



**ITU Kaleidoscope 2013**  
**Building Sustainable Communities**



# **Innovation Management of Electrical Vehicle Charging Infrastructure Standards in the Sino-European Context**

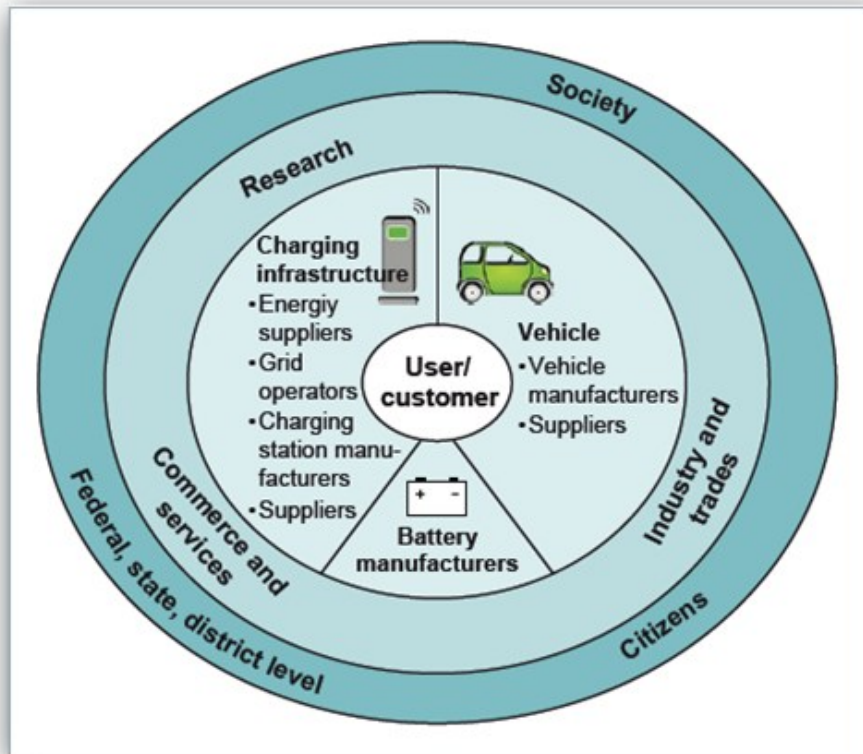
**Martina Gerst**  
**Tsinghua University, SEM**  
**[martina.gerst@ed.ac.uk](mailto:martina.gerst@ed.ac.uk)**

**Kyoto, Japan**  
**22-24 April 2013**

# Content

- ❑ Background: Electric mobility (E-mobility) and Standardization
- ❑ Regional NEV Standardization Strategies
- ❑ China-European Cooperation on Standardization & Certification
- ❑ Conclusions

# The Electric Mobility Environment



- ❑ Electrification of mobility embedding New Energy Vehicles (NEVs) in a wider urban mobility concept.
- ❑ The concept is including different layers and different components.
- ❑ Standardization of different interfaces of a NEV is a central factor for a broad take-up of E-mobility.

# E-mobility challenges

- ❑ Coordinate and integrate diverse standardization activities in different sectors in order to effectively meet customer demands.
- ❑ Address standardization challenges with a view towards fast marketability.

# Standardization

- ❑ Interoperability technology standards serve as valuable enablers of innovation.
- ❑ Standard making processes are embedded in a rapidly changing and complex global standardization environment.

