



# ETIP SNET WG4

## Digitisation of Energy System and Customer Participation (Digital Energy)

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# WG4 Membership

- **Chairman:** Maher Chebbo (ESMIG; GE Power)
- **Vice Chairmans:**
  - Esther Hardi (EDSO; Alliander)
  - Miguel Sanchez (EUTC; Iberdrola)
- ~100 applications
- ~60 are selected to be **active members** of the WG4. Selection **criteria** :
  - Expertize
  - Stakeholders
  - European Coverage
  - Gender
  - Motivation and time allocated
  - ...
- The remaining ~40 are informed Quarterly, invited sometimes as guest speakers

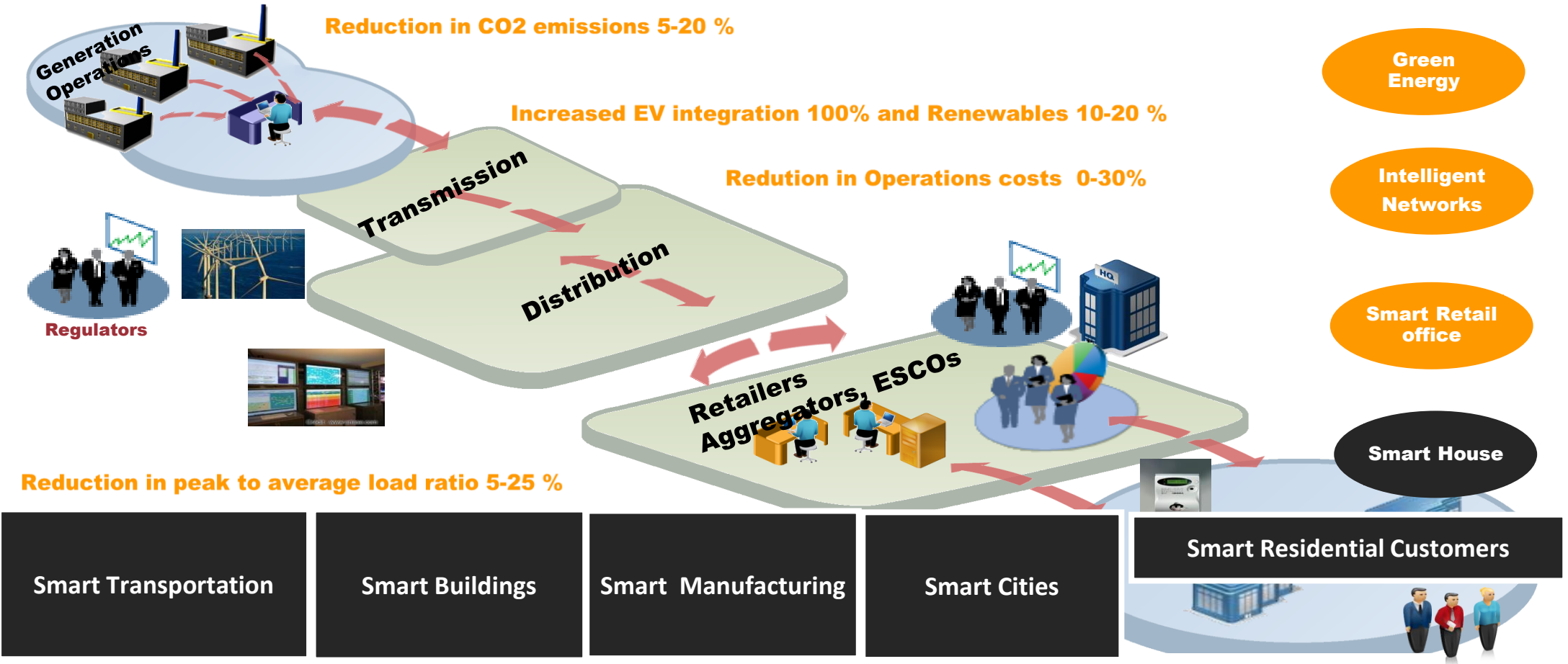
# WG4 Stakeholders

- Consumers
- DSO/TSO
- Equipment suppliers
- ICT Technology providers
- Telecom operators
- Renewable Energy Sources providers
- Research and Academia
- Others

# WG4 Objectives

- Support the **energy transition**
- Support the **digital transformation** introduced in every aspect of the **economy and customers' daily life**
- Bring **innovations** related to digitalization of energy sector
- Contributions will be required to **provide expertise** and to get a **better knowledge of ongoing R&I projects**

