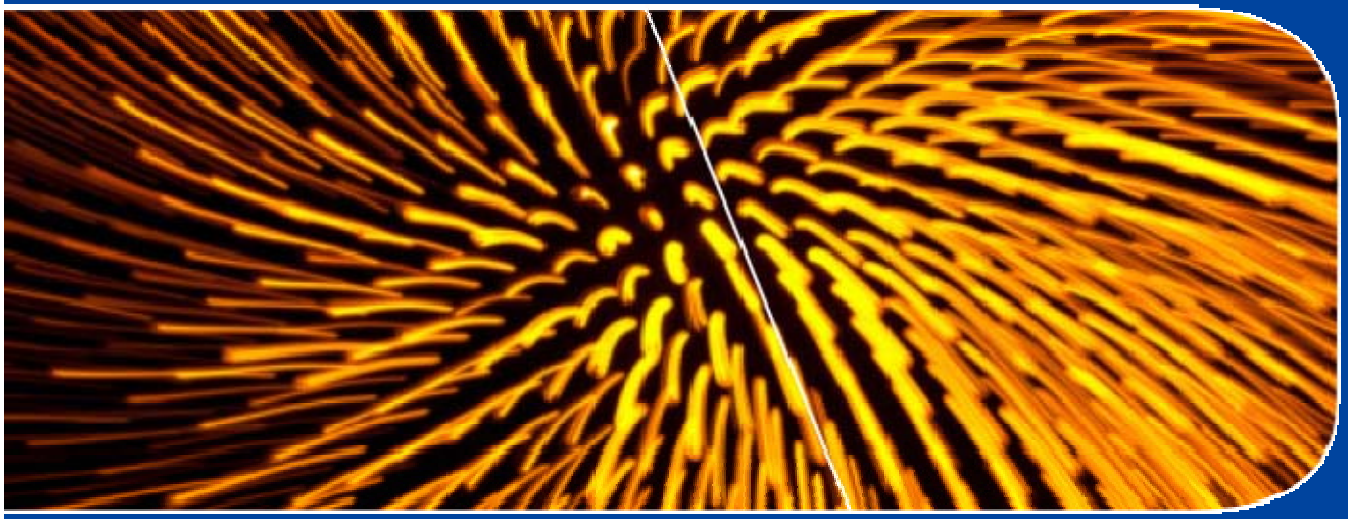

Electric vehicle standardization in Europe?

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- How we have geared up for eMobility
- What we are hoping to recommend
- What happens next?

Three actors – one framework

The European Committee for Standardization

The European Committee for Electrotechnical Standardization

The European Telecommunications Standards Institute

- = the European Standards Organizations ("ESOs")
- Recognised under European Union legislation
- CEN-CENELEC have now 31 national members (EU, EFTA, Croatia) and 19 affiliates (applicants, neighbours)

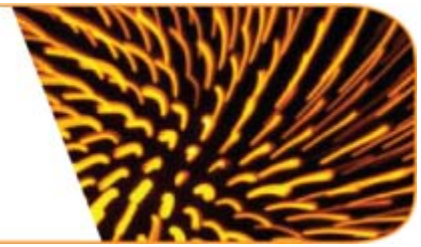
European standardization and a single market

- Much early standards work was required to remove internal trade barriers within the European Union
- One standard = no technical obstacles to placing products on the market
- Standards often linked to legislation
- European Standards implemented as national standards by our members – conflicting standards withdrawn
- But we are still 31 *(sic)* countries
- Still national regulations – the European electrical plug and socket case-study!
- How do we overcome these barriers and remain in line with global developments?

A global system…

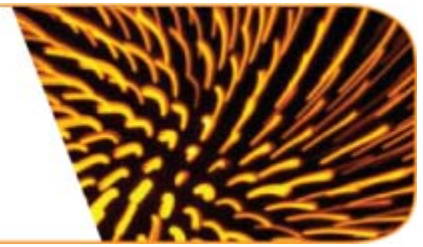
- CEN is the European partner of ISO – the International Organization for Standardization, CENELEC of IEC – the International Electro-Technical Commission
- 80 per cent of IEC standards are also implemented as European Standards, some 40 per cent of ISO standards
- We have agreements (CEN-ISO=Vienna Agreement, CENELEC-IEC=Dresden Agreement)
- Avoidance of duplication, tradition of work sharing etc.

...meeting European needs



- CEN and CENELEC have combined back offices
- Most of our national members are the same bodies
- Some topics for standards are converging
- So, as of 1 January 2010, we have the CEN-CENELEC Management Centre under one Director-General
- Efficiency savings in support functions; better synergies
- We are still two sovereign entities - but maybe this convergence helps for eMobility?

Where we're starting from



- Our vehicle standards work in Europe has been limited:
  - Legacy stuff – some early electric vehicle standards
  - Vehicle pollution requirements in support of EU Regulations
  - Intelligent Transport standards – electronic road tolling, driver information etc
- Political and market pressures –"Paris to Berlin via Brussels"
- Frantic experiment – "Amsterdam to Rotterdam"
- EU vehicle industry as a gigantic employment generator, needs to take advantage of even chances

The European mandate

- Mandate = Commission/EFTA request to the European Standards Organizations (ESOs), endorsed by Member States
- A mandate on electric vehicle standards issues has been given
- Request to produce a “standards work programme” by spring 2011, and the necessary standards within 18 months
- This is fast – but don’t forget we don’t re-invent the international wheel…

What are we asked to do?

