Challenges & Actions for Smart Grid Deployment in the EU Internal Energy Market

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Directorate-General for Energy

European Commission

S3P Energy: Smart Mediterraneo

Bari, 23-24 June 2016

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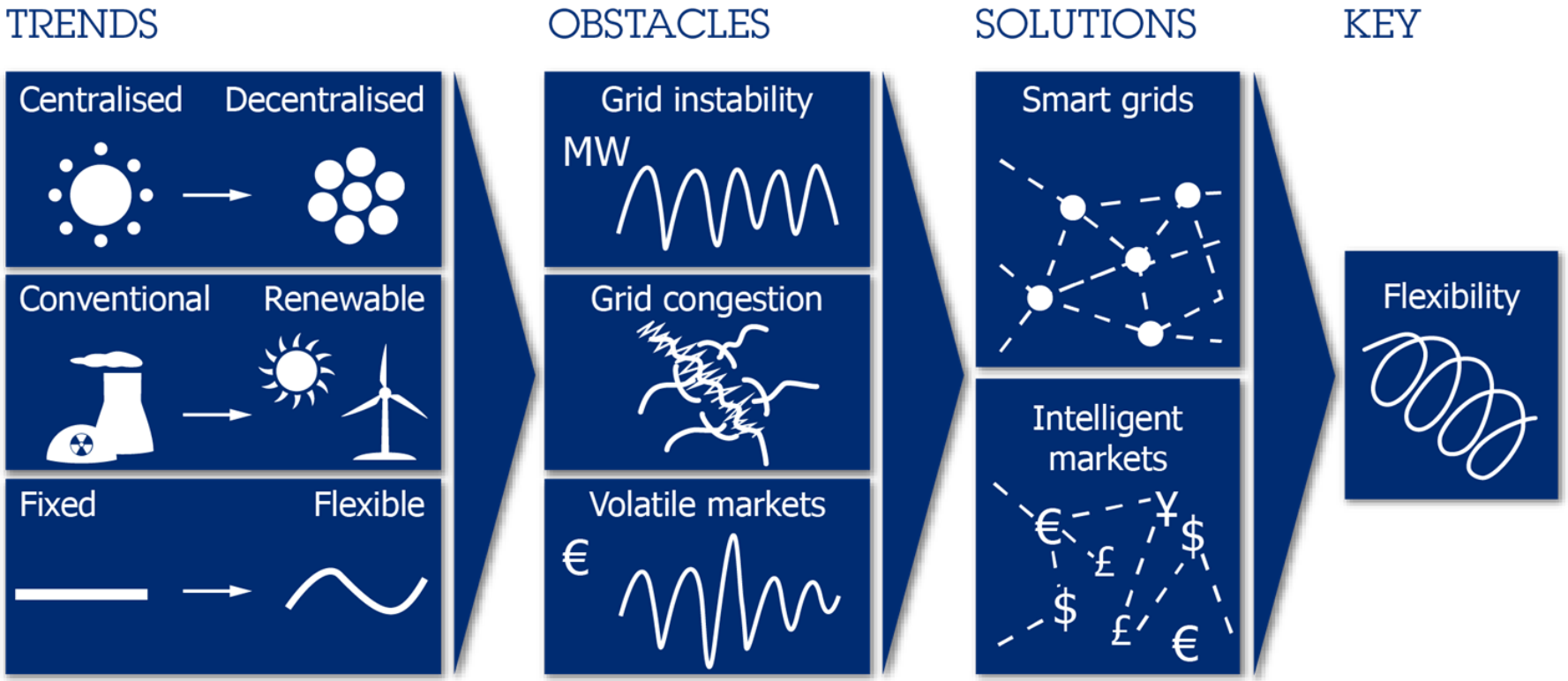
Context: Energy Union policy - energy landscape



