



“12th edition of the India Smart Utility Week (ISUW 2026)”

10th IEC-IEEE-BIS Smart Energy Standardization Coordination Workshop

Session: From Standards to Practice – Regulatory and Utility Perspectives on DER & EV Grid Integration”

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Outline

- ✓ About EU Project SESEI
- ✓ ESOs
- ✓ EU Policy Framework Supporting DER & EV Integration
- ✓ Standardization
- ✓ EU-India Partnership
- ✓ Conclusion



EU Project SESEI



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



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 , www.sesei.in , www.eustandards.in



ESOs: CEN, CENELEC and ETSI

CEN, CENELEC and ETSI are three officially recognised European Standards Organizations ([Regulation EU 1025/2012](#))



Standardization in various business sectors



Standardization in the Electrotechnology sector



Telecommunications, broadcasting and other electronic communications networks and services



1 standard in 34 different countries

Austria



Denmark



Greece



Latvia



Poland



Slovenia



Belgium



Estonia



Hungary



Lithuania



Portugal



Spain



Sweden



Bulgaria



Finland



Iceland



Luxembourg



Republic of North Macedonia



Switzerland



Croatia



France



Ireland



Malta



Romania



Türkiye



Cyprus



Czech Republic



Germany



Italy



Norway



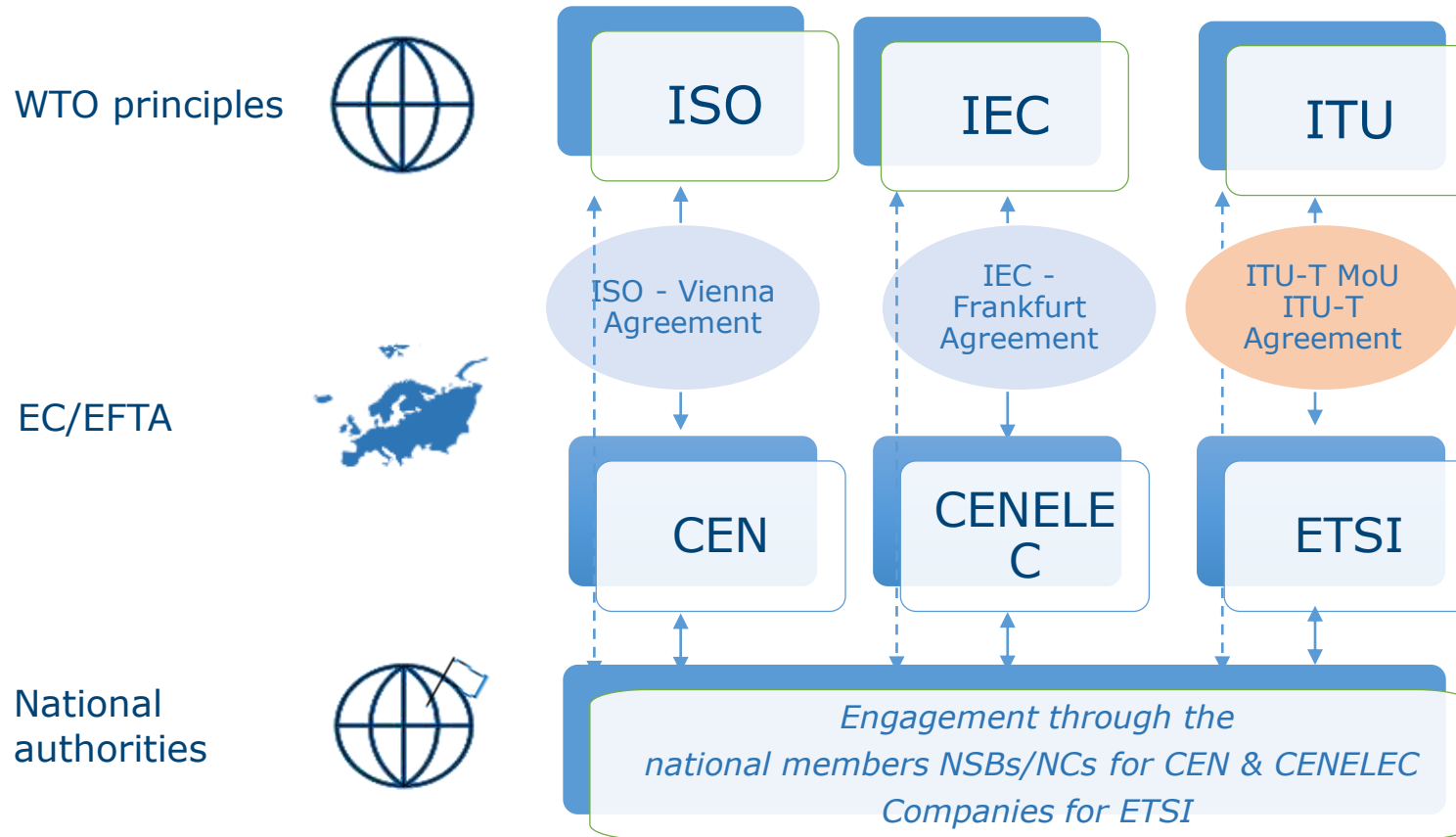
Slovakia



United Kingdom



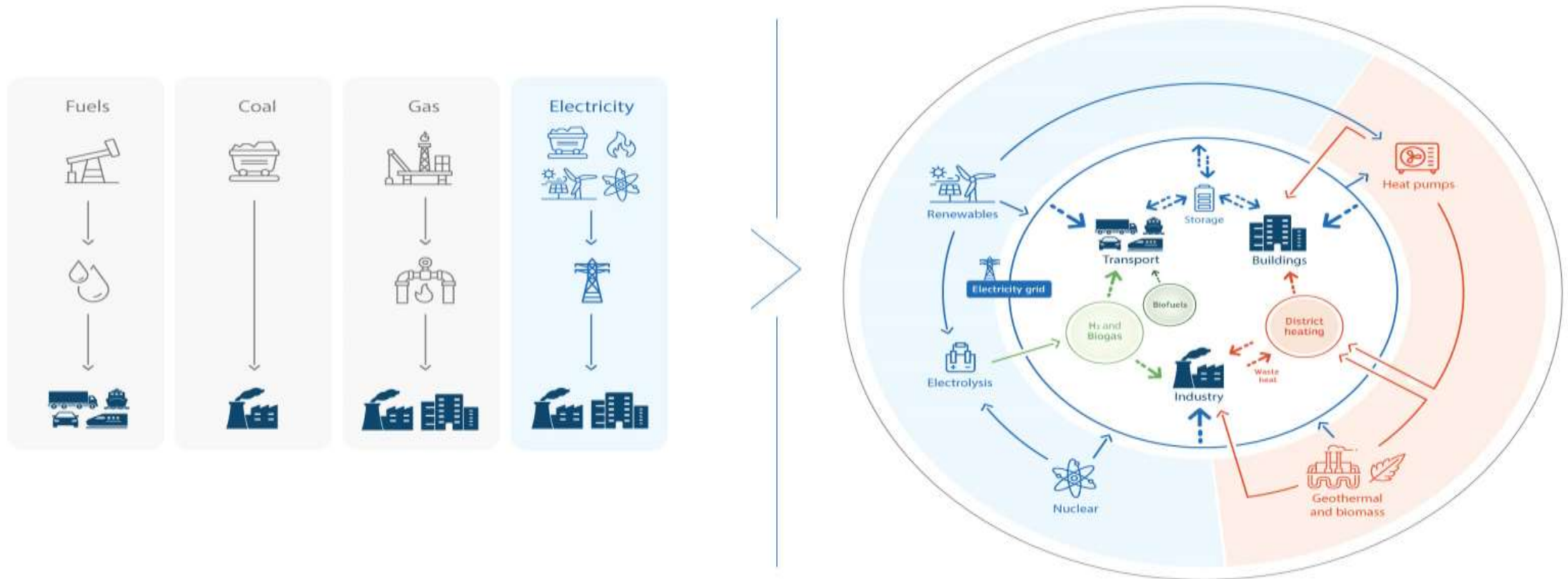
A coherent and inclusive system



Inclusive System representing all stakeholders voice: industry, SMEs, civic society, environmental organizations, academia and R&D, regulators, NGOs, etc

Energy system integration

- EU's future energy system will be very different from today's. As the energy system relies more and more on renewables, the direct use of electricity, rather than fuels, is the most cost-efficient way to decarbonise our energy use.



