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India Smart Grid Forum

India SMART UTILITY Week 2024

Supporting Ministries

8TH IEC - IEEE SMART ENERGY STANDARDIZATION COORDINATION WORKSHOP (IN COLLABORATION WITH BIS, IEC AND IEEE)

Session 1: Emerging Smart Energy Technologies and Standardization Landscape

Topic: "European policies and Standards"

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Outline

- Introduction
- Key Directives
- Key Policy Initiatives
- Standardization
- Conclusion

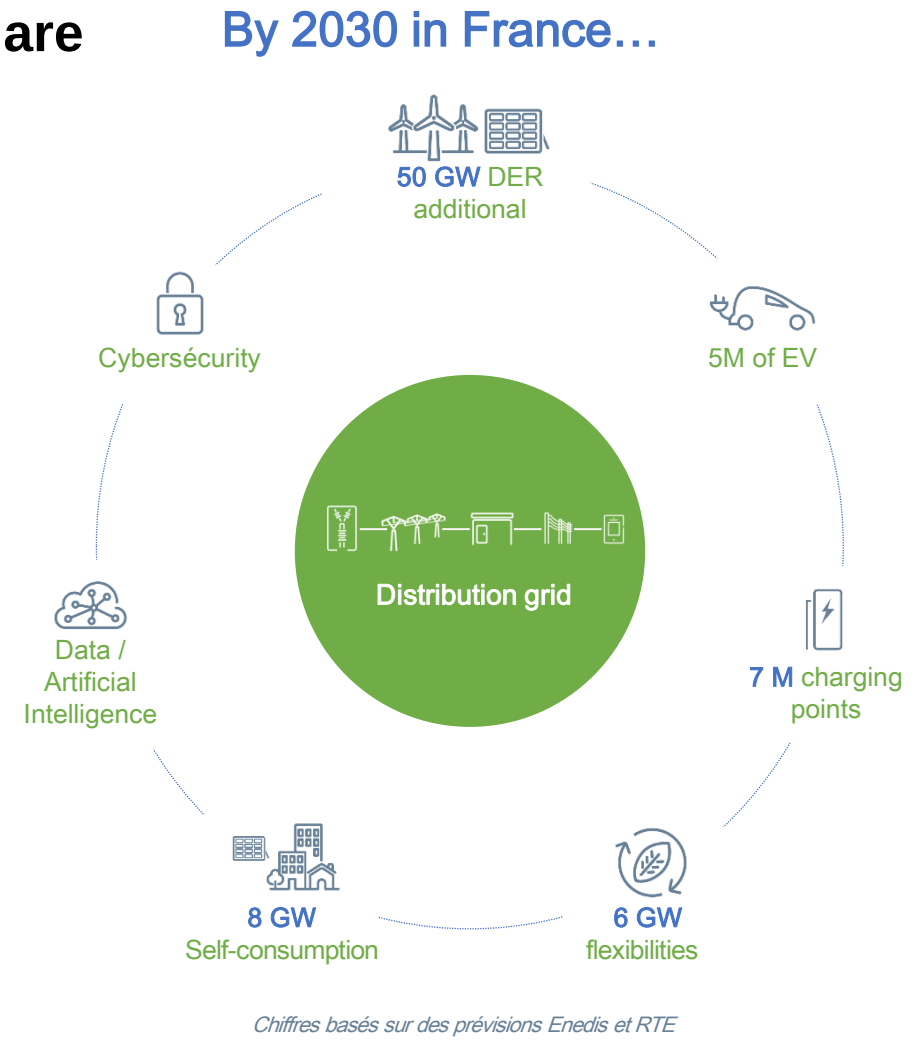
Introduction

- **Electricity Systems are vital for Europe yesterday, today and tomorrow**
  - Electricity plays a key role to achieve climate neutrality and Green Deal objectives.
- **EU framework and targets on climate and energy for 2030 are to reduce greenhouse gas emissions by 40% and increase the use of renewables to at least 27% by 2030**
  - **Smart grids** and **smart meters** enable better management of energy networks and more efficient consumption.
  - **Hydrogen** is also expected to play an important role in reducing greenhouse gas emissions and reach net zero emissions by 2050.
- **A study from December 2019 on deployment of smart meters in EU found out that:**
  - nearly 225 million smart meters for electricity and 51 million for gas will be rolled out by 2024.
  - by 2024, almost 77% of European consumers will have a smart meter for electricity and about 44% will have one for gas.
  - cost of installing a smart meter in the EU is on an average between €180 and €200
  - on average, smart meters provide savings of €230 for gas and €270 for electricity per metering point (distributed amongst consumers, suppliers, distribution system operators, etc.) as well as an average energy saving of at least 2% and as high as 10% based on data coming from the pilot projects.