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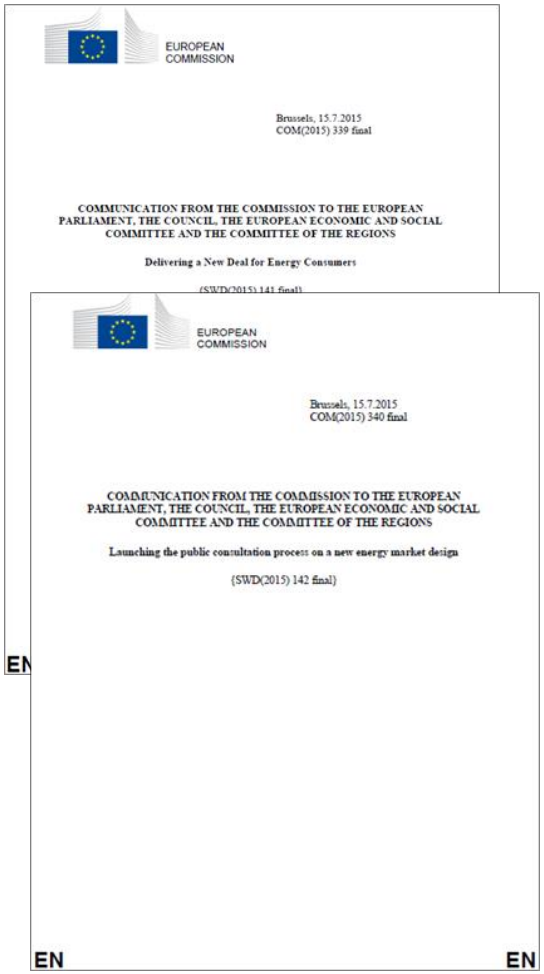
Recent policy drivers

Energy Union

- Security, solidarity and trust
- Integrated European market
- Energy Efficiency
- Decarbonisation of the economy
- R&D&i and competitiveness



EUROPEAN COMMISSION

Brussels, 15.7.2015
COM(2015) 339 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Delivering a New Deal for Energy Consumers

{SWD(2015) 141 final}

EN

EUROPEAN COMMISSION

Brussels, 15.7.2015
COM(2015) 340 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Launching the public consultation process on a new energy market design

{SWD(2015) 142 final}

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Summer package

- ✓ Market Design Initiative
- ✓ "New Deal" for Energy Consumers
- ✓ ETS reform
- ✓ Energy Labelling

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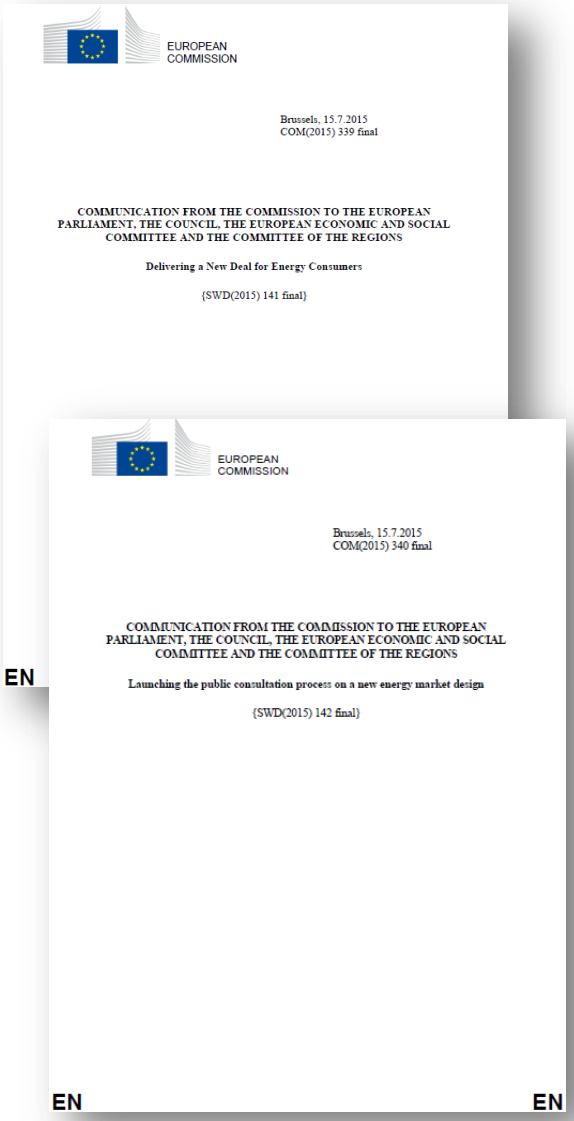
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{SWD(2015) 142 final}