EU Policy Framework Supporting DER & EV Integration



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Major EU initiatives enabling grid integration

- In Dec. 2025, Commission presented "[European Grids Package](#)", following the EU Action Plan for Grids adopted in November 2023.
 - It consists of a proposal to revise the [TEN-E Regulation](#) and [a proposal to accelerate permit granting procedures by amending the Renewable Energy Directive](#), the Electricity Market Design and the Gas Directive.
- As part of the [European Green Deal](#), in order to encourage this smart sector integration, the Commission presented an [EU strategy for energy system integration](#) in July 2020.
 - Strategy involves various existing and emerging technologies, processes and business models, such as ICT and digitalization, smart grids and smart meters
- [Energy system integration](#) will be facilitated by the correct and timely implementation of the
 - revised [Renewable Energy Directive](#)
 - reform of the [Electricity Market Design](#)
 - revised [Energy Efficiency Directive](#)
 - revised [Energy Performance of Buildings Directive](#)

EU Policy for EV Charging Infrastructure

- **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.
- **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)
- **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

Standardization



CEN-CENELEC-ETSI Coordination Group on Smart Grids (COG SG)

- **COG SG** aligns its activities with **EU regulations**, including the [Clean Energy Package](#) and the **EU Digital Agenda**, to streamline **European standardization** efforts.
- It liaises with the **European Commission**, **energy associations**, and **national and international standardization bodies** to ensure seamless **integration of smart grids** across the continent.
- **Key objectives include:**
 - Developing **interoperable data architectures** essential for energy transition.
 - Ensuring **security** and **efficiency** in **grid design, operation, and maintenance**.
 - **Standardizing smart metering** across **electricity, water, gas, and heat/cooling systems**.
- **Latest Report: [CoG-SEG Report 12 - European Standards available for Demand Response 13 Implementation](#).**
 - This report compiles relevant **European standards** supporting the **implementation of the flexibility mechanisms** in preparation of the future **European Network Code on Demand Response**.



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CEN-CENELEC TCs on energy infrastructure

Photovoltaic

CLC/TC 82 'Solar photovoltaic energy systems'
CLC/SR 117 'Solar thermal electric plants'
CEN/TC 312 'Thermal solar systems and components'

Wind

CLC/TC 88 'Wind turbines'

Gas infrastructure

CEN/TC 234 'Gas infrastructure'

Power generation

CLC/TC 8X 'Systems aspects for electrical energy supply'
CLC/TC 82 'Solar photovoltaic energy systems'

Hydrogen infrastructure

CEN-CLC/JTC 6 'Hydrogen in energy systems'
CEN/TC 234 'Gas infrastructure'
CEN/TC 268 'Cryogenic vessels and specific hydrogen technologies applications'

IoT

CLC/TC 65X 'Industrial-process measurement, control and automation'
CEN-CLC/JTC 19 'Blockchain and Distributed Ledger Technologies'
CEN-CLC/JTC 13 'Cybersecurity and Data Protection'
CLC/TC 205 'Home and Building Electronic Systems (HBES)'

Transmission Grid

CLC/TC 95X 'Measuring relays and protection equipment'
CLC/TC 57 'Power systems management and associated information exchange'
CLC/TC 22X 'Power electronics'
CLC/TC 8X 'System aspects of electrical energy supply'

Distribution Grid

CLC/TC 95X 'Measuring relays and protection equipment'
CLC/TC 57 'Power systems management and associated information exchange'
CLC/TC 8X 'System aspects of electrical energy supply'
CLC/TC 22X 'Power electronics'



HV Elec Equipment

CLC/TC 17AC 'TC 17 'Switchgear and controlgear'
CLC/TC 20 'Electric cables'
CLC/SR 36 'Insulators'
CLC/TC 99X 'Power installations exceeding 1 kV a.c. (1,5 kV d.c.)'

