



Feasibility analysis and development of on-road charging solutions for future electric vehicles

Standardisation in electromobility: future plans of international standardisation bodies for WPT

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Agenda

1. CUNA (Italian Body for Standardisation on Road Vehicles) presentation

- a. Industry Members
- b. List of technical commissions
- c. National contribution and National representatives

2. Standard related to electric vehicles especially for:

- a. Safety and Interoperability
- b. Standardization target

INDUSTRY MEMBERS

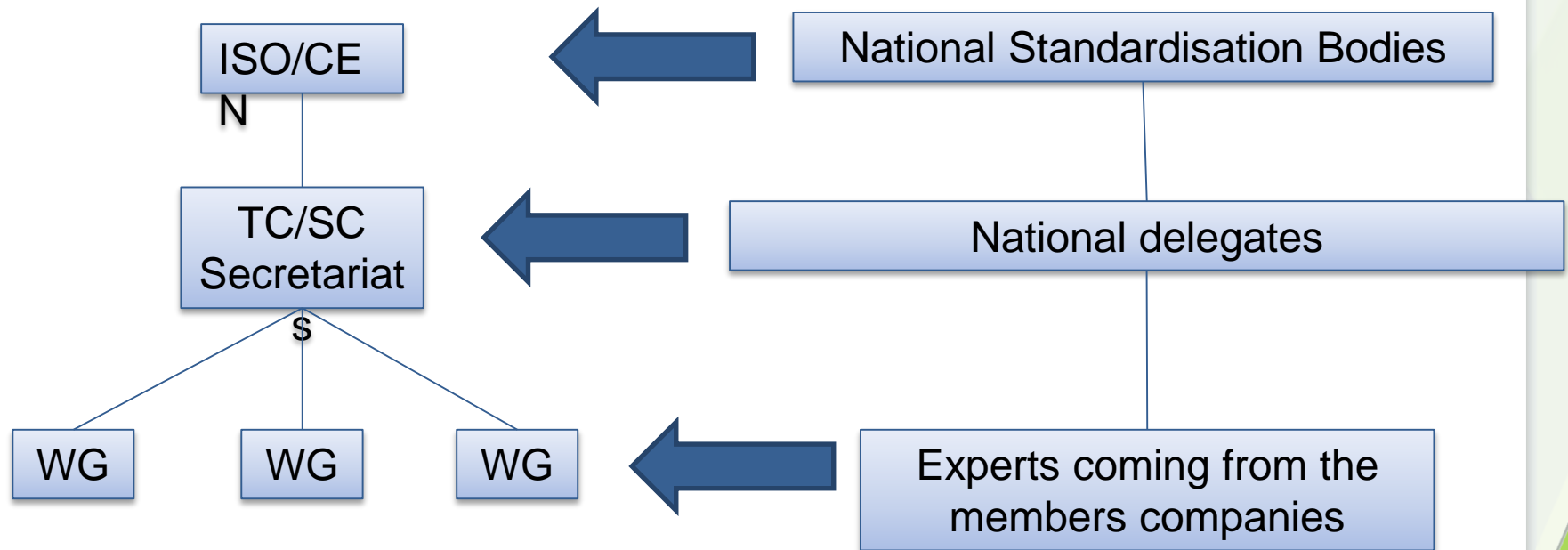
- ✦ FGA: passenger cars, powertrain and transmission (FCA)
- ✦ IVECO: Commercial vehicles & FPT Industrial (CNH Industrial)
- ✦ ANCMA: motorcycles and mopeds
- ✦ ANFIA: other road vehicles
- ✦ UNACOMA: agricultural machinery and tractors, Earth Moving Machinery
- ✦ UNACEA: Earth Moving Machinery
- ✦ UP: Fuels and lubricants
- ✦ Tyre manufacturers
- ✦ Component manufacturers