EN EN

Follow-up to Summer Package: towards a legislative proposal

A challenging process

- ✓ Assessment of status, good practices and barriers
- ✓ Definition of policy options to enhance flexibility markets
- ✓ Impact assessment of options
- ✓ **Legislative proposal by the end of 2016**

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Smart grid related EU legislation & policy documents

- ✓ Electricity Directive 2009/72/EC; Gas Directive 2009/73/EC
- ✓ Energy Efficiency Directive 2012/27/EC
- ✓ Energy Infrastructure Regulation (EU) 347/2013
- ✓ Electro-mobility Alternative Fuels Directive AFID; COM(2013)18
- ✓ Recommendation 2012/148/EU on smart metering
- ✓ Recommendation 2014/724/EU Data Privacy Impact Assessment
- ✓ COM(2011)202 on Smart Grids
- ✓ COM(2012)663 on the Internal Energy Market
- ✓ COM(2013)7243 on IEM and public intervention
- ✓ SWD(2013)442 on Demand Side Flexibility
- ✓ COM(2014) 356 Smart Metering & accompanying SWDs
- ✓ COM(2015) 339 on delivering a 'new deal' for energy consumers

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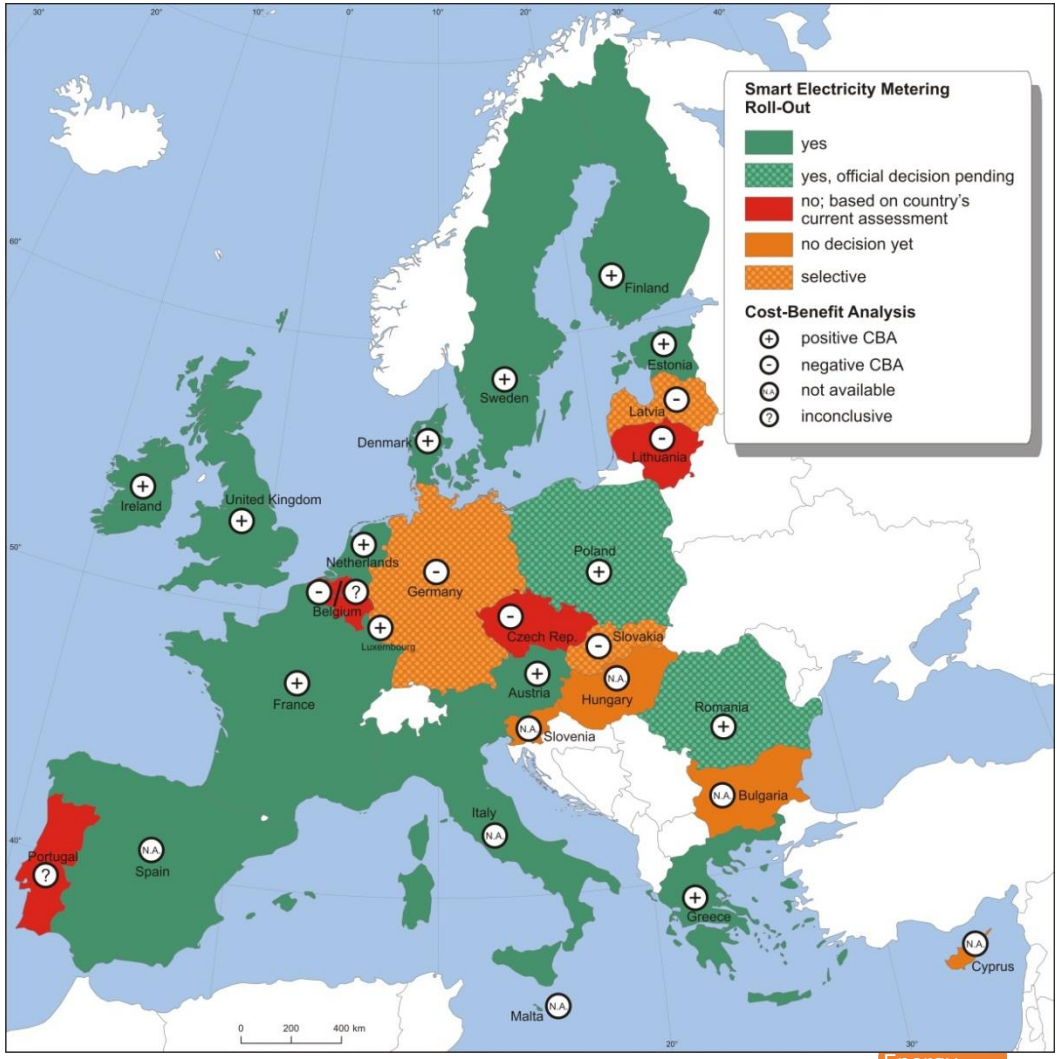
Investments in smart metering