MV Elec Equipment

CLC/TC121A 'Low-voltage switchgear and controlgear'
CLC/TC 85X 'Measuring equipment for electrical and electromagnetic quantities'
CLC/SR 121B 'Low-voltage switchgear and controlgear assemblies'
CLC/TC 20 'Electric Cables'

LV Elec Equipment

CLC/TC121A 'Low-voltage switchgear and controlgear'
CLC/TC 85X 'Measuring equipment for electrical and electromagnetic quantities'
CLC/SR 121B 'Low-voltage switchgear and controlgear assemblies'
CLC/TC 20 'Electric Cables'

Lift

CEN/TC 10 'Lifts, escalators and moving walks'

Heat Pumps

CEN/TC 109 'Central heating boilers using gaseous fuels'
CEN/TC 113 'Heat pumps and air conditioning units'
CEN/TC 182 'Refrigerating systems, safety and environmental requirements'

EV Charger

CLC/TC 69X 'Electrical systems for electric road vehicles'
CEN/TC 301 'Road vehicles'
CLC/TC 23H 'Plugs, Socket-outlets and Couplers for industrial and similar applications, and for Electric Vehicles'

Building

CEN/TC 89 'Thermal performance of buildings and building components'
CEN/TC 371 'Energy performance of buildings'
CLC/TC 205 'Home and Building Electronic Systems (HBES)'
CLC/TC 219 'Mains communicating systems'

For a Green & Sustainable Electricity System for all (incl SME's, NGOs)

EU Standardization : Distributed Energy Resources (DER)

CLC/TC 57 'Power systems management and associated information exchange'

- work focuses on European specificities, including CIM data models needed for the functioning of markets and access to consumption and production data

- **EN IEC 61968-5:2020** : Application integration at electric utilities - System interfaces for distribution management - Part 5: Distributed energy optimization
- **EN IEC 61850-7-420:2021** : Communication networks and systems for power utility automation - Part 7-420: Basic communication structure - Distributed energy resources and distribution automation logical nodes

CLC/TC 22X - Power electronics

- **EN IEC 62909-2:2019** : Bi-directional grid-connected power converters - Part 2: Interface of GCPC and **distributed energy resources**