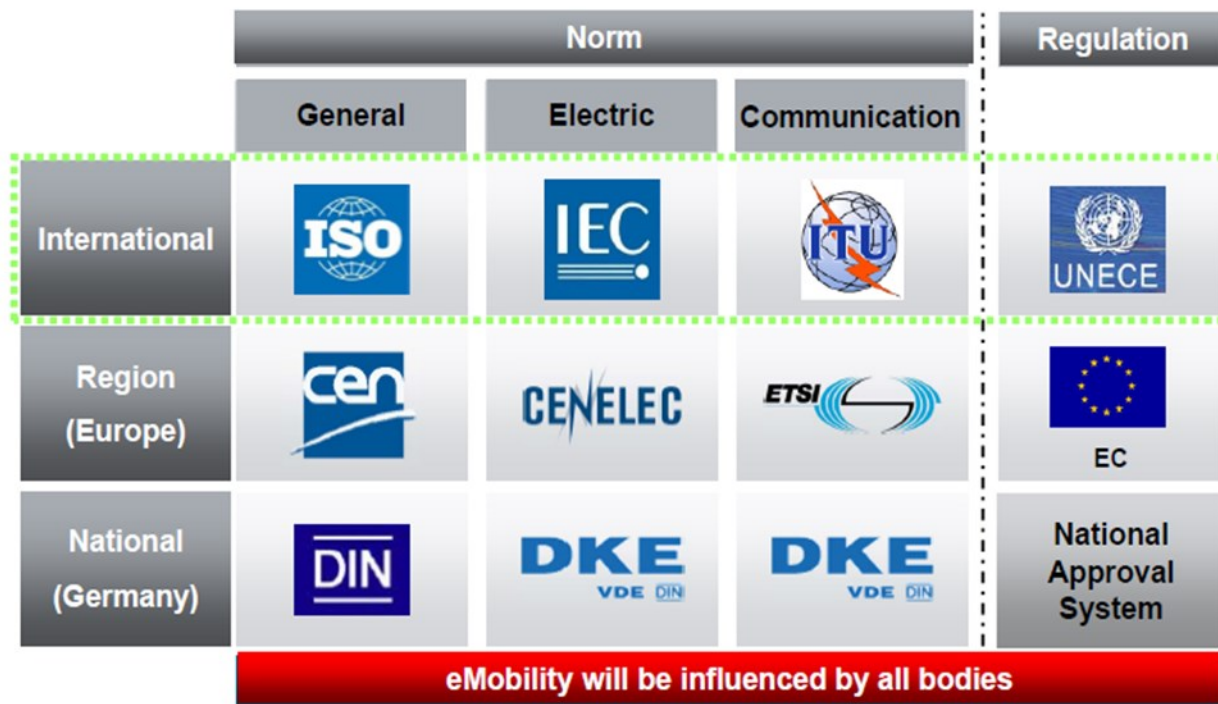
# Standardization& e-mobility

- ❑ Standards in the electrical engineering/energy technology and in the automotive technology domain have been considered as separate entities.
- ❑ Electric vehicle technology is less mature than combustion engine technology regarding the market, thus leading to different dynamics of standardization.



# The Standardization Framework

## □ Standardization Organizations and Regulatory Bodies



# European NEV Standardization Strategy

- ❑ Coordinate and integrate diverse standardization activities in different sectors in order to effectively meet customer demands.
- ❑ Address standardization challenges with a view towards fast marketability.



# China NEV Standardization Strategy

- ❑ China's standards development attempts to transform itself from a follower to a standard setter.
- ❑ Different programs have promoted about 60 own NEV standards
  - ❑ Impact on international Automotive industry and their standardization management.

# MNAE NEV Standardization Management in China

- ❑ International companies aim at international standards.
- ❑ Existing standards have to be used and further developed.
- ❑ Importance of conformity assessment for market access.