List of Technical Commissions

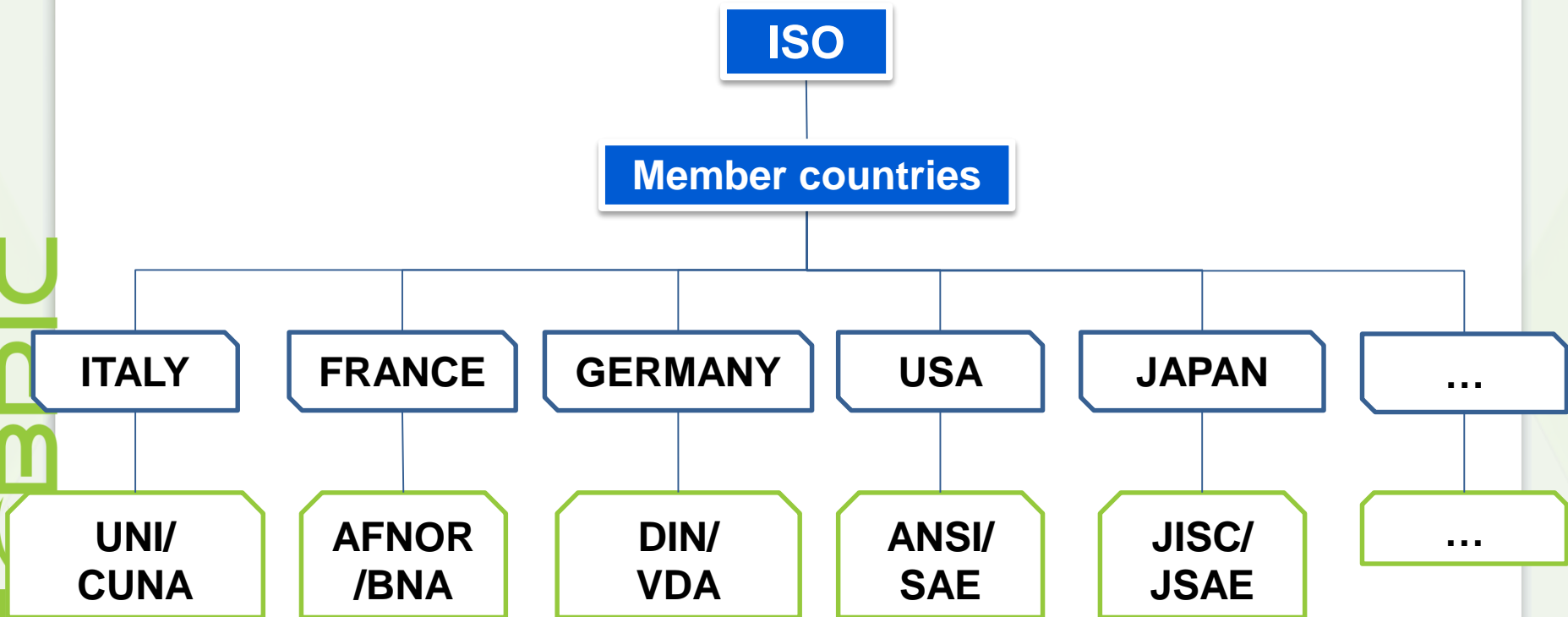
1. Vehicle ergonomics
2. Special outfitting and buses
3. Commercial vehicles outfitting and their trailers
4. Technical services
- 5. Motorcycles and mopeds**
6. Fuels and lubricants
7. Agricultural, Forestry and gardening equipment
8. Earth Moving Machinery
9. Powertrain
10. Tyres, Rims and Valves
11. Passive Safety
- 12. Electric, electronic and telematics on-board components**
13. Testing on vehicles and their components
- 14. Electric, hybrid and fuel cell vehicles**

ISO & CEN

Structure and National Contribution



National Representative within ISO & CEN



Standards ISO, IEC, SAE, UL on wireless charging (1/3)

ISO 19363 Electrically propelled road vehicles – Magnetic field Power Transfer – Interoperability and Safety requirements

CUNA is leader of the Italian Delegation involved in the standardization activity related to Electrically Propelled Road Vehicles

1. The document ISO 19363 is at Working draft stage (WD); the completion is scheduled for 10-2016
2. Focus point having relation with FABRIC development:
 - Flux geometry/ coil geometry
 - Core specification
 - Operating frequency
 - Alignment tolerance requirements
 - Location of secondary device
 - Control loop of power transfer and response time of the loop
 - Parameters needed to be exchanged for interoperability
 - Resonant circuit topology, coupling factor and impedance (informative)

Standards ISO, IEC, SAE, UL on wireless charging (2/3)

ISO/IEC 15118 (scheduled for 10-2016) Road vehicle to grid communication interface

- Part 6: General information and use-case definition for wireless communication
- Part 7: Network and application protocol requirements for wireless communication
- Part 8: Physical layer and data link layer requirements for wireless communication

IEC 61980 Electric vehicle wireless power transfer (WPT) systems

- Part 1: General requirements
- Part 2: Specific requirements for communication EV and infrastructure
- Part 3: Specific requirements for the magnetic field power transfer systems

Standards ISO, IEC, SAE, UL on wireless charging (3/3)

ISO 6469 Electrically propelled road vehicles -- Safety specifications

- Part 1 : On-board rechargeable energy storage system (RESS),
- Part 2 : Vehicle operational safety means and protection against failures
- Part 3 : Protection of persons against electric shock
- Part 4 : Post crash electrical safety (scheduled for 01-2016)

SAE J2954 Wireless Charging of Electric and Plug-in Hybrid Vehicles
(Guideline scheduled for 06/2014)

SAE J2836/6 J2847/6 J2931/6 Communication for inductive charging
(Guideline scheduled for 06/2014)

SAE J1773 Electric Vehicle Inductively Coupled Charging (published as recommended practice)

UL 2750 Wireless EV charging

FABRIC – Standards interactive information opportunities

- User need, concept and requirements for ICT solutions
- Review of existing ICT solutions and technical benchmarking
- Prototype of ICT modules for the on board information strategies
- Technical and user requirements
- Specification document
- Architecture definition
- Assessment of the technical feasibility of ICT and charging solutions
- FABRIC final use cases
- FABRIC test scenariosFABRIC needs

FABRIC – Actions performed (I)

Ref. Deliverable D5.5.4.