Continue….

The Energy Transition and the Digital Revolution are profoundly transforming the management of the electricity grid:

- The frequency and magnitude of climate hazards is increasing ➔ **urgency to decarbonize the economy**
- The development of renewable energies is massive.
- New uses must be integrated into the network: electric vehicle, storage, etc.
- The trend towards "local consumption" is accelerating through self-consumption, local energy systems...
- Communities are waiting for services for the development of territories.
- Digital technology is omnipresent in everyday life.
- The landscape of stakeholders in the distribution is changing massively.



EU: Key Directives

- EU Directives concerning common rules for the **internal market for electricity and gas**
  - ✓**2009/72/EC** by repealing Directive 2003/54/EC and **2009/73/EC** by repealing Directive 2003/55/EC
- **Energy performance in buildings:**
  - ✓**Energy Performance of Buildings Directive (EU 2018/844):** outlines specific measures for building sector to tackle challenges by updating and amending many previous rules (Directive 2010/31/EU).
- **Renewable energy:**
  - ✓Revised Renewable Energy Directive (2018/2001/EU), established as a new binding on renewable energy target for the EU in 2030 to become at least 32%.
- **Energy efficiency:**
  - ✓Directive on Energy Efficiency (EU) 2018/2002, sets binding targets of increasing energy efficiency on its current levels at least 32.5% by 2030.

EU: Key Policy initiatives

- **Clean Energy for All Europeans package, 2019**
  - ✓ It includes regulations on energy efficiency, renewable energy, and the design of the electricity market, promoting the integration of smart technologies.
- **EU strategy on energy system integration:**
  - ✓ As part of the European Green Deal, and to encourage energy sector integration, the European Commission presented its EU strategy for energy system integration on 8th July 2020.
  - ✓ Strategy involves various existing and emerging technologies, processes and business models, such as ICT and digitalization, smart grids and smart meters.
- **EU Action Plan for Grids:**
  - ✓ Aims to address the missing links of the clean energy transition and to ensure that EU grids operate more efficiently and are rolled out further and faster.
- **Digitalising the energy system - EU action plan, 2022**
  - ✓ It aims at effectively promoting investments in smart grids.
- **Fit for 55 Delivering the European Green Deal**
  - ✓ Strategy sets a 55% reduction target in net EU greenhouse gas emissions compared to 1990 and increased EU-level target for the share of renewable energy consumed in the EU to at least 40% with a clause for a possible upwards revision.
- With **Green Deal Industrial Plan** and **Net-Zero Act**, Europe is setting a clear framework to scale up the manufacturing of clean technologies and ensure it is well equipped for the transition to climate neutrality.

EU: Hydrogen initiatives

- **EU** strategy on hydrogen was adopted in 2020 and it suggested policy action points in 5 areas: support investment; support production and demand; creating a hydrogen market and infrastructure; research and development and international cooperation.
- European Clean Hydrogen Alliance was launched alongside the EU hydrogen strategy in 2020 as part of the new industrial strategy for the EU.
  - ✓ It brings together industry, national and local authorities, civil society and other stakeholders.
- Hydrogen is also an important part of the **EU strategy on energy system integration**
  - ✓ https://energy.ec.europa.eu/topics/energy-systems-integration/hydrogen_en
- Clean Hydrogen Partnership was established in November 2021 to support research and innovation in hydrogen ecosystem.
- RePowerEU communication in March 2022 calls for an EU production target of 10 million tons of **clean hydrogen** along with 10 million tons of imported clean hydrogen by 2030.
- Fit for 55 package also put forward several legislative proposals that translate the European hydrogen strategy into concrete European hydrogen policy framework.
- The policy framework was completed with 2 delegated acts**,** adopted on 20 June 2023, applicable to renewable hydrogen under **Renewable Energy Directive**.
  - The first one covers renewable fuels of non-biological origin (RFNBOs) and sets the criteria for products that fall under the 'renewable hydrogen' category.
  - The other one puts forward a detailed scheme to calculate the life-cycle emissions of renewable hydrogen and recycled carbon fuels to meet the greenhouse gas emission reduction threshold set in the directive.