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

Connection of Smart grids and AES

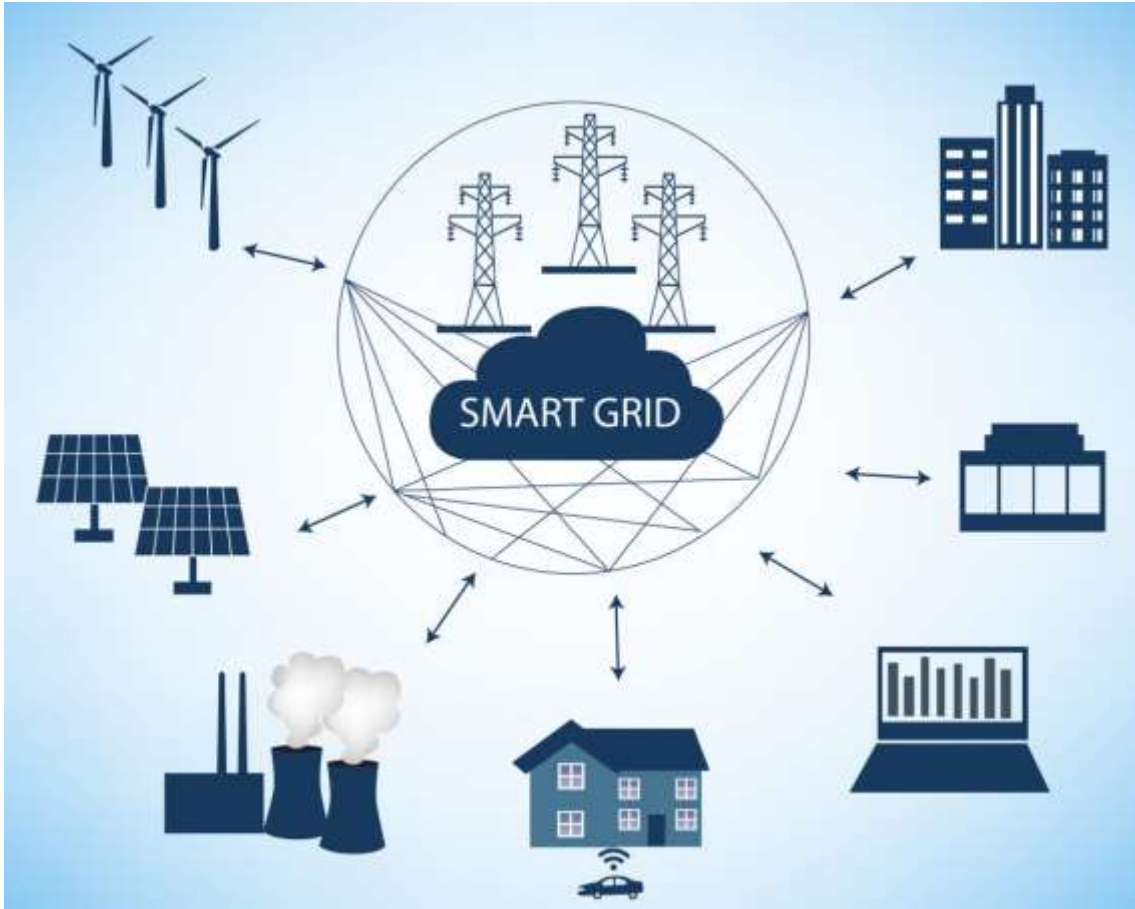


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Connection of Smart grids and AES



Smart Grids are considered the backbone of the AES

- Interoperability layer: Smart Grids ensure all energy systems (buildings, vehicles, devices, industries) can communicate and coordinate seamlessly
- Flexibility enabler: real-time balancing between demand and supply, enabling demand response, distributed energy resources, and aggregator models
- Digital Infrastructure: Smart Grids provide the data, control systems, and secure communication layers required for automated, AI-assisted energy management
- Foundation for sector coupling: integrate not just electricity, but also heat, mobility, and industry, via shared standards and data platforms
- Grid Stability & Resilience: Smart Grids support grid visibility, dynamic reconfiguration, and fault tolerance, which are essential in a decentralized AES

CEN-CLC Technical Governance Review

- **Need for Technical Governance review:**
Objective to ensure that the BTs fulfil their role as strategic governing bodies for technical matters and provide an accurate standardization response to the new and emerging needs and priorities
- CLC/BTWG 176-3 'All electric society' to **reassess their scope and activities**
- (...) to merge with the COG Smart grids
- (...) to better **address standardization activities** in the field, **including those covered by CCEN-CENELEC-ETSI/COG AES**



COG AES: Mission and key tasks

*'To **coordinate and guide** European standardization across smart grids, flexibility, sector coupling, and digital energy systems to enable the transition to the All-Electric Society (AES) — in alignment with EU policies (e.g., the Clean Energy Package, Net-Zero Industry Act) and international frameworks, especially IEC SG 14, HLF 9*

The group acts as a bridge between policy, technology, and standardization, ensuring that emerging use cases and business models are effectively enabled by interoperable and future-ready standards.

Note: the COG AES was not established with the intention to draft standards rather more to bridge pre-standardisation activities.

CEN-CLC-ETSI/COG AES – Better coordination of Smart Grids and AES

| Aspect | Smart Grids | All Electric Society (AES) |
|----------------------------|---|--|
| Initiation | Focused on grid modernization and standardization | Broad societal transition to electrified energy systems |
| Scope | Electricity grid + multi-commodity metering | All sectors: energy, industry, buildings, environmental |
| Key Standards Focus | SGAM, interoperability | Integration of all electrification systems & smart tools |
| Digitalization | Communication architectures, smart metering | Digital Twin of the grid, full system modeling |
| Security Focus | Cybersecurity, privacy, data protection standards | Same, plus cross-sectoral digital security |
| Coordination Entity | CG-SG (now merged) | COG-AES (09-2025) |

Key tasks of the COG AES

Strategic Coordination

- Develop a unified Terms of Reference with CEN, CENELEC, and ETSI
- Align and integrate the work of existing groups, particularly the CG-Smart Grids.
- Support the transformation from product standards to system-level interoperability

Policy & Regulatory Alignment

- Interpret and respond to new and evolving EU legislation (e.g., Clean Energy Package, Net-Zero Industry Act)
- Ensure standardization efforts support EU policy objectives such as decarbonization, energy independence, and digital sovereignty

Standardization Monitoring & Gap Analysis

- Identify gaps in existing standards and propose future standardization needs (e.g., on flexibility, cybersecurity, sector coupling)
- Monitor and integrate outputs from global standardization bodies (notably IEC SG14)
- Track EU initiatives like the Grid Action Plan, Digital Product Passport, and Smart Contracts

Technical enablers and interoperability

- Promote and support the use of:
 - Smart Grid Architecture Model (SGAM)
 - SAREF (Smart Appliances Reference Ontology)
 - Digital Twins and Data Spaces
- Encourage development of semantic models and data communication standards across sectors.



