



# “Seminar on Safety and Compliance requirements of EV Technologies “

Organized by CII-IQ and Defence Institute of Quality Assurance

## Session 3: EV Ecosystem: Standards, Conformity Assessment for future

**Topic:** European regulatory and standard requirements related to EV infra with focus on safety requirements

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# Outline

- ✓ About EU Project SESEI
- ✓ In brief EU Scenario around Electric Vehicle
- ✓ EU : Key Directives, Regulation, Policy initiatives and Standardization
- ✓ EU-India Partnership
- ✓ Conclusion



# Project is a permanent presence in India

*SESEI (Seconded European Standardization Expert in India) is a local face for the European standardization community in India: Dinesh Chand Sharma*



CENELEC



**Why SESEI:** India is a major trade partners for Europe, Increasing role of standards to gain market access and Evolving & complex nature of regulatory and standardization landscapes, sharing best practices, and work together on topics of mutual interest..

## Priority Sectors/topics:

### **Digitization: Strategic technologies, digital governance, and digital connectivity**

Smart Cities/Urban Development, ITS, Quantum Technologies, Smart Grid/Meter, Artificial Intelligence, 5G/6G, Open RAN, M2M/IoT (Cyber-Physical Systems), DECT, Data Privacy, Satellite Communication, Blockchain, Digital Signature, Smart Manufacturing, e-Accessibility, cybersecurity, digital skills, digital platforms including Research and Innovation etc.

**Green & Clean technologies :** Clean Energy, Energy Efficiency (Green ICT), Environment, Circular Economy including Resource Efficiency, Waste Management, Energy storage technologies, **Electric mobility**, Green Hydrogen, Advanced biofuels including R&I etc.

**Other topics** of mutual interests such as Rail, Ropeways, Machinery Safety etc.

[www.sesei.eu](http://www.sesei.eu) , [www.sesei.in](http://www.sesei.in) , [www.eustandards.in](http://www.eustandards.in)



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Standardisation  
Expert in India  
Enabling Europe-India Cooperation on Standards

# EV Market Scenario: Europe

- EU transport sector contributes around 5% to EU GDP and employing more than 10 million people
- Today, transport emissions represent around 25% of EU's total greenhouse gas emissions, and these emissions have increased over recent years
- Just like rest of world, Europe has started adopting Electric Vehicles (EVs).
- Electric mobility could help EU to achieve its goals of reducing:
  - greenhouse gas emissions,
  - air pollution,
  - noise and dependence on oil
- Number of EVs is growing in Europe, every year
  - For example, electric car registrations for 2023 made up 23.6% in share of total new car registrations, according to preliminary data.
- As of 2023, EU has over 630,000 public charging stations for EVs
  - both AC and DC chargers



# EU: Key Directives, Regulation, Policy initiatives



# Key Policies initiatives: Europe

- European Green Deal:

- Promotes green mobility and sets clear targets to reduce 90% greenhouse gas emissions from transport by 2050.

- Sustainable and Smart Mobility strategy:

- As part of EGD, this strategy lays the foundation for how the EU transport system can achieve its green and digital transformation and become more resilient to future crises.
- at least 30 million zero-emission cars on European roads by 2030 and nearly all cars, vans, buses as well as new heavy-duty vehicles will be zero-emission by 2050
- zero-emission large aircraft will be market-ready by 2035
- deliver EGD targets, by a smart, competitive, safe, accessible and affordable transport system



# EU Directives/Regulations

- [Regulation \(EU\) 2023/1804](#) on deployment of alternative fuels infrastructure sets out minimum requirements -> Standards needed
  - Electric recharging points
  - Hydrogen refuelling points
  - Natural gas refuelling points
  - Fuel labelling
- (39) The safety and security of users, particularly at unattended recharging stations, could be addressed by equipping the recharging stations with emergency buttons, displaying emergency services contact information, ensuring adequate lighting or by any other appropriate measures.
- Regulation applies to road vehicles, trains, vessels, stationary aircraft, and areas without mandatory Union-wide targets
- [Directive \(EU\) 2019/1161](#), amending Directive 2009/33/EC, on the promotion of clean and energy-efficient road transport vehicles
  - Sets out minimum targets for 'clean' (low- and zero- emission) vehicles in public procurements
  - Promotes better coordination of mobility and urban planning, such as through sustainable urban mobility plans (SUMPs)



