

**eVS | 27**

The 27th **INTERNATIONAL  
ELECTRIC VEHICLE  
SYMPOSIUM & EXHIBITION.**

Barcelona, Spain  
17th-20th November 2013

# **Beyond the Plug and Socket: Towards Safe Standardized Charging Infrastructures**

**Pascal Blockx, Peter Van den Bossche**

Vrije Universiteit Brussel, MOBI, pblockx@vub.ac.be, pvdbos@vub.ac.be

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- Background
- Conductive charging standardisation
- Charging accessories
- Residential charging
- Conclusion

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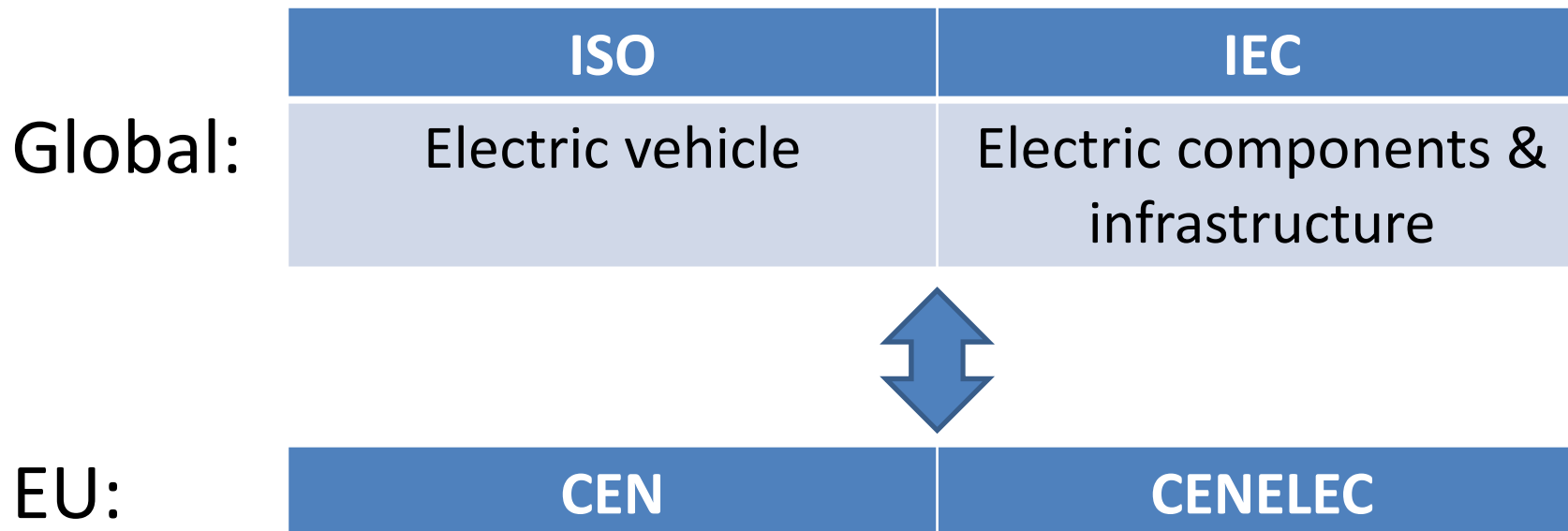
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EV: Road vehicle & electrical device



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### Develop & review standards

- Interoperability
  - Electricity supply point ↔ EV charger
  - EV charger ↔ EV
- Smart charging
- Safety risks & EM compatibility

Co-op of CEN, CENELEC & ETSI

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- Focus group
  - Recommendations for EV standardization
- Electro Mobility Co-ordination group
  - Support standardization activities
- EU directive proposal: EU clean fuel strategy
  - 7.900.000 charging points in 2020
  - 10% public

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Main reference: IEC61851

- Part1 (2001) - general requirements → revised 3d edition
- Part 2
  - Part 21(2001) split: 21-1/2 about EMC  
Vehicle requirements to ISO17409
  - Part 23 & 24(FDIS end 2013) - d.c. charging
- Part 3 :LEV

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- Mode 1:
  - Standard sockets, non-dedicated infrastructure
  - uncertainty of electric installation
- Mode 2:
  - ICCB protection (IEC 62752)
  - Still on non-dedicated infrastructure
  - Occasional charging

