



3rd EDITION SMART METER SUMMIT 2023

Status Update from Europe (Policy & Standards)

Market Dynamics and Regulatory challenges in Smart Meter rollout

Mr. Dinesh Chand Sharma

Director – Standards & Public Policy (SESEI)

Outline

- EU Project SESEI
- Introduction
- Policy Initiatives
- Standardization
- Key challenges for Smart Grid/Meter rollout
- 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



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, work together

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.

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Introduction

- 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.
- A [study](#) 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.
- EU Directives concerning common rules for the internal market for electricity and gas ([2009/72/EC](#) and [2009/73/EC](#)) and EU Directive on energy efficiency ([2012/27/EU](#)) requires Member States to ensure the implementation of 'intelligent metering systems' that shall assist the active participation of consumers in the energy market.

EU: Key Policy initiatives

- **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.
- The strategy involves various existing and emerging technologies, processes and business models, such as ICT and digitalization, **smart grids and meters**.

- **Digitalising the energy system - EU action plan**

- To further promote the digitalisation of the energy sector, European Commission will formally re-establish the existing Smart Grids Task Force (SGTF) and the group will be renamed as 'Smart Energy Expert Group' and it will have a greater responsibilities while involving all Member States and additional relevant stakeholders.
- Commission will also promote international cooperation, through joint research and innovation activities supported under Horizon Europe and build on existing experiences, such as the [EU-India High-Level Platform on Smart Grids](#).

- **Clean energy for all Europeans package, adopted in 2019**

- It will help transform Europe's energy systems, while also maintaining a high level of security, not least in terms of reinforcing cybersecurity of the digital transformation in the energy sector.

Standardization work

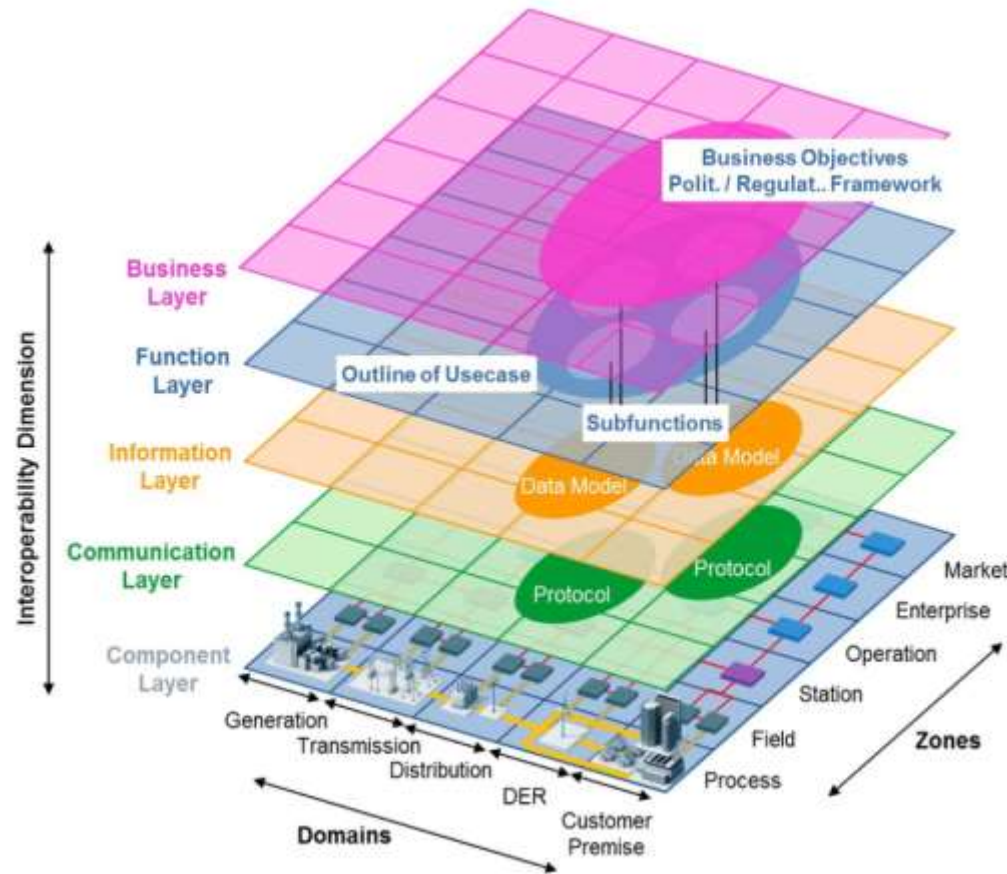
Smart Metering

- **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 Grids

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

Smart Grid Reference Architecture



Smart grid architecture model (SGAM) with interoperability layers.