- The ESOs are asked to develop European standards or to review existing standards in order to:
  - Ensure interoperability and connectivity between the electricity supply and on-board chargers of electric vehicles, so that they can be connected and be interoperable in all EU States
  - Ensure interoperability and connectivity between “off-board” chargers and the electric vehicle and removable batteries
  - Consider any smart-charging issue with respect to the charging of electric vehicles
  - Consider safety risks and electromagnetic compatibility of the charger of electric vehicles in the field of relevant Directives

How are we doing it?

- We have created a Joint Working Group ("Focus Group") CEN-CENELEC, with participation of ISO, IEC, ETSI
- Representatives of technical activities, interested associations, CEN-CENELEC national members, Commission etc
- Note the Focus Group is not preparing standards as such!
- Focus Group Tasks:
  - Prepare an overview of European requirements for electric vehicle standards
  - Match these against existing international standards and all relevant work in progress in standards bodies
  - Recommend how missing issues should be covered by standardization, by whom and on what timescale
  - Propose how ESOs respond to European Commission mandate

What are the real issues?

- We're trying to understand:
  - Commercial initiatives from global players > conflicts
  - Differences in regional electrical supply requirements (Japan/US/Europe) > options
  - Differences in national wiring rules in Europe > interoperability issues
  - Different needs for home charging, fast charging, types of vehicle etc. > technical detail
- Some standards issues are more developed than others
- "Chicken and egg"- lack of standards may deter roll-out, implementation may be needed to standardise

An interesting challenge

- Many participants active in international standardization but there are multiple committees
- Clash of standards cultures?
- Complex links between standards and regulation in Europe
- A too-short timescale
- Consequence – Focus Group has delayed its delivery…
- Report and recommendations now for mid-May

A question of maturity?

- Are we being too fast? Why not let the market mature before putting standards in place?
- Are we being too slow? How can we ensure a vehicle market without a standardised infrastructure?
- Are we being too complex? What are the barriers to prevent cars being plugged into domestic supplies?
- Are we being too detailed? What are the barriers in national wiring rules that prevent one solution for Europe, which everyone wants?
- Are we in a hype curve? What is the business model for financing an interoperable electronic charging infrastructure – how do we keep the costs manageable?

Vehicles à la mode

- Mode 1 - domestic circuits AC at home
- Mode 2 - AC charging with “industrial” sockets – at home or at work, in apartment block garages and business places
- Mode 3 - dedicated AC charging stations
- Mode 4 – DC fast charge

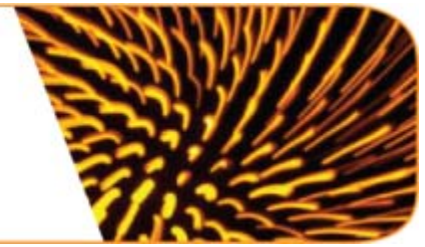
Connecting to the mains – on the wall

- Modes 1 and 2 – maybe used a lot at the start?
- Use of adapters where required – but are domestic circuits always OK, are the national rules consistent, do existing standards need adjustment? ***URGENT***
- Mode 3 - draft IEC 62196 Part 2 has several options, but we need interoperability for Europe – we have to find a solution ***URGENT***
- Mode 4 - not a problem (charger off the vehicle)

Connecting to the mains – at the vehicle – and charging it…

- Modes 1, 2, 3 - different types of inlet are specified in IEC standards
- Do we need to specify one or can we leave a choice?
- Mode 4:
  - competing solutions at present
  - European OEMs would like one combined with AC
  - IEC standards may still need options
  - inductive charging – the future challenge
- Europe needs to move towards harmonised solution (incl. with US?)

Vehicle communication issues



- These are less mature
- Low-level communication for AC and DC charge control and safety functions are defined in the IEC 61851 series
- Higher-level communication V2G:
  - work in joint ISO/IEC WG defining power-line communication between vehicle and charging device, defining message content
  - signals for load control for the optimization of the grid and electricity usage, and mobility services (link to the grid issues)
  - use of existing data channels that will also be used on in thermal vehicles (ITS, 3G, WiFi)
  - final choice of physical layer between vehicle and charging post may have a major influence on choices made for smart grid (and the “smart home”)

Other issues

- Battery issues:
  - interoperability challenges: dimensional standards of battery and modules for EVs, interface systems, electric cycle batteries, safety, supply chain, battery switching stations
- Safety/EMC – standards are there but were not designed for eMobility issues, need adapting, sometimes complex issues
- Basically:
  - urgent - the pan-European connectors and chargers, ie so interoperable infrastructure can be created
  - a lot of other detail needs sorting out
  - there are some medium and longer-term challenges for DC and for communication
  - “medium-term” still means “get on with it now”

Next steps

- Report and recommendations mid-May
- NO proposals for European Standards work unless specifically justified – but there will be such (local needs, timing issues)
- Need to discuss aspects addressed to ISO and IEC with them
- There need to set up any technical groups fast
- We need a collaboration mechanism to:
  - monitor progress internationally and by regulators etc
  - ensure that CEN and CENELEC TCs work in collaboration
- BTW – we've a similar work on smart grids: eMobility communication issues should be addressed there…

Transatlantic collaboration

- Setting up a dialogue with ANSI:
  - being here, thanks for the invitation
  - regular ANSI-ESO “standards summits”, next one in October
  - need to exchange information, collaborate if required
  - but our members and ANSI are both in ISO and IEC…
- Transatlantic Economic Co-operation:
  - high-level regulatory and business dialogue
  - is discussing collaboration on eMobility issues, including standards
  - is also interested in longer-term issues, e.g. inductive charging
- We’ll let ANSI Panel have our report and would appreciate observations

Thank you!

Standards – essential to help electric vehicles achieve their potential

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