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- Dedicated equipment
- Control pilot (IEC 61851-1)
  - Proper connection
  - Earth
  - Ampacity
  - (de-)energization
- Safety
- Recommended by focus group

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- Domestic plugs
  - Long time operation
  - Frequent disconnection
  - Exposure
- Industrial plugs (IEC 603099-2)
  - Safer
  - Lack of user-friendliness
  - Better than domestic



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- IEC 62196
- Three phase: 5 power contacts + 2 auxiliary

– Type 2:



– Type 3



- Type 2 selected in proposed EU directive

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### IEC 62196-2 connectors

- Type 2&3
- Type 1: 1 fase 30A
  - USA & Japan
  - Vehicle connector only
  - SAE-J1772



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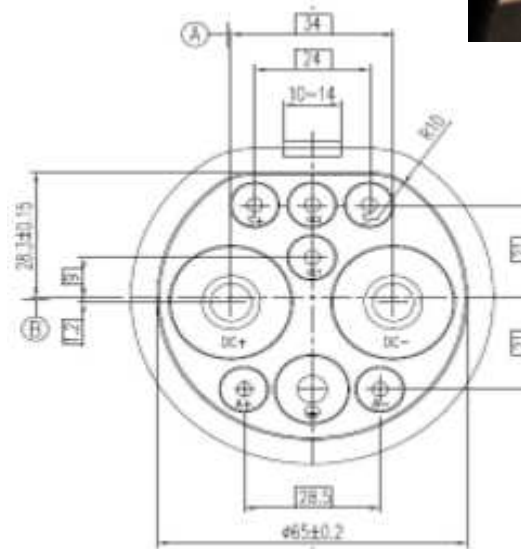


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3 families d.c. connectors:

- CHAdeMO
  - Only d.c.
  - Japan & USA
  
- Chinese NC
  - Only d.c.



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- Combo connector
  - Type 1 or 2
  - d.c.
- Commutable pins
  - 3f, 1f +dc, dc
  - Safety concerns



- EU directive: Combo Type2

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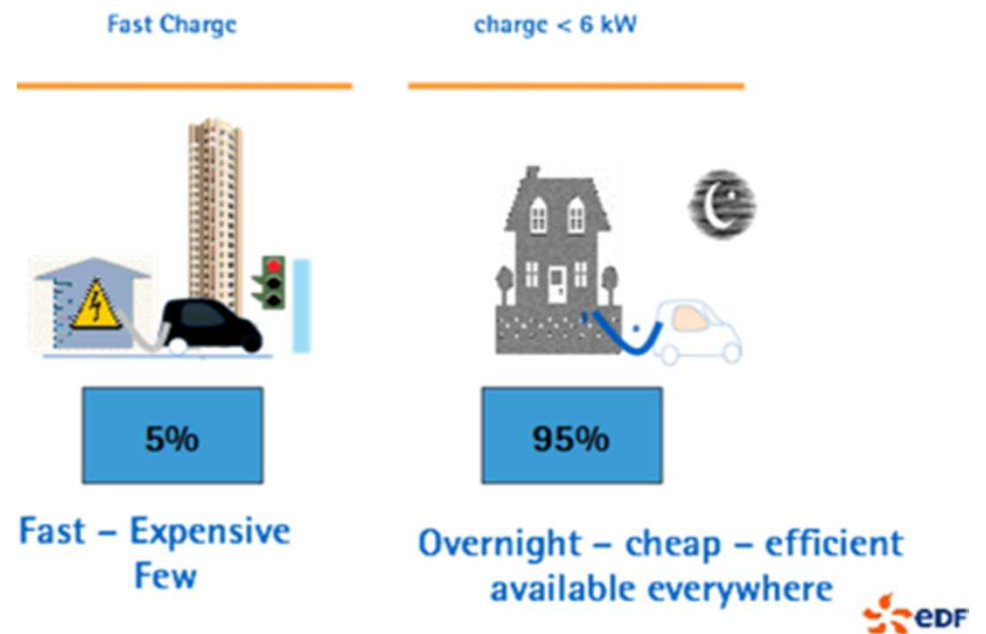
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- Most charging at home
- Existing infrastructure
- Smart Grid
- Formation for electricians



