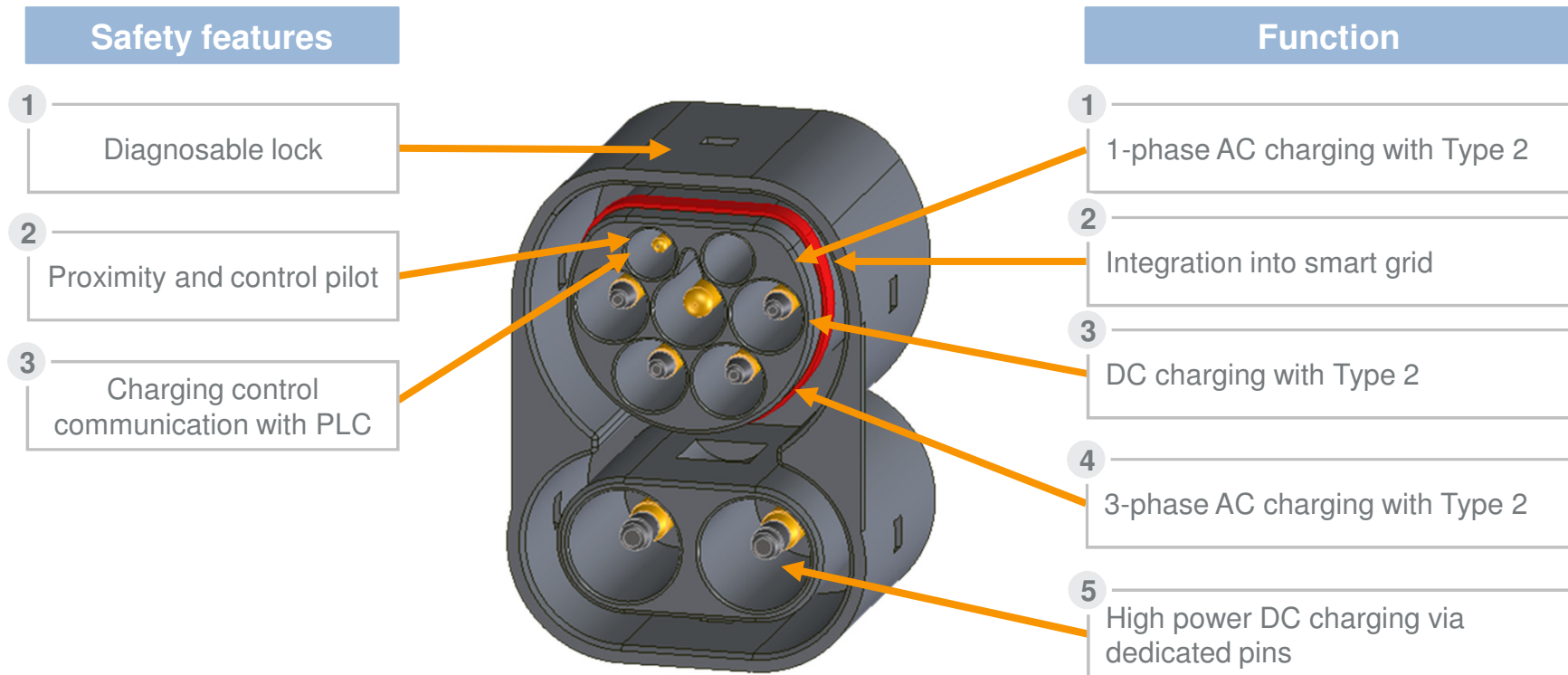


- DC charging satisfies customer expectations for range extension and ultra-fast charging.



Design DC Combo 2 Inlet

The Combo 2 inlet provides comprehensive functionality at a high level of safety.





Availability of Combo DC-Chargers

Sample chargers for the Combined Charging System are ready.