# EU Directives/Regulations

- **Energy Performance of Buildings Directive (EU/2024/1275)** aims to improve the energy efficiency of buildings and reduce the EU's carbon emissions
  - Roll-out of recharging points for EVs in buildings, removing barriers to their installation, enabling smart charging and introducing measures for bike parking in buildings
- **Renewable Energy Directive EU/2023/2413 (amendment)** provides a legal framework for developing clean energy, including electric vehicles (EVs)
  - Supporting the roll-out of public recharging infrastructure
  - Encouraging the maximum use of renewable energy in recharging sessions





# EU Directives/Regulations

- [Battery Regulation \(EU\) 2023/1542](#): helps ensure EV batteries are a safer, more efficient, and more sustainable option for consumers and businesses alike.
  - Reduce the environmental impact of battery manufacturing and use.
  - **Ensure that batteries meet strict safety standards for consumers and workers**
  - Improve battery manufacturing efficiency and sustainability
  - Enhanced traceability & battery passports



# EU: Standardization work



# Standardization

- Three recognized ESOs are: ETSI, CEN & CENELEC
- Standardization mandate [M/468](#) on charging of Electric Vehicle: addressed to CEN and CENELEC and ETSI concerning the charging of EVs
- CEN and CENELEC, through its various technical committees are developing standards for the transport sector, particularly regarding interoperability and safety requirements.
  - In addition, CEN and CENELEC are also deeply involved in another critical area for the transport industry: addressing the environmental impact and promoting the circularity of materials used in vehicles and transport infrastructure.



# EU: Overview of main safety and charging standards

## Safety & Security:

EN ISO 17409:2020  
EN 61140:2016  
EN 62040-1  
EN 60529  
EN ISO 18243:2019  
EN ISO 18246:2023  
EN ISO 19363:2021  
EN IEC 62840-2:2019  
EN ISO/IEC 27000 family  
etc.

## Connector:

EN IEC 62196-1  
EN IEC 62196-2  
EN IEC 62196-3  
EN IEC 62196-6



## Charging Topology:

EN IEC 61851-1:2019  
EN 61851-21-  
1:2017/AC:2017-11  
EN 61851-23:2014/AC:2016-  
06 etc.

## Communication:

EN 61851-24:2014  
CLC IEC/TS 61851-3-7:2023  
EN 61850

# CEN: TC 301 – Road Vehicles

Reference	Title
EN ISO 17409:2020	Electrically propelled road vehicles - Conductive power transfer - <b>Safety requirements</b>
EN ISO 18243:2019	Electrically propelled mopeds and motorcycles - Test specifications and <b>safety requirements</b> for lithium-ion battery systems
EN ISO 18243:2019/A1:2020	Electrically propelled mopeds and motorcycles - Test specifications and <b>safety requirements</b> for lithium-ion battery systems - Amendment 1
EN ISO 18246:2023	Electrically propelled mopeds and motorcycles - <b>Safety requirements</b> for conductive connection to an external electric power supply
EN ISO 19363:2021	Electrically propelled road vehicles - Magnetic field wireless power transfer - <b>Safety and interoperability requirements</b>