Roll out of ELECTRICITY smart metering by 2020:

- 22 CBAs, 17 MS: large-scale roll-out
- ~ 72% EU consumers
- 195 million meters
- € 35 billion

ref. COM(2014) 356; SWD(2014) 189

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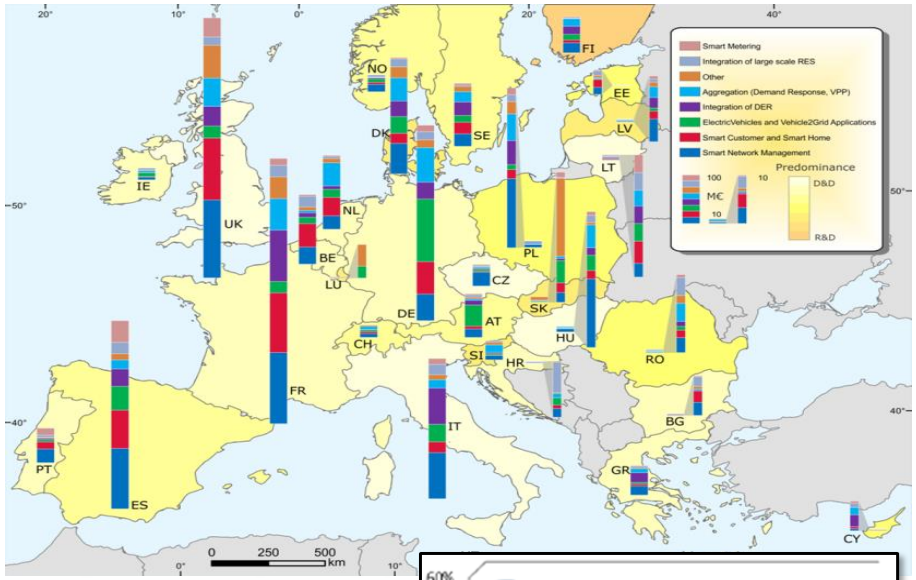
Investments in Smart Grids projects (2013, excl. metering)



