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VAKGROEP INDUSTRIËLE
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(INDI)



Electrically propelled vehicles standardization in Europe

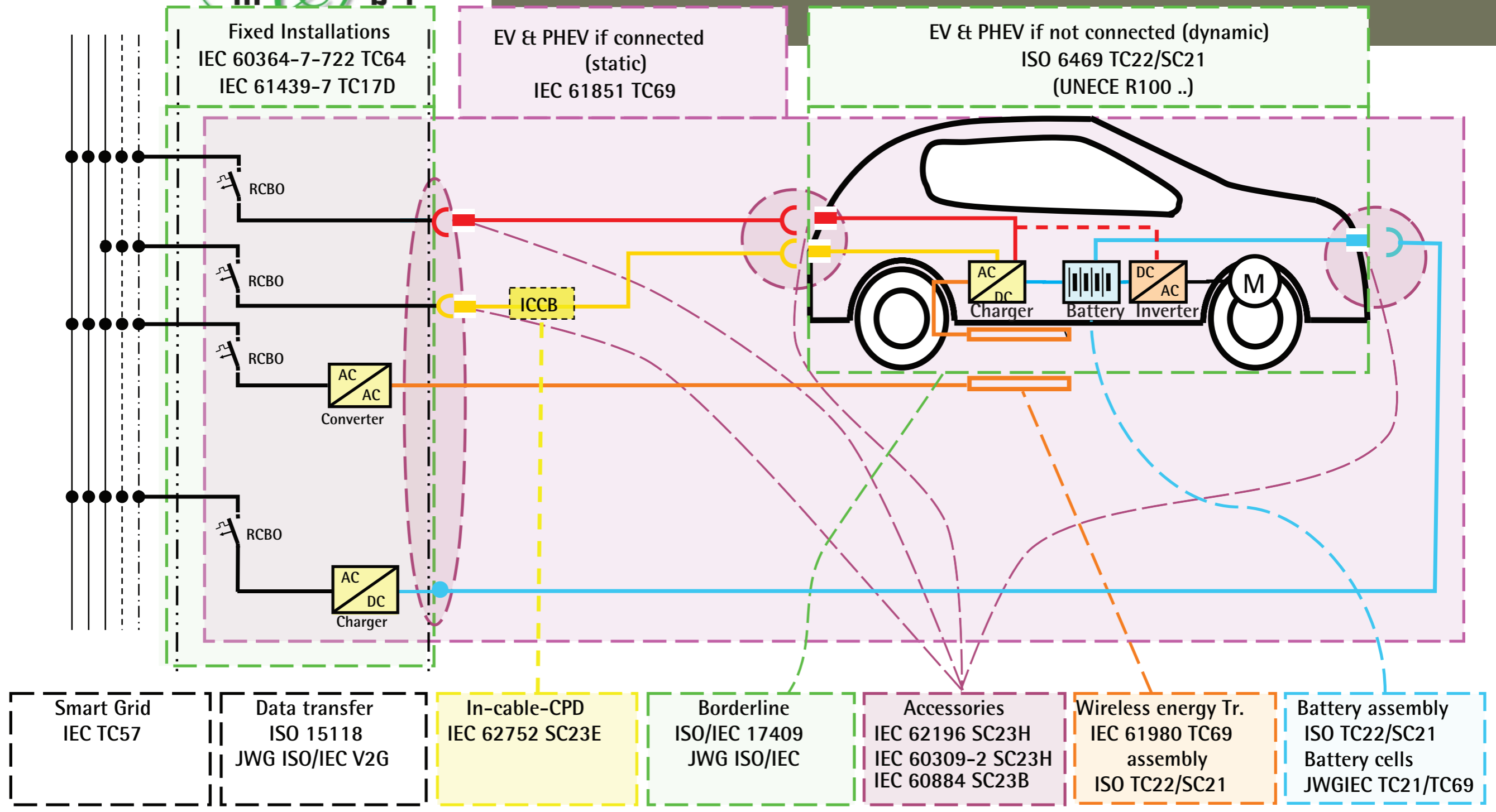
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Overview