Standardization work

Smart metering

- **Standardization Mandate: M/441, March 2009** on the development of open communication architecture for utility meters involving communication protocols enabling interoperability (smart metering).

- **Smart Meter Co-ordination Group (SMCG):** CEN, CENELEC, ETSI and European stakeholder representatives including consumers
  - ✓ M/441- 1st phase: CEN-CENELEC-ETSI TR 50572: 2011 'Functional reference architecture for communications in smart metering systems' published in December 2011
  - ✓ M/441- 2nd phase: European Standards containing harmonized solutions for additional meter functionalities within an interoperable framework finalised in December 2012 (Click here)

- SM-CG has released four reports from 2013 to 2016:
  - ✓ SM-CG - Privacy and Security approach – part I
  - ✓ SM-CG - Privacy and Security approach – part II
  - ✓ SM-CG - Privacy and Security approach – part III
  - ✓ SM-CG - Privacy and Security approach – part IV
  - ✓ SM-CG – Minimum Security Requirements for smart metering

- For more details, please click here:
  - ✓ https://www.etsi.org/technologies/internet-of-things/smart-metering
  - ✓ https://www.cencenelec.eu/areas-of-work/cen-cenelec-topics/smart-grids-and-meters/smart-meters/

Smart Grid

- **Standardization Mandate: M/490, March 2011**
  - ✓ Develop a framework Reference architecture, Sustainable processes covering efficiency, interoperability, security, data protection and privacy, Set of consistent standards and work in Synch with Mandates M/441 (Smart Meter),M/468 (Charging of Electrical Vehicles) and other energy directives

- **CEN-CENELEC-ETSI Smart Grid Co-ordination Group (SG-CG) established in 2011**
  - ✓ In 2012, SG-CG produced the following reports: **Sustainable Processes**, **First Set of Consistent Standards**, **Reference Architecture**, **Information security and data privacy** and the **Framework Document**
  - ✓ In 2014 SG-CG produced the following reports and successfully completed the requirements of M/490: Extended Set of Standards in support of Smart Grids deployment ; Overview Methodology , General Market Model Development, Smart Grid Architecture Model User Manual and Flexibility Management ; Smart Grid Interoperability and its tool; Smart Grid Information Security.
  - ✓ SG-CG also released following two reports to maintain transverse consistency and promote continuous innovation in the field of Smart Grids:
    - Smart Grid Set of Standards report 1
    - Smart Grid Set of Standards report 2

- In 2021, Smart Meters Coordination Group (SM-CG) and Coordination Group on Smart Grids (CG-SG) were merged to the Smart Energy Grid Coordination Group (CG-SEG) More info is available on below links:
  - https://www.cencenelec.eu/areas-of-work/cen-cenelec-topics/smart-grids-and-meters/smart-grids/

ETSI Technical Committees

- **ETSI TC for Access, Terminals, Transmission and Multiplexing (ATTM)**
  - ✓ Main ETSI entry point of ETSI participation in CEN/CENELEC/ETSI Smart Grids/Energy Coordination Group (CG-SG) with other ETSI TBs that indicated their interest to take part in CG-SG (TC SmartM2M, ISG OEU, TC EE, TC CYBER, ISG CIM, TC ERM, TC SET, TC MSG (3GPP).

- ETSI TC SET (Secure Element Technologies) responsible for core platform specification and defining the interface between a UICC (universal integrated circuit card) and a terminal (TS 102 221)
  - ✓ TS 102 221 is also one of the mandated specifications for the smart meter work item of EC and EFTA (M/441).