Charging Station

- Two-box design: charge pump and separate converter
- Network connection to AC 3ph 125A 400V
- Charging communication via PLC
- Charging connector DC Type 2
- Safety measures according to IEC 61851-23



Vehicle

- Two sample vehicles with integration of DC Type 2 or Combo 2 Inlet respectively
- Charging current up to 70A DC
- Alternatively, charging with AC 1ph via the same inlet possible
- Vehicles used for permanent tests
- Handling with high comfort
- Acceptable temperature rise at connector



Coordination Office Charging Interface
c/o Carmeq GmbH



DAIMLER





Combined Charging System

Combined Charging: the universal charging system for electric vehicles has been demonstrated at vehicles of German OEMs at the 15th international conference on „Electronics in Vehicles“ at Baden-Baden on October 12-13.



Coordination Office Charging Interface
c/o Carmeq GmbH

Current_status_of_the_Combined_Charging_System_V1.2



DAIMLER



Availability of Vehicles



Vehicles have been announced and are under development.

	2011	2012	2013
production		 <p>Smart ForTwo EV</p>	 <p>Audi R8 e-tron</p>  <p>BMW i3</p>  <p>VW Golf blue-e-motion</p>
		 <p>Focus EV</p>	 <p>VW E Up!</p>
series development	 <p>BMW i3 at IAA</p>  <p>VW E Up! at IAA</p>	 	

Coordination Office Charging Interface
c/o Carmeq GmbH



DAIMLER

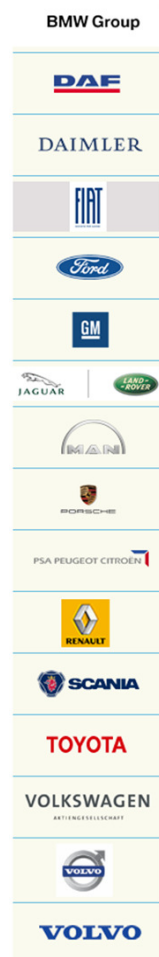



Strategic Assessment of existing Charging Systems



European OEMs have agreed to exclusively support Type 2 / Combo 2 based charging systems after 2017.

- ACEA suggest the **Type 2/ Combo 2**
 - to be used in the EU
 - as the standard for **AC/DC charging**
 - both on the side of the vehicle and the public charging infrastructure
- Preference **PLC communication** between EV and EVSE shall be ISO/IEC 15118 compliant
- ACEA decided to concentrate all efforts on IEEE 1901 Profile **Green PHY on CPLT/PE**, with a demand for further tests to confirm this direction
- Joint position and recommendation is based on today's best knowledge of the current situation and state of technical development





Brussels, 14 September 2011

ACEA position and recommendations for the standardisation of the charging of electrically-chargeable vehicles

Following previous commitments and the subsequently updated ACEA position from 2 March 2011 (http://www.acea.be/news/news_detail/acea_members_address_the_challenge_of_standardising_the_charging_of_electrically-chargeable_vehicles) ACEA members are continuing to contribute to the on-going debate within EU institutions on standards for electrically chargeable vehicles.

Having recognised the progress made over the last few months, namely in the CEN/CENELEC Focus Group and progress made in TEC (Trans-Atlantic Economic Cooperation), ACEA members present their final and joint recommendations on the interface between cars and the relevant infrastructure.

ACEA members express the urgent need to reach European agreement for standard AC charging and present their vision for common agreement on quick charging that also creates room for a global solution and for simplification.

Quick progress and EU-wide agreement for standard charging is a pre-requisite for quicker market uptake of electric vehicles and higher investment into a quick charging network. The recommendations and solutions presented by ACEA will have positive effects for all stakeholders:

- Consumers will find a unique EU-wide solution, at reduced cost and fulfilling all safety requirements;
- Infrastructure providers are provided a clear indication about future developments and investment planning;
- OEMs will be able to reduce costs and progress more quickly on the market uptake of electrically chargeable vehicles.