# CENELEC: TC 69X – Electrical systems for electric road vehicles

Reference	Title
EN 61851-24:2014	Electric vehicle conductive charging system - Part 24: Digital communication between a d.c. EV charging station and an electric vehicle for control of d.c. charging
CLC IEC/TS 61851-3-7:2023	Electric vehicles conductive charging system - Part 3-7: DC EV supply equipment where protection relies on double or reinforced insulation - Battery system communication
CLC IEC/TS 61851-3-2:2023	Electric vehicle conductive charging system - Part 3-2: DC EV supply equipment where protection relies on double or reinforced insulation - Particular requirements for portable and mobile equipment
EN IEC 62576:2018	Electric double-layer capacitors for use in hybrid electric vehicles - Test methods for electrical characteristics
EN 61851-21-1:2017/AC:2017-11	Electric vehicle conductive charging system - Part 21-1: Electric vehicle on-board charger EMC requirements for conductive connection to an AC/DC supply
EN IEC 61980-1:2021	Electric vehicle wireless power transfer (WPT) systems - Part 1: General requirements
CLC IEC/TS 61980-3:2020	Electric vehicle wireless power transfer (WPT) systems - Part 3: Specific requirements for the magnetic field wireless power transfer systems
EN IEC 61980-3:2022	Electric vehicle wireless power transfer (WPT) systems - Part 3: Specific requirements for magnetic field wireless power transfer systems
EN IEC 61980-2:2023	Electric vehicle wireless power transfer (WPT) systems - Part 2: Specific requirements for MF-WPT system communication and activities
EN IEC 63119-2:2022	Information exchange for electric vehicle charging roaming service - Part 2: Use cases
EN IEC 61851-1:2019/AC:2023-12	Electric vehicle conductive charging system - Part 1: General requirements
EN IEC 61851-1:2019	Electric vehicle conductive charging system - Part 1: General requirements
CLC IEC/TS 61980-2:2020	Systèmes de transfert de puissance sans fil (WPT) pour véhicules électriques - Partie 2 : Exigences spécifiques en matière de communication entre un véhicule électrique routier et l'infrastructure
CLC IEC/TS 61851-3-4:2023	Electric vehicles conductive charging system - Part 3-4: DC EV supply equipment where protection relies on double or reinforced insulation - General definitions and requirements for CANopen communication
EN IEC 63119-1:2019	Information exchange for electric vehicle charging roaming service - Part 1: General
EN 61851-23:2014	Electric vehicle conductive charging system - Part 23: DC electric vehicle charging station
EN 61851-23:2014/AC:2016-06	Electric vehicle conductive charging system - Part 23: DC electric vehicle charging station
EN IEC 62840-2:2019	Electric vehicle battery swap system - Part 2: Safety requirements
CLC IEC/TS 61851-3-5:2023	Electric vehicles conductive charging system - Part 3-5: DC EV supply equipment where protection relies on double or reinforced insulation - Pre-defined communication parameters and general application objects
EN IEC 63110-1:2022	Protocol for management of electric vehicles charging and discharging infrastructures - Part 1: Basic definitions, use cases and architectures
EN IEC 61851-21-2:2021	Electric vehicle conductive charging system - Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply - EMC requirements for off board electric vehicle charging systems
EN 61851-21-1:2017	Electric vehicle conductive charging system - Part 21-1: Electric vehicle on-board charger EMC requirements for conductive connection to an AC/DC supply
CLC IEC/TS 61851-3-6:2023	Electric vehicles conductive charging system - Part 3-6: DC EV supply equipment where protection relies on double or reinforced insulation - Voltage converter unit communication
EN 61851-24:2014/AC:2015	Electric vehicle conductive charging system - Part 24: Digital communication between a d.c. EV charging station and an electric vehicle for control of d.c. charging
EN IEC 61851-25:2021	Electric vehicle conductive charging system - Part 25: DC EV supply equipment where protection relies on electrical separation
CLC IEC/TS 61851-3-1:2023	Electric vehicles conductive charging system - Part 3-1: DC EV supply equipment where protection relies on double or reinforced insulation - General rules and requirements for stationary equipment

# CLC/TC 23H- Plugs, Socket-outlets and Couplers for industrial and similar applications, and for Electric Vehicles

Reference	Title
EN 62196-3:2014	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3: Dimensional compatibility and interchangeability requirements for d.c. and a.c./d.c. pin and contact-tube vehicle couplers
EN 62196-1:2014	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements
EN 62196-2:2017	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 2: Dimensional compatibility and interchangeability requirements for a.c. pin and contact-tube accessories
EN IEC 62196-1:2022	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements
EN IEC 62196-3:2022	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3: Dimensional compatibility requirements for DC and AC/DC pin and contact-tube vehicle couplers
EN IEC 62196-2:2022	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 2: Dimensional compatibility requirements for AC pin and contact-tube accessories
EN IEC 62196-6:2022	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 6: Dimensional compatibility requirements for DC pin and contact-tube vehicle couplers intended to be used for DC EV supply equipment where protection relies on electrical separation