The motivation for the creation and utilization of reference architectures can be to have a blueprint for the development of future systems and components, providing the possibility to identify gaps in a product portfolio. It can also be used to structure a certain Smart Grid domain and provide a foundation for communication about it to other domains which need to interoperate. Furthermore, it can be used to document decisions which have been taken during the development process of an infrastructure.

It must support the work of Smart Grids standardization over a long period of time:

- Be able to **represent the current situation** (snapshot of already installed basis and reference architectures)
- Be able to **map future concepts** (migration and gap analysis)
- Achieve a **common understanding of stakeholders**
- **Fulfill the demand for systematic coordination of Smart Grid standardization from an architectural perspective**
- **Provide a top-level perspective encompassing entire smart grid but enabling enlargements to details**
- Be able to be represented using established and state-of-the art System Engineering technology and methodologies (e.g. lifecycle model, architecture standards and methods)
- Take into account Standardization activities (regional, Europe, international)
- Be able to reflect European Pilot and research projects (regional, Europe, international)

Set of standards

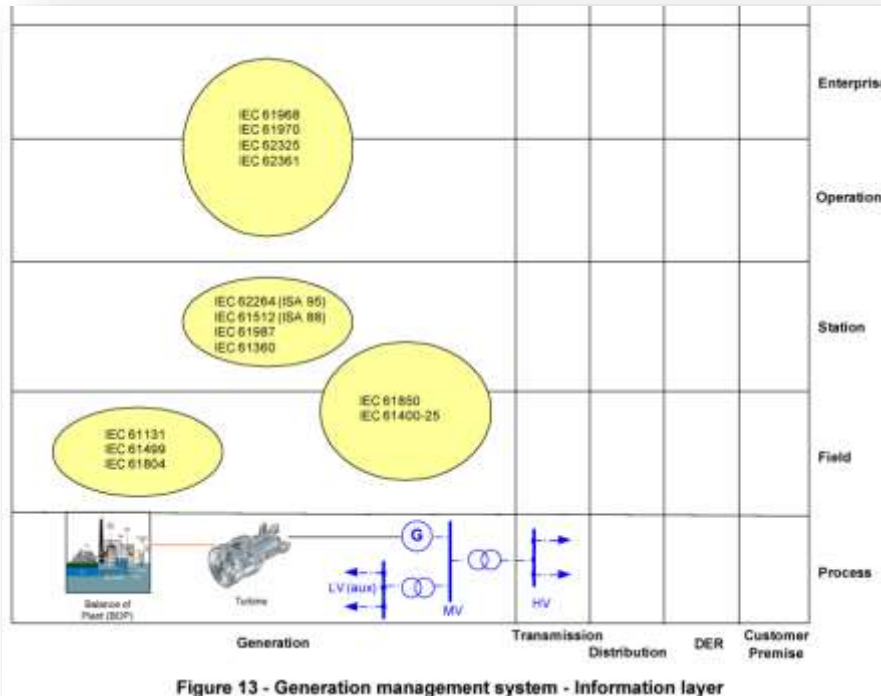
Set of standards = Smart Grid users a selection guide which, depending on the targeted system and the targeted layer (component, communication or information layers) will set out the most appropriate standards to consider

Table 14 - Generation management system - Available standards

Layer	Standard	Comments
Information	EN 61131	Programmable controllers
Information	EN 61499	Function Blocks
Information	IEC 61804	Function Blocks for process control
Information	IEC 62264	Enterprise-control system integration (ISA 95)
Information	IEC 61512	ISA 88
Information	IEC 61987	Industrial-process measurement and control - Data structures

Table 15 - Generation management system - Coming standards

Layer	Standard	Comments
Information	EN 61968-1 EN 61968-3 EN 61968-11	Application integration at electric utilities - System interfaces for distribution management
Information	EN 61970-301 EN 61970-302 EN 61970-452 EN 61970-453 EN 61970-458 EN 61970-502-8 EN 61970-552	Energy management system Application Program Interface for 61970
Information	EN 62325-301 EN 62325-451-1 EN 62325-451-6	CIM information model (Market profiles) – Refer to 8.7 for more details



SGAM was the base of other works: IEC, Industry 4.0 (RAMI)