However, it is important to note, that the current joint position and recommendation is based on today's best knowledge of the current situation and state of technical development. This applies both for connectors/modes and communication. Certain technical solutions may still need to be validated in detail, as the technical specifications have not yet been finalised in the different International Standardization Groups. Also, insights and outcomes of demonstration projects and testing could eventually result in a set of different recommendations.

ACEA members call upon the European Commission, relevant standardisation bodies, and other stakeholders to support its recommendations and use them as a basis for the development of common European standards. In the global context, ACEA strongly supports the IEC standardisation process for a global solution. In this framework, ACEA recommends one defined "envelope"¹ for the vehicle inlet supporting single phase AC, three-phase AC and DC charging, including safety requirements. ACEA members will fully respect global solutions agreed in the future if found.

¹ See Annex III of the position

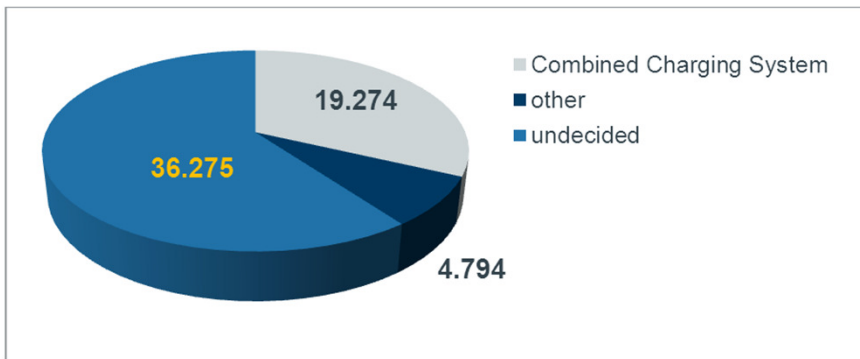
See: http://www.acea.be/images/uploads/files/20110922_ACEA_Position_Paper_on_EVs_standardisation.pdf



Strategic Assessment of existing Charging Systems

Joint support for the Combined Charging System will have a significant impact on the future market of Electric Vehicles.

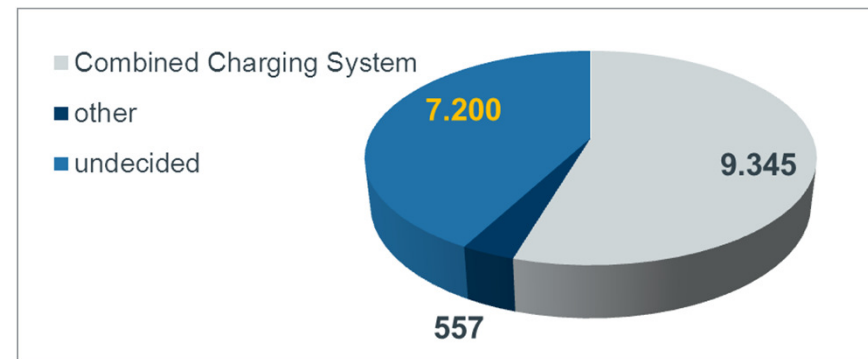
- Alignment of OEMs in the definition of the Combined Charging System provides guidance for sustainable investment
- Market shares will establish significant demand for charging stations according to the Combined Charging System
- Continuous support of alternative technologies will slow down dissemination
- Customer acceptance will decrease



World car production of Top 50 brands

Total 60 M, Share 30%

See: <http://oica.net/wp-content/uploads/ranking-2010.pdf>



Europe vehicle production of all brands

Total 17 M, Share 55%

See: http://www.ccfa.fr/?action=dw2_out&id=5112

- For comparison: vehicle registrations in Norway 2010 127.000 pcs.

See: <http://sdw.ecb.europa.eu/browseTable.do?sk=132.STS.M.NO.W.CREG.PC0000.3.ABS&node=SEARCHRESULTS>



Charging Connectors for the Combined Charging System

The Combo inlet shall serve as a universal plug for all relevant charging scenarios.