- Evolution of standardization activities
 - Where do we come from?
 - Where do we go?
- Global development
- European development

EV Standardization Landscape





Historical development

- IEC TC69: Founded 1969
- ISO TC22 SC21 founded in 1973
- Difference in standardization culture

ISO TC22 SC21	IEC TC69
Aspects related to the electric vehicle as a whole	Aspects related to electrical components and electric supply infrastructure



ISO: vehicle-oriented

- Vehicle safety (ISO 6469 series)
- Vehicle performance
- Battery as a system (ISO 12405 series)



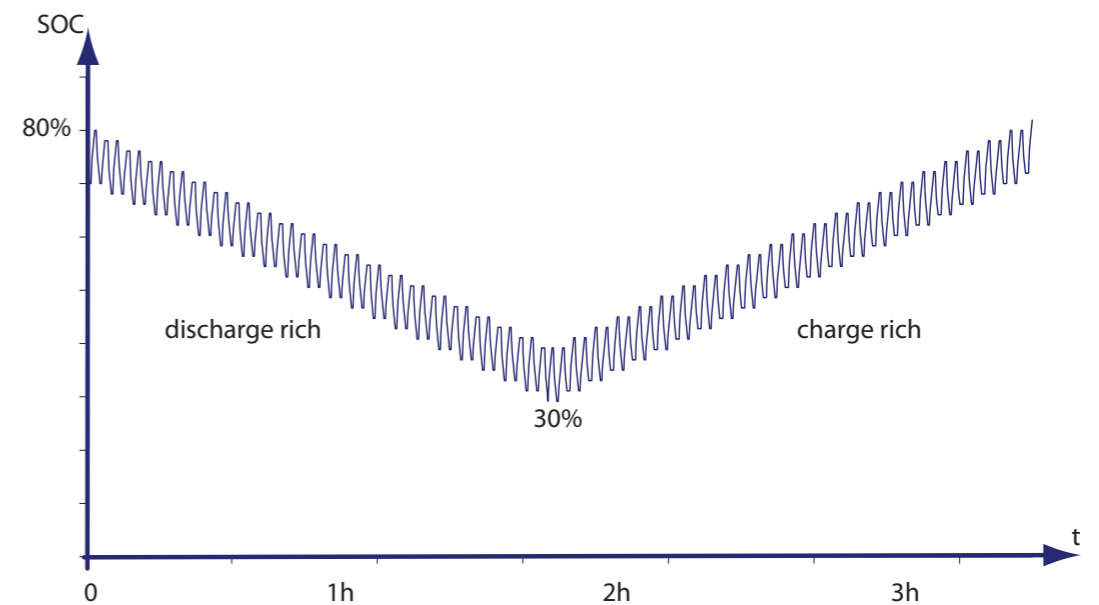
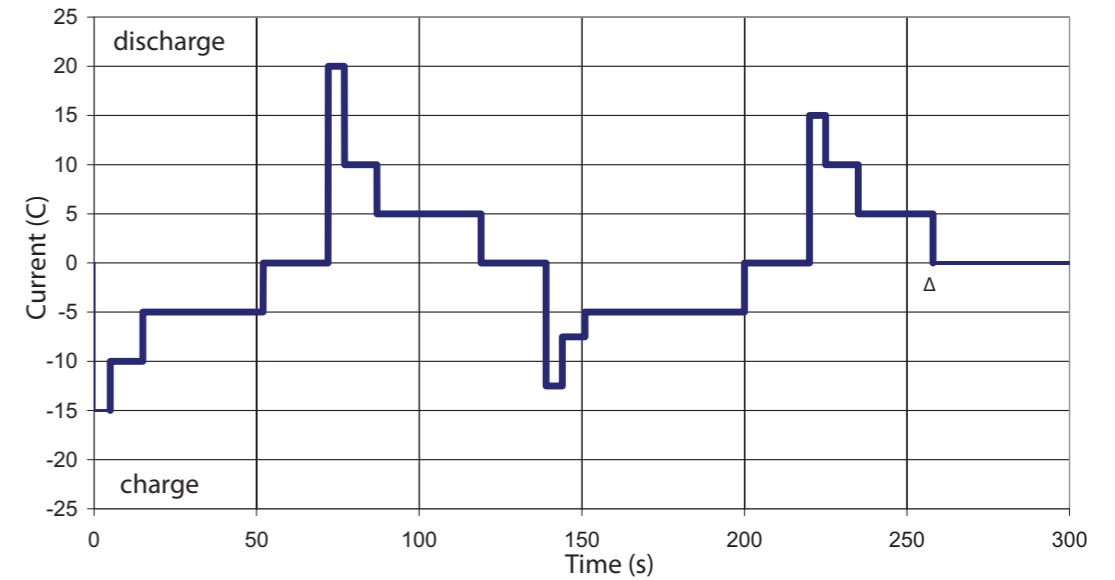
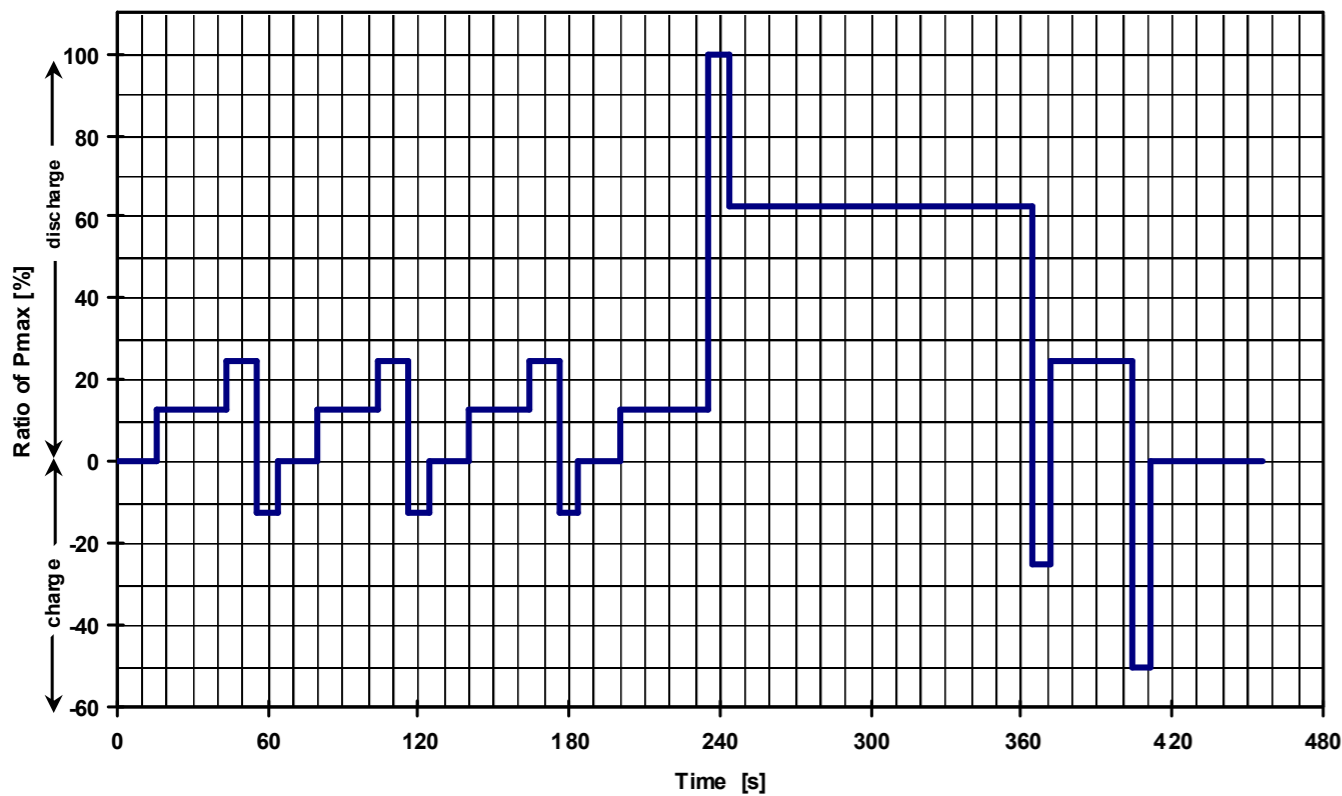
IEC: components and infrastructure