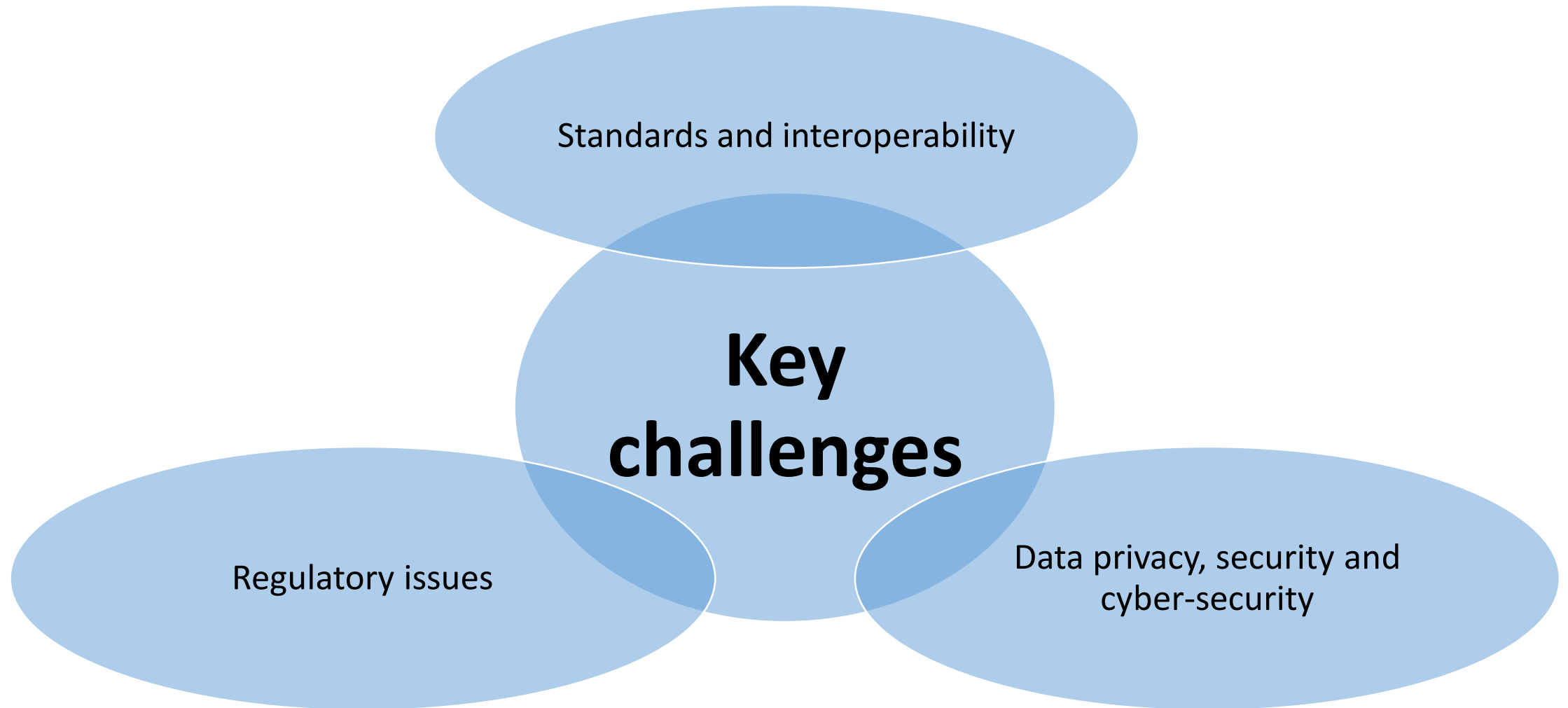
Status

- Recent new structure of the CEN-CENELEC ETSI Smart Grid Coordination Group (SG-CG)
- Last plenary meeting: 2022-11-25
- Working Group: Clean Energy Package
 - Task: to ensure that the SG-CG supports the implementation of the European Commission proposals for new rules for consumer-centred clean energy transition → i.e. the [Clean Energy for All Europeans package](#)
- Working Group: Set of standards
 - Task: to update the list of Smart Grids standards gaps and rank these gaps based on stakeholders' priorities + to update the 'Set of standards' based on new inputs
- Working Group Smart Metering
 - Task: to provide a focal point for smart metering standardization in respect to the field of measuring instruments and for the development of an open architecture and advanced multi-utility metering infrastructure involving communication protocols enabling interoperability
- Working Group Privacy & Security
 - Task: monitor the work of European Commission group on Security & Privacy + check whether security and privacy matters are covered by standards + liaise with CEN-CENELEC JTC13 'Cybersecurity and Data Protection'

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 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)).
- TC SET (Secure Element Technologies) core platform specification defining the interface between a UICC (universal integrated circuit card) and a terminal (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 V1.1.2 \(2020-05\)](#): SmartM2M; Extension to SAREF; Part 1: Energy Domain
 - [ETSI TS 103 410-1 V1.1.1 \(2017-01\)](#): SmartM2M; Smart Appliances Extension to SAREF; Part 1: Energy Domain

Key challenges for Smart Grid/Meter rollout



Commission Recommendation 2012/148/EU on preparations for the roll-out of smart metering systems

