



ETIP SNET WG4

Digitalization of Energy System and Consumer Participation (Digital Energy)

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Working Group 4 Representative

Chairman of FOSS Research Centre for Sustainable Energy

Nicosia Regional Workshop

November 24th 2017

WG4 Membership

- **Chairman:** Maher Chebbo (ESMIG; GE Power)
- **Vice Chairmen:**
 - 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

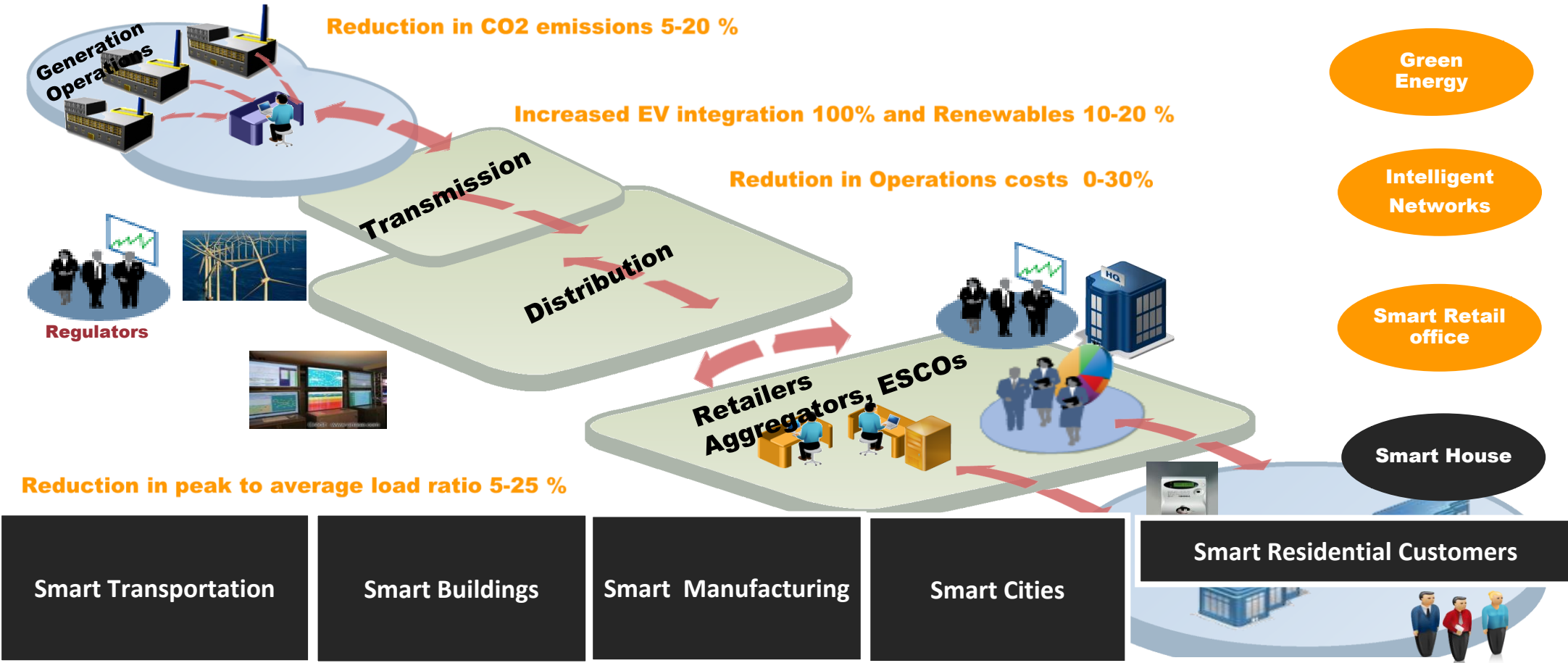
WG4 Stakeholders

- 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**

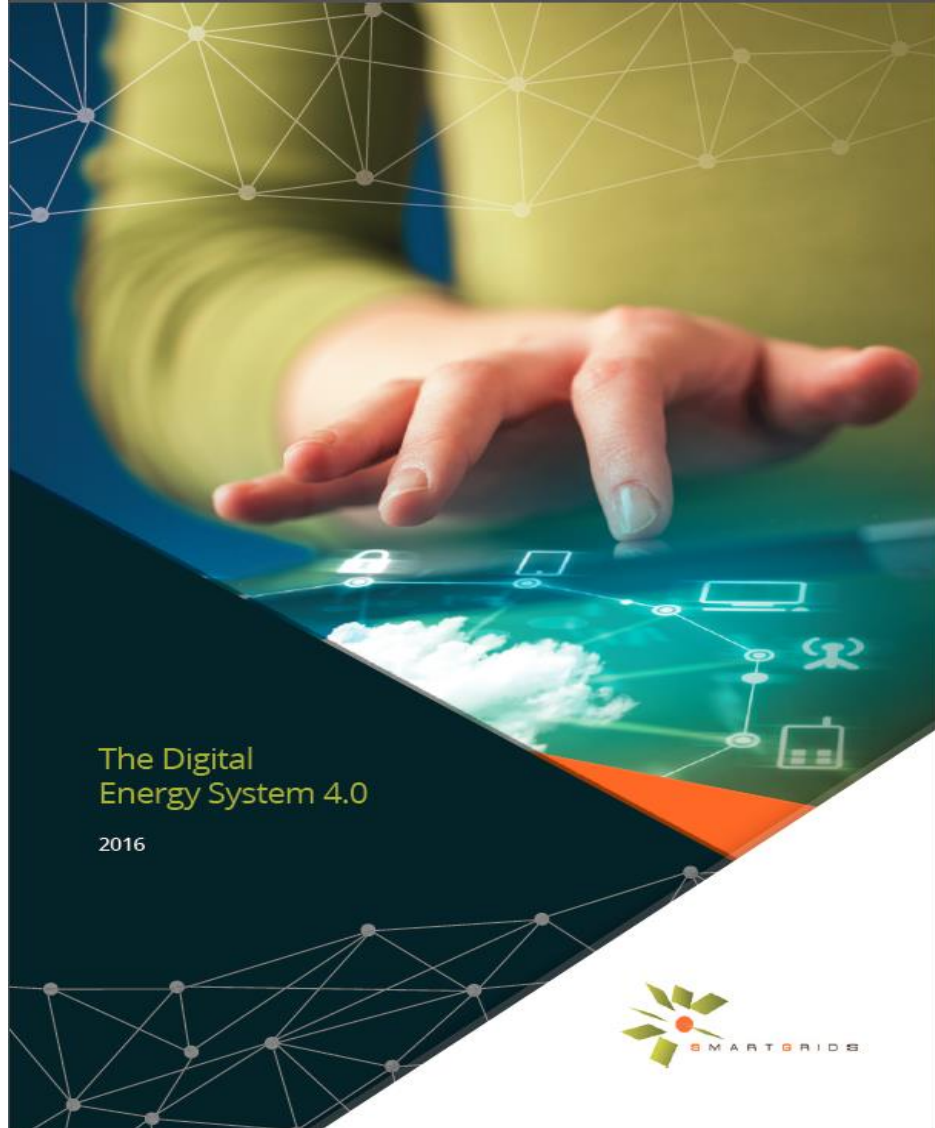
By 2025, can we predict that 90% of C&I and 70% of Residential Customers will run Energy Smarter ? Or ?



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 & €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 Marketplace** 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 Modelling (**ENABLERS**)
2. Digital Energy Disruptive Use Cases and New Market and Business Models (**SERVICES**)
3. Digital Cyber-Security recommendations (**ROBUST**)

Scope of WG4

- Full digitalization 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**



ETIP SNET

EUROPEAN SMART
TECHNOLOGY AND NETWORKS FOR
INNOVATION PLATFORM ENERGY
TRANSITION

Thank you!

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