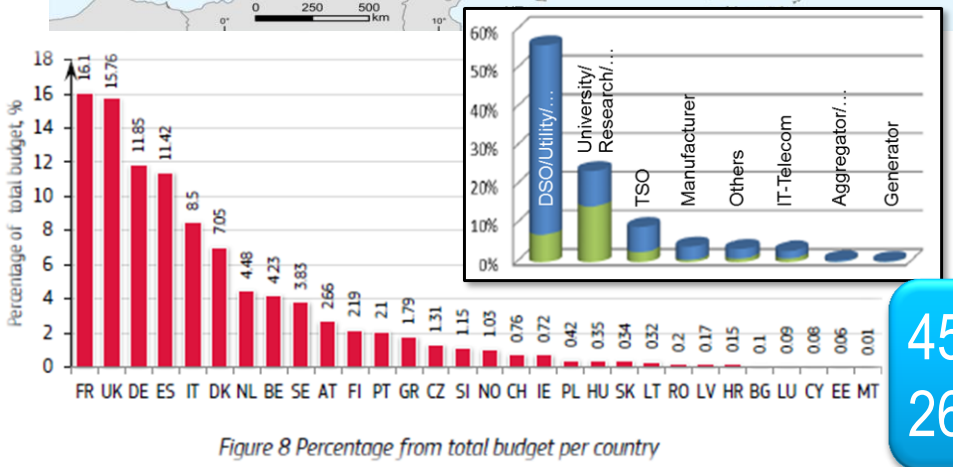
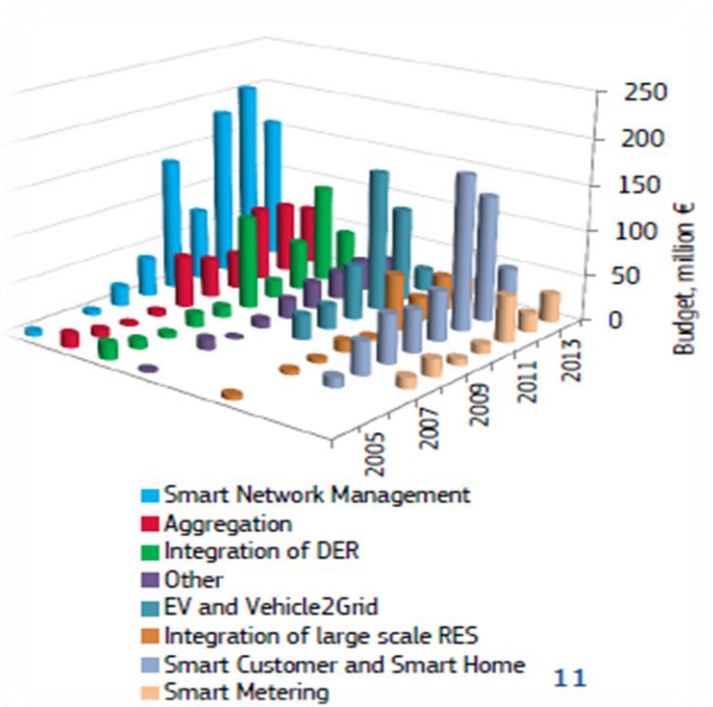


Figure 8 Percentage from total budget per country

Next update: still in 2016



11

459 smart grid projects - €3.15 billion
26% R&D and 74% Demo & Deployment

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European Smart Grids Task Force is working on key challenges

- Standards and interoperability
- Data privacy, data protection and cyber-security
- Regulatory issues
- Industrial policy and infrastructure

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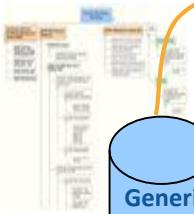
Standards & Interoperability

European Commission

Smart Grids standardisation process completed

2. Step
Map GUCs to SGAM
Security and privacy evaluation



Generic Use Cases (GUC)

Use Cases Management Repository

SGAM

SL & DPC

3. Step
Locate requirements for standards

4. Step
Identify existing standards and new gaps

existing standards, gaps

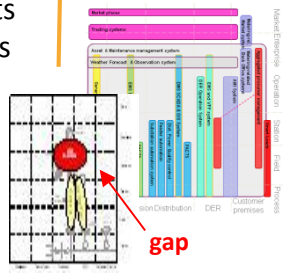
5. Step
Definition of standardization projects

Standardization projects (responsible committees, work plan, deliverables)

6. Step
Work on standards

existing, modified and new standards

Smart Grid Standards



Use Cases Sources

1. Step
Identification of Generic Use Cases

CEN CENELEC ETSI
European Standardization Organizations
Smart Grid Coordination Group