Analysis of deployment scenarios, standardization and harmonization

Analysis of consistency of FABRIC development to Standards ISO 19363 "Electrically propelled vehicles – Magnetic field wireless power transfer – Safety and interoperability requirements" (mainly considered from the vehicle side), scheduled for definition by October 2016 and proposed for comments by November 19th, 2015.

The analysis was conducted on the last edition of the standard draft, which presently covers the wireless power transfer “for stationary applications”, considered mainly from the vehicle side.

For this document (scheduled for definition by October 2016), comments have been prepared, with considerations related to FABRIC technology developments with respect to the static applications, but also in view of a specific standard provisions for dynamic WPT.

FABRIC – Status of actions performed (II)

Comments to ISO/PDPAS 19363 regarding Interoperability

- General
Capability of the supply device and the electric vehicle device being able to transfer power wirelessly in a safe and efficient manner (as in IEC 61980-1)
- Location of the secondary device
Recommended to be located in the central position of the vehicle, to foster the interoperability between different charging modes (e.g. dynamic)
- Alignment tolerance requirements
To be defined, with consideration to static and dynamic applications indications can be proposed according to the progress of the study and the development of the technology, also with consideration of the MF-WPT system and the possible use of driver assist system for the approach to the charging source.
- Pairing
Suggest to delete “unique” dedicated primary device, to open the way to other modes of user identification
- System frequency
The System frequency range should be defined taking into consideration the present developments of the technology and the possible interoperability with other operational modes (dynamic, stationary)

Template for comments and secretariat observations

Date: 2015-11-16

Document: ISO/PDPAS 19363

Project: ISO 19363

MB/ NC1	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment2	Comments	Proposed change	Observations of the secretariat
IT1	68	6.1		ge	Completion of the definition of Interoperability, consistently with the definition given in IEC 61980-1	The sentence is proposed to be read: Interoperability refers to the capability of the supply device and the electric vehicle device being able to transfer power wirelessly in a safe and efficient manner, based on compliance with the regarding specification	
IT2	142	6.4.1		ed	Table 4, instead of table 7	Substitute table 7 with table 4	
IT3	147	6.4.1	Table 4	te	Alignment tolerance requirement (tbd) should be defined in accordance to the study and development of the technology for static and dynamic application, in consideration to the interoperability and the possible driver assist mechanism by the EV for alignment	Presently no change	
IT4	170 175	6.5.2	Table 5 Table 7	te	The system frequency range and the nominal frequency should be defined taking into consideration the present developments of the technology and the possible interoperability with other operational modes (dynamic, stationary)	Presently no change	
IT5	259	7.6		te	Correlation with unique dedicated primary device could constitute a limitation of the modes of user identification for certain use cases	Delete unique	

Actions planned

Propose a NWI for a Standard dedicated to WPT in dynamic mode, harmonized with ISO, IEC and SAE, with main focus on:

- Interoperability, at the general mobility system level, which should concern the Wireless Power Transfer capability between vehicle and infrastructure with dynamic mode and with static wireless infrastructure facilities.
- EMF and EMC aspects and related safety protective system
- Vehicle system safety, in relation with Standard ISO 6469-1,-2,-3,-4
- Homogenize vehicle layout in order to improve every aspect related to safety and rescue activities in case of accident
- Bi-directional energy transfer G2V and V2G
- Harmonization with drive assisting systems for supporting charging point approach and positioning

COP 21st : Final Agreement

- 195 Countries will signed on April this agreement
- Main target for the year 2030 are:
 - ✓ CO2 production limit at 40 billion t
(if we continue with the current trend would arrive to produce 55 billion t)
 - ✓ Earth temperature increase limit at maximum 2°
(General commitment to limit at 1,5 °) the

COP 21st : Financial Opportunities

**“BIG OIL”, to day, moves investments for
~ 30.000 billion \$**

**Achieve COP 21st Target it means to reduce
dramatically coal and oil consumption**

**In this contest, according to the main financial
opinion leader, the investments on “Big Oil” will be
reduced by ~ 8.000 b\$ and its will move towards
renewable energy and related application.....**

CONCLUSION

**This new context is very favorable for the
“world of zero emission vehicle”**



**Electric cars will play a major role for
decreasing pollution and improving the
world living standards**



Feasibility analysis and development of on-road charging solutions
for future electric vehicles

Thank you!



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