- Drive train components: no interest in standardization
- Batteries (JWG TC21/SC21A/TC69)
 - IEC61982: non-lithium
 - IEC62660: lithium (cells and modules)
 - IEC62576: capacitors
 - Test cycles corresponding to real operation in a specific application



Battery cycles

- For BEV or HEV





Infrastructure standards (TC69)

- Conductive charging: IEC 61851
 - Definition of “charging mode” concept
 - Mode 1: non-dedicated outlet
 - Mode 2: non-dedicated outlet, in-cable control box
 - Mode 3: dedicated outlet, control pilot
 - Mode 4: d.c. charging
 - 3rd edition being prepared
- Wireless charging: IEC 61980



Interactions

- Vehicle issues (ISO TC22 SC21)
- Accessories (IEC SC23H)
- Low voltage installations (IEC TC64)
- Assemblies (IEC SC17D)
- Smart grid (IEC TC57)



Accessories

- Plugs, sockets and connectors for a.c. and d.c.





Charging communication

- Basic control pilot function in Mode 3
- Specific d.c. communication with battery
- High level communication between vehicle and charging post: ISO/IEC 15118
- Development of advanced and complex business models (billing, roaming, etc.)



European standardization

- CENELEC TC69X
- 1990s: parallel work with IEC
 - not efficient
- Dormant 2000s when IEC documents published
- Reactivation 2012



The Mandate

- Mandate M/468
- Issued by European commission June 2010
- Addressed to CEN, CENELEC and ETSI
- Ensure interoperability, connectivity, safety and electromagnetic compatibility
- CEN/CENELEC Focus Group to make recommendations in response to mandate
 - Collaboration between relevant committees and European standard organizations
 - Standardization needed for interoperability



Draft directive

- January 2013
- Development of infrastructure
- Mode 3 charging
- Type 2 accessories for a.c.
- Combo accessories for d.c.
- Under preparation with consultation of CEN/
CENELEC Steering Group