Prioritization

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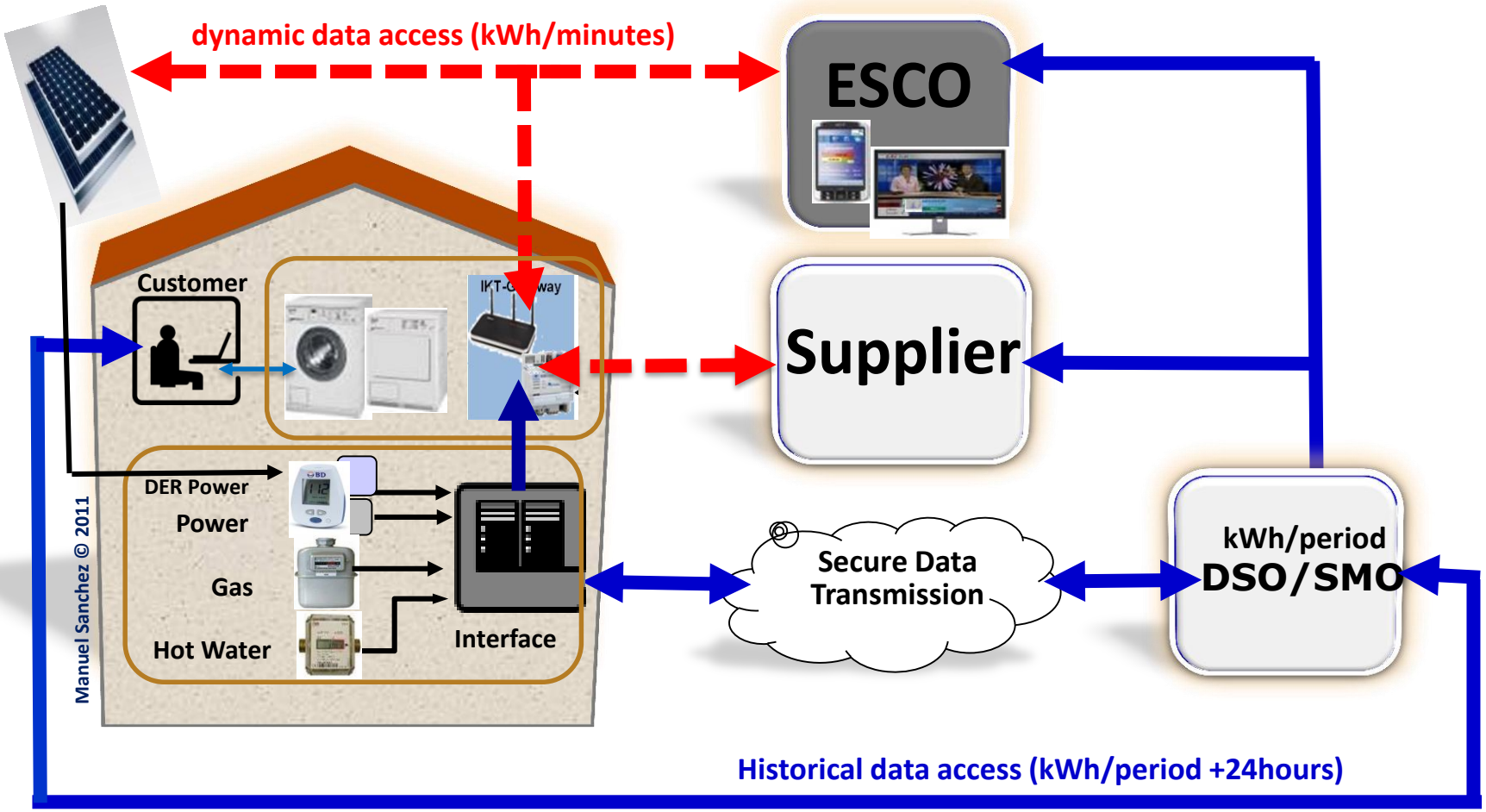
Standards & Interoperability