# China-European Cooperation on Standardization & Certification (1)

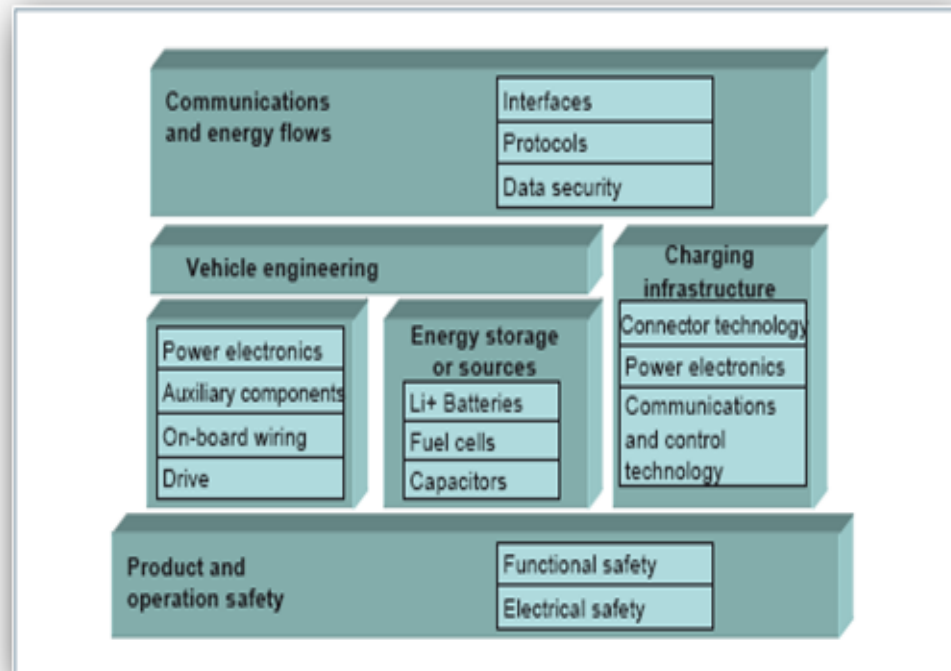
- ❑ Implement joint long-term cooperation between China's governmental institutions and European stakeholders.
- ❑ Involve relevant stakeholders in the necessary standardization activities in order to understand the different requirements.

# China-European Cooperation on Standardization & Certification (2)

- ❑ Participants
- ❑ Approach
  - ❑ Fact finding and structuring
  - ❑ Prioritization of topics
  - ❑ Detailing and project recommendations
- ❑ Working groups
  - ❑ Overall Car Safety
  - ❑ Battery Safety
  - ❑ Charging infrastructure

# China-European Cooperation on Standardization & Certification (3)

- Charging infrastructure is the area of a NEV with the strongest link to ICT standards and standards management.



# China-European Cooperation on Standardization & Certification (4)

- ❑ Relevant standards cover
  - ❑ Connectors (e.g. plugs, socket-outlets, couplers, inlets)
  - ❑ Communication (e.g. communication protocols)
  - ❑ Safety (e.g. supply, batteries)
  - ❑ Charging topology (e.g. charging station, conductive connection)

# China-European Cooperation on Standardization & Certification (5)

## Connectors

### AC

- ❑ Decision EU Commission for Type 2
- ❑ China has already adopted a variant of the Type 2 connector as its standard =>

**Safety risk!**

### DC (fast charging)

- ❑ CHAdeMO connector
- ❑ Use of different connectors to allow for different currents
- ❑ Harmonization with international standards not clear for China



# China-European Cooperation on Standardization & Certification (6)

## Communication

- ❑ Combined Charging System; universal charging system for fast loading.
- ❑ Agreement of EU Auto Manufacturers on power-line com using, e.g. “Home Plug Green PHY”.
- ❑ Chinese solution seems to be geared towards separate communication channels.
- ❑ No final decision has yet been made.

Both sides are aware that additional communication channels will be needed for a full integration of batteries of NEVs into future Smart Grids.

# China-European Cooperation on Standardization & Certification (7)

## Testing and Homologation

- ❑ Based on existing specifications for the “low voltage” area. Since charging currents generally exceed the limits set for “low voltage”
  - ❑ Combination of various testing standards (mostly for power supply of 220/380V)
- ❑ No specific homologation requirements in Europe and China.

# Conclusions (1)

- ❑ Standardization management is influenced by national approaches.
- ❑ Stakeholders recognize the differences and subsequently try to influence the trajectory of technology by using standardization as a strategic instrument.

# Conclusions (2)

- ❑ Charging is the most urgent NEV standardization issue
  - ❑ Standards are nationally defined but no existing testing procedures for charging poles, wall boxes (or home-chargers), cables and plugs.
  - ❑ No existing global set of standards for the charging infrastructure dedicated to electric vehicles.
  - ❑ Unclear what regulations and standards shall be applied, the ground for any meaningful and comprehensive certification scheme is not yet in place.

# Conclusions (3)

- ❑ e-mobility and NEVs will be a major field of innovation throughout the coming decades.
- ❑ Ensuring sustainable mobility is one of the prerequisites for economic growth, and transport and automotive industries are still major industrial sectors of enormous relevance for example in Europe and in China.

# Thank you for your attention!



[martina.gerst@ed.ac.uk](mailto:martina.gerst@ed.ac.uk)