# CLC/TC 21X - Secondary cells and batteries

Reference	Title
EN 50604-1:2016	Secondary lithium batteries for light EV (electric vehicle) applications - Part 1: General safety requirements and test methods
EN 50604-1:2016/A1:2021	Secondary lithium batteries for light EV (electric vehicle) applications - Part 1: General safety requirements and test methods
EN 61982-4:2016	Secondary batteries (except lithium) for the propulsion of electric road vehicles - Part 4: Safety requirements of nickel-metal hydride cells and modules
Parts of EN 62133	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications
Parts of EN 62485	Safety requirements for secondary batteries and battery installations
EN 62660-3:2016	Secondary lithium-ion cells for the propulsion of electric road vehicles - Part 3: Safety requirements



# Other TCs of CEN/CENELEC

- **CLC/SR 70 - Degrees of protection provided by enclosures**
  - **EN 60529**: Degrees of protection provided by enclosures (IP Code)
- **CLC/TC 64 - Electrical installations and protection against electric shock**
  - **EN 61140**: Protection against electric shock - Common aspects for installation and equipment
- **CLC/TC 57- Power systems management and associated information exchange**
  - Parts of **EN 61850**: Communication networks and systems for power utility automation
- **CLC/TC 22X - Power electronics**
  - **EN IEC 62040-1**: Uninterruptible power systems (UPS) - Part 1: Safety requirements
- **CEN-CENELEC/JTC 13 ‘Cybersecurity and data protection’**
  - Parts of **EN ISO/IEC 27000**: Information security, cybersecurity and privacy protection



# EU-India Partnership



# EU-India Partnership

## EU-India Strategic Partnership: A Roadmap to 2025

- EU & India in its July 2020 summit have endorsed “EU-India Strategic Partnership: A Roadmap to 2025”.
- Through this roadmap, both sides have agreed on many provisions to strengthen trade and market access but notably below provision highlights alignment to international standard.
  - Strengthen mutual engagement through existing institutional mechanisms, notably the EU-India Trade Sub-Commission and its specialized working groups and dialogues, with a view to enhancing market access, particularly for Small and Medium Enterprises (SMEs), addressing existing trade barriers and preventing the emergence of new ones, seeking alignment to international standards and best practices, easing up the assessment of conformity and improving investment conditions.
- The roadmap also includes cooperation on sustainable mobility, including the deployment of EV charging infrastructure.

## EU-India connectivity partnership:

- EU and India have also signed a connectivity partnership to support sustainable digital, transport and energy networks, and the flow of people, goods, services, data and capital centred on equity and inclusivity for the benefit of both India and the EU and assisting in global development efforts, based on Sustainable Development Goal principles that no one is left behind.

## EU-India Trade and Technology Council (TTC), launched in May 2023:

- This strategic coordination mechanism aims to allow both partners to tackle challenges at the nexus of trade, trusted technology, and security, and thus deepen cooperation in these fields between the EU and India.
- Within TTC WG-2 on Green and Clean Energy Technologies focuses on key areas of collaboration, including battery recycling technologies for EVs, among others.



# Conclusion

- With traditional and new entrants using a variety of technology approaches towards electric vehicles, it is critical that standards are established to ensure that EV technologies are reliable.
- Need for Regulatory frameworks that establish benchmarks for various EV component technologies and offer a certification process for providers to increase consumer confidence, safety, and supplier compliance.
- Key benefits of establishing/adopting EN/global standards and certifications include:
  - Safety of personnel, product, and charging infrastructure
  - Interoperability so a common infrastructure can be utilized
  - Cost reduction to ensure mass production and accessibility of EV technology
  - Increased adoption of new technologies underpinning the EV revolution
- Several standards are published at global level by ISO/IEC and transposed in supra-national and national versions.
- EU and India should capitalize on their ongoing partnerships to strengthen collaboration in promoting, adopting, and deploying international standards in support of smart mobility including safety and security of Electric Vehicles(EV).



Thank you!

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