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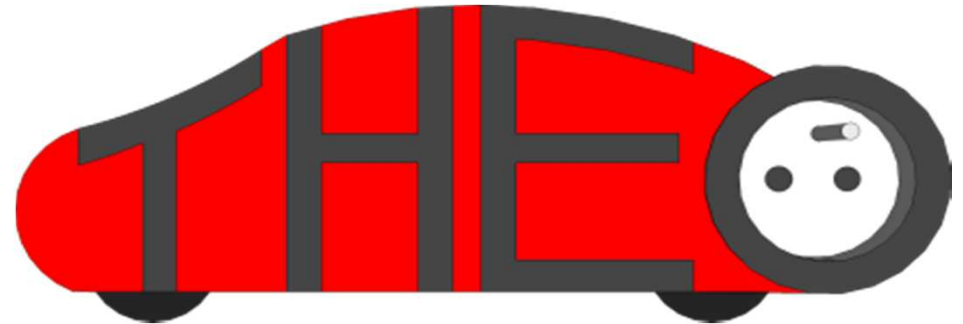
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- Flemish funded project
- User committee
- Gathering information & workshops
  - Charging stations
  - Installation techniques
  - Security & standard conformity



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### Other activities:

- Support SME's with own products
- New mode 3 communication & V2H
- Synergy with solar panels & CHP

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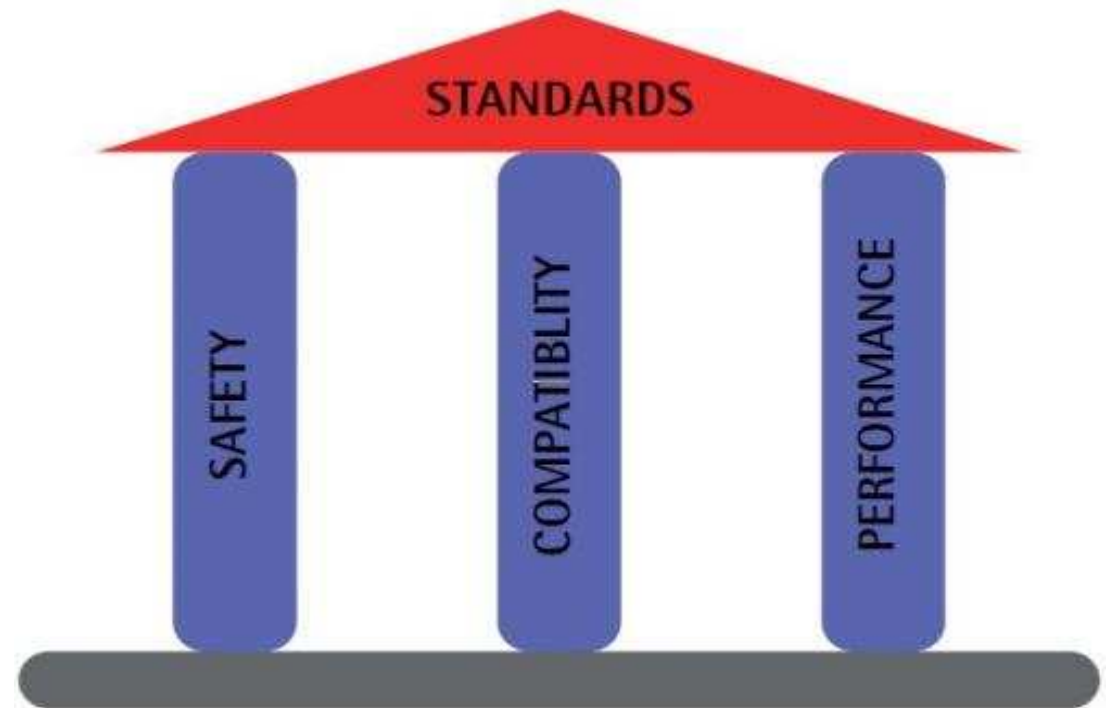


EV charging key issue

- EMC and electric protection
- Universaly usable
- Energy measurment

Battery SoC / SoH

→ Unified solutions!



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