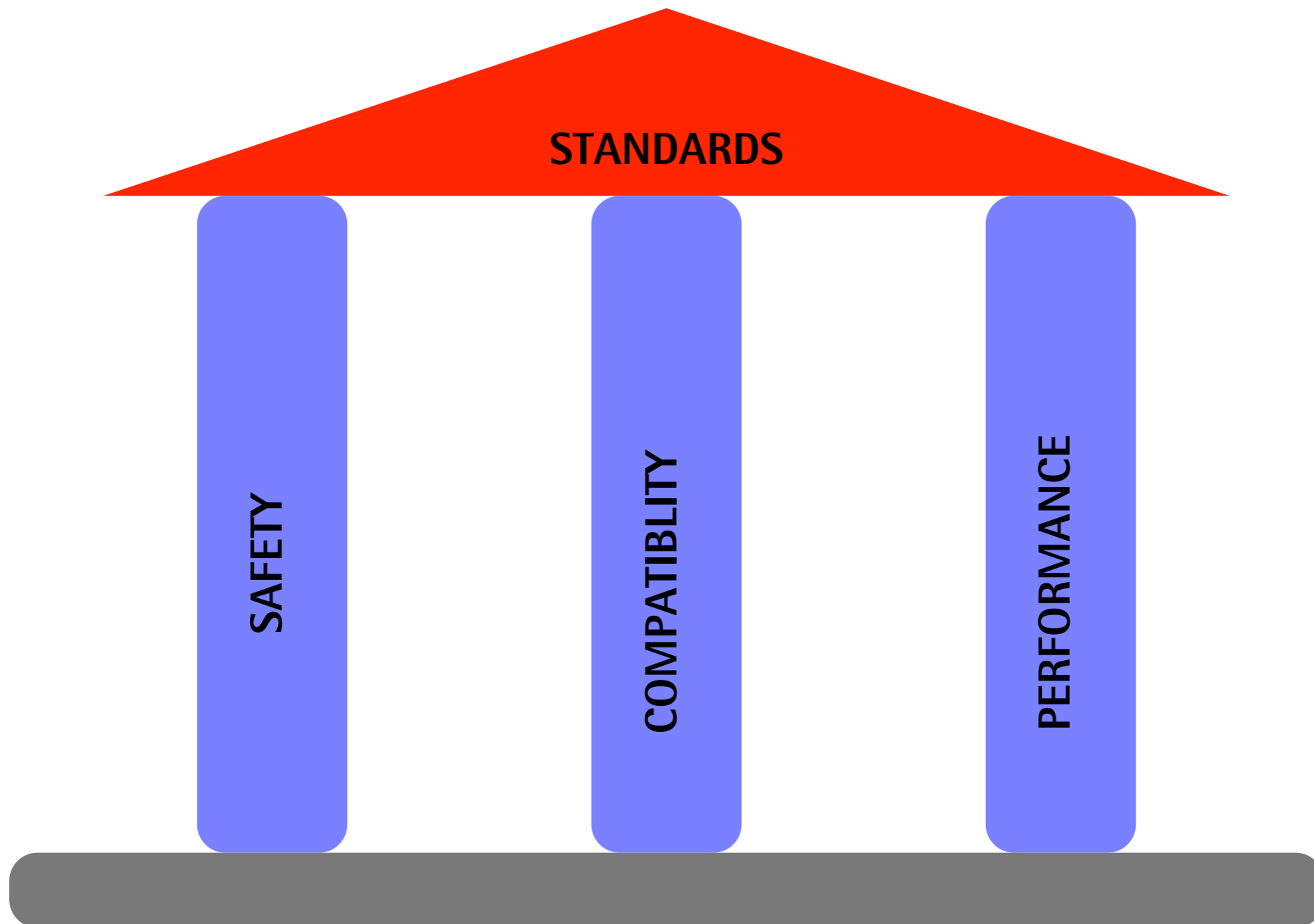


Standardization process

- European committees (CLC TC69X and CEN TC301) reactivated
- Avoid parallel work: follow work on international level (IEC, ISO) and adapt international standards as EN
- European work only where deemed necessary for specific European requirements



House of Standardization





So many committees, so many standards...

- Sectoral division: IEC versus ISO
 - Field of competence
 - Standardization culture: electrical and automotive
- Regional division:
 - international standards
 - European standards
 - national standards
- Regulations versus standards
- But they all have to agree....



State of standardization

- **Standardization:**
a microcosmos of society
 - Players
 - Interests
 - Interactions
 - Cultures



The strength of standards

- Bottom-up process
- Drafted by technical experts
- Established by consensus
- Aimed at the achievement of the optimum degree of order in a given context
- Democratic voting process



The problems

- Slow process due to consensus principle
- Plethora of conflicting standards
- Overstandardization

"Standardization is a useful servant, but a bad master"

N.F. Harriman, 1928



Where do we go from here

- The ideal of infrastructure standards
 - **Any vehicle should be able to safely charge anywhere**



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Thank you!

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