New COG AES – Outlook important Topics

Flexibility

- Identified as the most urgent and strategic topic
- Requires technical standards for demand response, market-based aggregation, and system balancing
- Linked to upcoming EU Network Code on Demand Response (NCDR) and IEC SG 14 guidance

Sector Coupling

- Standards are needed to support interoperability between electricity, gas, heating, mobility, and digital systems
- Requires common terminology, architectures, and cross-TC coordination (TC 205, TC 69, TC 8X, etc.)

Consumer & Market Integration

- Standards need to reflect the real-world diversity of consumers (tenants, SMEs, prosumers)
- Includes privacy, affordability, and meaningful participation in flexibility markets

Digitalization & Interoperability

- Semantic standards, data models, digital twins, and APIs are needed to enable automated, smart energy systems
- Priority for EU and IEC coordination (e.g., with Digital Product Passport and Asset Administration Shell frameworks)

Smart Grid Evolution

- Smart Grids are the foundational enabler of AES
- Work continues through alignment of SGAM, SAREF, smart metering, and DSO/TSO communication

System Stability & Security

- AES must ensure grid resilience and cybersecurity as systems decentralize and digitize
- Link to IEC SG 14's work on stability trade-offs and energy system guides



EU-India Partnership



EU-India: New Strategic Agenda

- On September 17, 2025, European Union (EU) unveiled a new "[Strategic EU-India Agenda](#)" to significantly deepen and broaden cooperation with India across multiple sectors.
 - This builds on Strategic Partnership established in 2004 and is underpinned by shared interests and complementary strengths.

Five Pillars



EU-India TTC – What's in it

WG1: Strategic technologies, digital governance and digital connectivity

Areas to be explored:

- Digital connectivity (*MoU in Nov'23*)
- Artificial Intelligence
- 5G/6G (*MoU b/w B6GA and 6G-IA*)
- High performance and Quantum computing
- Semiconductors (*EU-Ind signed*)
- Cloud systems
- Cybersecurity
- Digital skills
- Digital platforms

WG 2: Green & clean technologies

The group focuses on **standards**, emphasis on research and innovation.

Areas to be explored :

- Research and Innovation
- Wastewater treatment
- Recyclable Plastics
- Waste to Energy
- **E-mobility and battery performance and recycling**
- Green hydrogen and green ammonia
- Liquid fertilizers

WG 3: Trade, investment and resilient value chains

- ▶ The resilience of supply chains and access to critical components, energy, and raw materials.
- ▶ To resolve identified trade barriers and global trade challenges by promoting cooperation in multilateral fora.
- ▶ Towards **promotion of international standards** and cooperation on addressing global geopolitical challenges.



Other Partnership Projects/instruments

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 Global Gateway

- Strategic partnership under **EU's Digital & Connectivity Strategy with** Priorities around **Emerging tech, Cybersecurity, DPI, Trusted digital infra, Online platforms**
- Initiatives:
 - **EU-India Global Gateway Conference for Connectivity Investments in North-Eastern India (Shillong Conference-2023)** – Digital, Energy & Transport sectors
 - **Trilateral cooperation** in Africa, Indo-Pacific, Central Asia
 - **India-Middle East-Europe Economic Corridor (IMEC)** → Transport, energy & **digital connectivity**

SESEI Project (Phase VI: 2024-2027)

- Managed by **CEN, CENELEC, ETSI, EC-DG INTPA, EFTA**
- Enhances visibility of **European Standardization System (ESS)** in India
- Supports EU-India alignment in **standards, regulations, policies**
- Priority Areas are aligned with EU-India TTC topics:
 - **Digitization:** AI, 5G/6G, **IoT**, Quantum, Smart Manufacturing, e-Signature, e-accessibility etc.
 - **Green & Clean Tech:** Clean Energy, EVs, Green Hydrogen, Circular Economy etc.



Conclusion

- DER and EVs are transforming the power system.
- EU policies support decarbonization, digitalization, and decentralization.
- Standards are critical to move from policy to practical implementation.
- Global cooperation and harmonization are essential for a sustainable energy transition.
- EU and India should capitalize on their ongoing partnerships to strengthen collaboration in promoting, adopting, and deploying international standards in support of Smart energy and smart mobility.



Thank you!

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