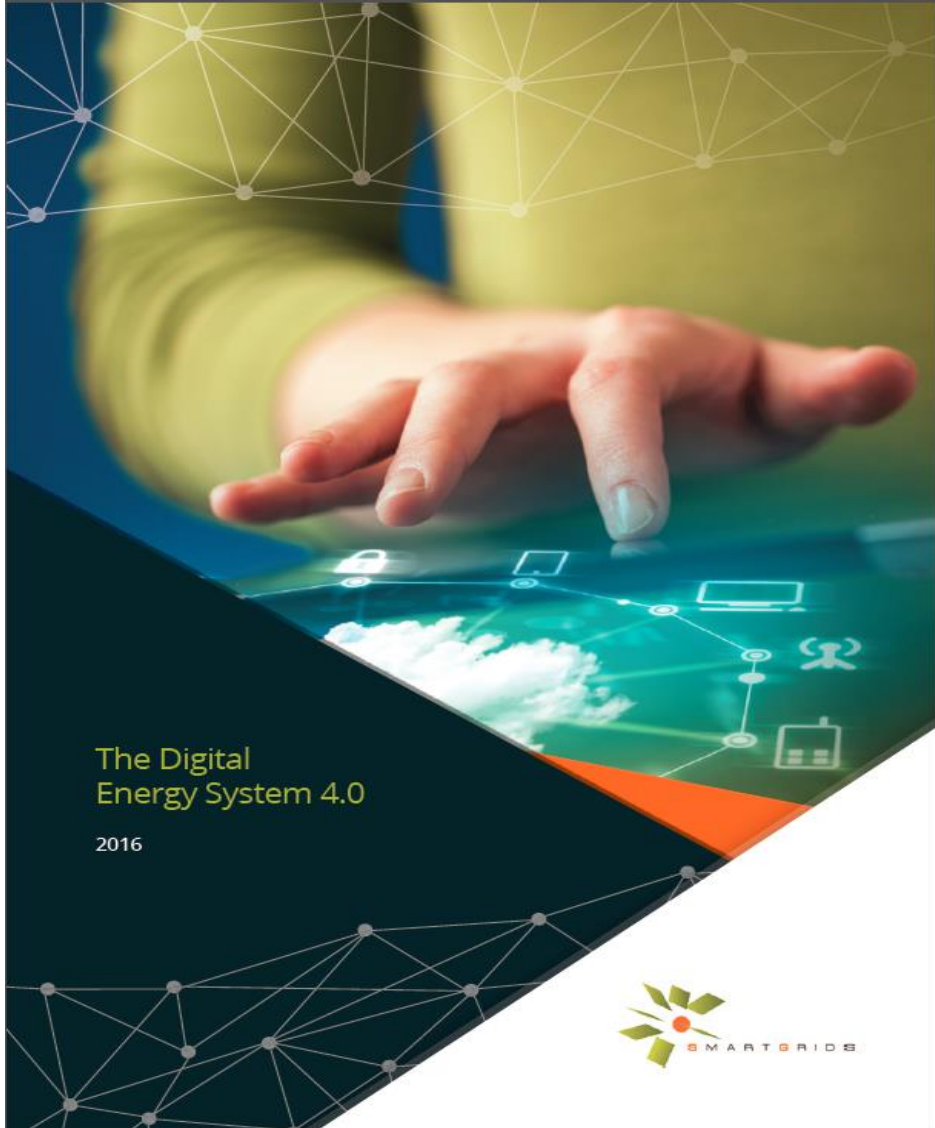
# By 2025, can we predict that 90% of C&I and 70% of Residential Customers will run Energy Smarter ? Or ?



90% of C&I (25 Sectors) with Smart Energy by 2020 ?

70% of Res. Customers as Smart Home by 2020 ?

# The Digital Energy System 4.0 by ETP SmartGrids



## **1) Foreword**

## **2) What does Digital Transformation mean? What are the use cases ?**

## **3) Practical use cases and field trials**

### **3.1. Digital use cases for power generation**

- 3.1.1 Probabilistic forecasting of wind generation, forecasting of extremes and optimal use of forecasts in power system operations and markets.
- 3.1.2 Smart curtailment, dynamic line rating and Improved forecasting tools to maximize integration of wind

### **3.2. Digital use cases for transmission & distribution networks**

- 3.2.1 The STAR project: Remote operation and Grid Automation systems
- 3.2.2 Innovative Tools for Electrical System Security within Large Areas
- 3.2.3 Autonomous grid reconfiguration and forecasting in the MV grid
- 3.2.4 Meter data management for network operation in the LV grid
- 3.2.5 Collaborative Asset Management
- 3.2.6 Advanced tools and ICT servicers for Distribution System Operators
- 3.2.7 A Platform to interface demand side management with DSO needs