- **ETSI TC SmartM2M**
  - ✓ focus on an application-independent 'horizontal' service platform with architecture capable of supporting a very wide range of services including Smart Metering, Smart Grids, eHealth, Smart Cities, consumer applications, car automation, Smart Applications (SAREF).
    - ETSI TS 103 410-1 V1.2.1 (2023-11): SmartM2M; Extension to SAREF; Part 1: Energy Domain
    - ETSI TS 103 410-12 V1.1.1 (2023-11): SmartM2M; Extension to SAREF; Part 12: Smart Grid Domain
    - ETSI TR 103 904 V1.1.1 (2023-04): SmartM2M; SAREF extension investigation Requirements for the Smart Grid domain

Hydrogen standardization

- In March 2023, **New Roadmap on hydrogen standardization** was developed by **European Clean Hydrogen Alliance** :
  - It provides a comprehensive overview of standardization gaps, challenges and needs across the whole hydrogen chain, together with the steps taken by the industry.
  - It also includes a set of recommendations to streamline and accelerate the standards development process, in line with the **European Standardization Strategy** of 2nd February 2022.
- **CEN and CENELEC,** through its various technical committees, have been committed to developing standards for hydrogen technologies:
  - **CEN-CLC/JTC 6 'Hydrogen in energy Systems'**,
  - **CEN/TC 268 'Cryogenic vessels and specific hydrogen technologies applications'** and
  - **CEN/TC 234 'Gas infrastructure'** etc.
- **CEN and CENELEC have also established a Sector Forum on Energy Management Working Group 'Hydrogen',** which provides horizontal support to the different CEN and CENELEC Technical Committees working with hydrogen.

EU-India Partnership

EU-India Clean Energy and Climate Partnership, established in 2016:

- To guide the energy and climate policy dialogue between both regions and to support joint projects and research.
- To promote access to and dissemination of clean energy and climate-friendly technologies and it encourages research and development of innovative solutions.
- Current areas of collaboration includes activities in offshore wind energy, rooftop solar and solar parks, integration of renewable energy and storage, smart grids, biofuels and energy efficiency in buildings.

EU-India Trade and Technology council, established in Feb 2023:

- Three working groups:
  - ✓ WG-01: Strategic technologies, digital governance and digital connectivity
  - ✓ **WG-02: Green & clean energy technologies**
    - In synergy with the EU-India Clean Energy and Climate Partnership, the Green & Clean energy technologies Working Group will focus on green technologies, including investments and standards, with an emphasis on research and innovation.
  - ✓ WG-03: Trade, investment and resilient value chains

Additional Information

- Road to Net Zero: Standards for the All-Electric Society conducted on 05-12-2023
  - ✓CEN-CENELEC (https://www.cencenelec.eu/news-and-events/events/2023/2023-12-05-stakeholder-workshop-aes/)
  - ✓Event Report: (https://www.cencenelec.eu/media/CEN-CENELEC/Events/Events/2023/AES/20231205_aes-workshop_event-report.pdf)
- Report on Standards in support of the European Green Deal Commitments:
  - ✓https://www.cencenelec.eu/media/CEN-CENELEC/Areas%20of%20Work/CENELEC%20sectors/Accumulators,%20Primary%20cells%20and%20Primary%20Batteries/Documents/standardsinsupporteuropeangreendealcommitments.pdf

Conclusion

- Digital and sustainable transformation of energy system across European Union (EU) is seen as essential to become independent of fossil fuels, tackle the climate crisis and ensure affordable access to energy.
  - ✓ **“Digitalising the energy system - EU action plan”** will help unlock the potential of digitalising the energy sector and help achieving the energy savings benefitting all consumers.
- Standards play an important role in implementing Smart Energy (smart grid and meter) projects
  - ✓ Standardization work will continue to cope with the technical challenges, advancement and introduction of new emerging technologies
- CEN-CENELEC-ETSI Coordination Group is pioneer for smart grid and metering standardization
- For Smart Energy, Energy efficiency is also an integral part hence:
  - ✓ Energy monitoring and management etc.
  - ✓ Eco-design of the products
  - ✓ Interoperability to achieve economies of scale
- EU and India cooperation continues through various instruments such as Horizon Europe, TTC, SESEI and is ready to build further on existing experiences, such as the EU-India High-Level Platform on Smart Grids.

THANK YOU

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