1. Data protection and security considerations

- Data protection impact assessment
- Data protection by design and data protection by default settings
- Data protection measures
- Data security
- Information and transparency on smart metering

2. Methodology for the economic assessment of the long-term cost and benefits for the roll-out of smart metering systems

3. Common minimum functional requirements for smart metering systems for electricity

[>>Download Commission recommendations 2012/148/EU dated March 9, 2012](#)

Commission Recommendation of 10 October 2014 on Data Protection Impact Assessment Template for Smart Grid and Smart Metering Systems

- The DPIA Template is an **evaluation and decision-making tool** which helps entities planning or executing investments in smart grids **to identify and anticipate risks to data protection, privacy and security**.
- The DPIA provides **guidance to help ensure the fundamental rights to protection of personal data and to privacy** in the deployment of smart grid applications and systems and smart metering roll-out.
- **Smart Grids Task Force** in September 2018, has updated [impact assessment template](#) which serves as guidance on data protection and privacy for data controllers and investors in smart grids.

[Download EC recommendation dated 10 October 2014>>](#) and Updated DPIA template is available [here>>](#)

Cybersecurity in Energy Sector

- Digitalisation in Energy sector creates significant risks as an increased exposure to cyberattacks and cybersecurity incidents potentially jeopardizes the security of energy supply and the privacy of consumer data.
- European Commission has taken following key measures to tackle with Cybersecurity and related challenges
 - [EU Cybersecurity Strategy](#) 2020: It covers the security of essential services particularly in the **energy sector**.
 - [Cyber Resilience Act 2022](#): the proposal for a regulation on cybersecurity requirements for products with digital elements, known as the [Cyber Resilience Act](#), bolsters cybersecurity rules to ensure more secure hardware and software products.
 - [Directive on Security of Network and Information Systems \(the NIS Directive\) \(EU\) 2022/2555](#)
 - [EU Cybersecurity Act](#):
 - strengthens the EU Agency for cybersecurity (ENISA) and establishes a cybersecurity certification framework for products and services.
 - introduces an EU-wide cybersecurity certification framework for ICT products, services and processes.
 - On 18 April 2023, the Commission [proposed a targeted amendment to the EU Cybersecurity Act](#).

Continue...

- [Implementing decision establishing priority lists for the development of network codes and guidelines for electricity for the period from 2020 to 2023 and for gas in 2020 \(EU\)2020/1479](#)
 - sector-specific rules for cyber security aspects of cross-border electricity flows, including rules on common minimum requirements, planning, monitoring, reporting and crisis management;
- [Commission recommendation on cybersecurity in the energy sector \(C\(2019\) 2400 final\)](#)
 - provides guidance on how to address the specific challenges of the energy sector on cybersecurity and identifies the main actions required to preserve cybersecurity and be prepared to possible cyberattacks in the energy sector, taking into account the characteristics of the sector such as the real-time requirements, the risk of cascading effects, and the combination of legacy systems with new technologies.
- [Report: Recommendations on implementation on sector-specific rules for cybersecurity](#), Smart grids task force expert group 2 (June 2019)
 - Aspects of Cross-Border Electricity Flows, on Common Minimum Requirements, Planning, Monitoring, Reporting and Crisis Management,
- Study: [Evaluation of risks of cyber-incidents and on costs of preventing cyber-incidents in the energy sector](#) (October 2018)
- [Regulation on gas security of supply \(\(EU\) 2017/1938\)](#)
- [Report: Cyber security in the energy sector](#), Energy Expert Cyber Security Platform (February 2017)

Conclusion

- Standards play an important role in implementing smart grid and meter projects
 - standardization work will continue to cope with technical improvements and new technologies
- Digital and sustainable transformation of energy system across European Union (EU) is seen as essential to become independent on 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 important energy savings, benefitting all consumers.”
- CEN-CENELEC-ETSI Smart Energy Coordination Group is pioneer for smart grid and metering standardization
- For Smart Energy, we shall also need to promote energy efficiency
 - Eco-design of the products
 - Interoperability to achieve economies of scale
 - Energy monitoring and management etc.

A handwritten message in blue ink that reads "Thank you!". The script is cursive and fluid, with a large exclamation mark at the end.

Dinesh Chand Sharma

(Seconded European Standardization Expert in India)

Director – Standardization & Public Policy

SESEI C/O EBTC, DLTA Complex, Gate No 3, 1st Floor, 1, Africa Avenue,
New Delhi 110029

Mobile: +91 9810079461, **Tel:** +91 11 3352 1525,

dinesh.chand.sharma@sesei.eu

www.sesei.eu ⇔ www.sesei.in