### **3.3. Digital use cases for retailers and aggregators**

- 3.3.1 Empowering SG Market Actors through Information and Communication Technologies
- 3.3.2 IDE4L Use Cases on technical and commercial aggregators
- 3.4. Digital use cases for consumers & Prosumers 45
- 3.4.1 Dynamic pricing and Demand Response Management
- 3.4.2 Smart houses in a smart grid environment
- 3.4.3 Smart charging of electric vehicles
- 3.4.4 Neighborhood energy management
- 3.4.5 Use cases
- 3.4.6 Technology development needed to meet the challenges

### **3.5. Digital use cases for new market platforms**

- 3.5.1 Local Energy Markets
- 3.5.2 ICT tools for cross-border markets
- 3.5.3 The DSO as market facilitator
- 3.5.4 The Universal Smart Energy Framework

## **4) Main recommendations on Digital roadmap**

## **Conclusions**

## **Appendix: ETP SG Workshop on Energy Digitalization**

(ETP SmartGrids **Digital Energy 4.0** task force chaired by M. Chebbo) – white paper issued in May 2016

# The Digital Energy System 4.0 by ETP SmartGrids



- Major conclusions:
  - **Digitalization** will be happening
    - Cost-benefit analysis not always positive
  - Actors need to adjust their **internal operational and business strategy**
    - Adopt **new technologies**
    - More interaction through **dedicated platforms and data exchanges**
  - **Regulation** plays an important role
    - They have to provide the correct **incentives** to **develop** the required **technologies**
  - **Funding research agencies** will be necessary

# Top 10 recommendations for the Digital Roadmap of Europe



Predicted spending of 50 b€ for the Digital Transformation of Europe  
Energy 22% annual growth rate and €330 billion annual economic benefit for European Industry by 2020  
Utilities can get additional 30% revenues from Energy Data Services

1. **Do not miss** the non-reversible Digital Transformation. Otherwise, it will be too late.
2. SmartGrids Management is not (yet) a **plug and play story** but Digital SmartGrids is!
3. We should **empower ICT infrastructures** using Digital simulation and forecasting models
4. The development of Open **electronic Marketplaces** will boost Digital Energy
5. **Well-guided data confidentiality** accelerates the digital transformation
6. Digital **well designed Energy Management** can successfully integrate massive renewables
7. **Leveraging Digital technologies** will also enable a well-functioning, **open and flexible markets**
8. **Digital home technologies** can shift residential consumption during peak demand
9. Keep investing in **disruptive digital technologies** while thinking first your **digital use cases**
10. Setup a **Virtual Innovation Hub** focusing on innovations in new **Energy Services**



# Task Forces Themes

1. Digital Technologies and reference architectures and standards (Advanced IT, Telecommunications, ...IOT, Big Data, Blockchain, Exchange Platform), data Science and Modeling (**ENABLERS**)
2. Digital Energy Disruptive Use Cases and New Market and Business Models (**SERVICES**)
3. Digital Cyber-Security recommendations (**ROBUST**)

# Scope of WG4

- Full digitalisation in both **transmission and distribution networks**
  - **Development of tools** for monitoring, automation and control, cybersecurity; use of big data, IoT and tools to network management
  - Use of IoT and data mining to develop **smart asset management strategies**, manage the network, closer to physical limits
  - Coordinate and participate in **standardization activities** for communication and data exchanges between stakeholders
  - Develop scalable solutions to address **large-scale data management** issues in power system
  - Ensure **physical and cyber-security** of digital substations

# Scope of WG4

- **Cybersecurity** issues:
  - Identify and define **cyber-security issues** (confidentiality, integrity, vulnerability and availability of information flow) by considering the different layers of SGAM
  - Identify the existing **standards**, possible **gaps** and provide potential **improvement**
  - Explore possible **cyber-security R&I issues** for Smartgrids
- Leverage knowledge of **consumer data**:
  - Efficient **data mining algorithms** for various applications (generation/load forecast, consumer behavior, failure/aging models for network components)
  - Efficient **data mining algorithms** for market players to create **new business opportunities**
  - Address **data privacy** concerns, while ensuring **transparent** and **non-discriminatory** access to the data for all market players
  - Develop standard systems for **editing smart meter data** with different customer interfaces and **connected to smart appliances**

# Scope of WG4

- **Consumer involvement** in the development and operation of the energy system:
  - **Improve public awareness** of long term energy challenges and the need to build and protect energy infrastructure to increase the social benefit of energy use
  - **Assessment of new environmental challenges** improvement of the energy infrastructure land use and **environmental integration**
  - Exploit new channels for the **public consultation processes**



# Thank you!

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