European Commission

Open model for consumption data flow – an example



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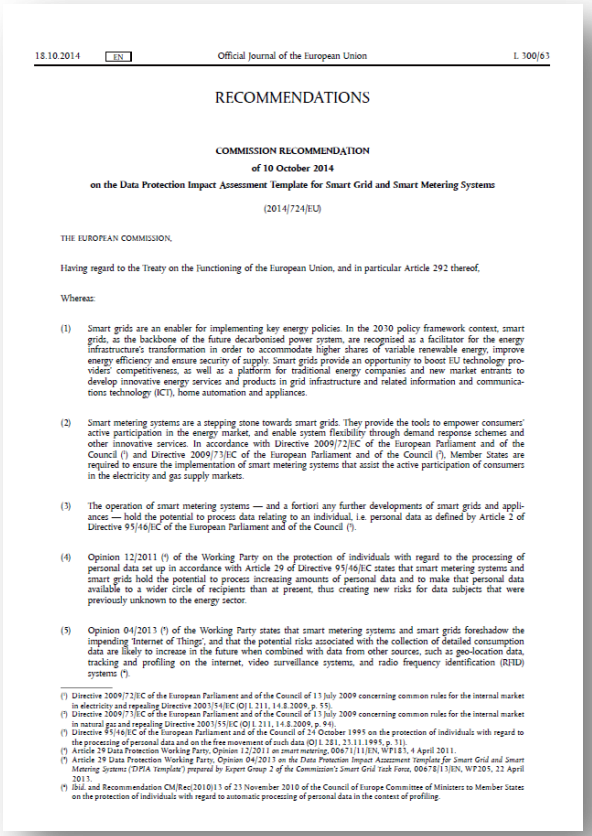
Data Protection

European Commission

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



18.10.2014 EN Official Journal of the European Union L 300/63

RECOMMENDATIONS

COMMISSION RECOMMENDATION
of 10 October 2014
on the Data Protection Impact Assessment Template for Smart Grid and Smart Metering Systems
(2014/724/EU)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 292 thereof,

Whereas:

(1) Smart grids are an enabler for implementing key energy policies. In the 2030 policy framework context, smart grids, as the backbone of the future decarbonised power system, are recognised as a facilitator for the energy infrastructure's transformation in order to accommodate higher shares of variable renewable energy, improve energy efficiency and ensure security of supply. Smart grids provide an opportunity to boost EU technology providers' competitiveness, as well as a platform for traditional energy companies and new market entrants to develop innovative energy services and products in grid infrastructure and related information and communications technology (ICT), home automation and appliances.

(2) Smart metering systems are a stepping stone towards smart grids. They provide the tools to empower consumers' active participation in the energy market, and enable system flexibility through demand response schemes and other innovative services. In accordance with Directive 2009/72/EC of the European Parliament and of the Council (1) and Directive 2009/73/EC of the European Parliament and of the Council (2), Member States are required to ensure the implementation of smart metering systems that assist the active participation of consumers in the electricity and gas supply markets.

(3) The operation of smart metering systems — and a fortiori any further developments of smart grids and appliances — hold the potential to process data relating to an individual, i.e. personal data as defined by Article 2 of Directive 95/46/EC of the European Parliament and of the Council (3).

(4) Opinion 12/2011 (4) of the Working Party on the protection of individuals with regard to the processing of personal data set up in accordance with Article 29 of Directive 95/46/EC states that smart metering systems and smart grids hold the potential to process increasing amounts of personal data and to make that personal data available to a wider circle of recipients than at present, thus creating new risks for data subjects that were previously unknown to the energy sector.

(5) Opinion 04/2013 (5) of the Working Party states that smart metering systems and smart grids foreshadow the impending 'Internet of Things', and that the potential risks associated with the collection of detailed consumption data are likely to increase in the future when combined with data from other sources, such as geo-location data, tracking and profiling on the internet, video surveillance systems, and radio frequency identification (RFID) systems (6).

(1) Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC (OJ L 211, 14.8.2009, p. 55).
(2) Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC (OJ L 211, 14.8.2009, p. 94).
(3) Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data (OJ L 281, 23.11.1995, p. 31).
(4) Article 29 Data Protection Working Party, *Opinion 12/2011 on smart metering*, 00671/11/EN, WP183, 4 April 2011.
(5) Article 29 Data Protection Working Party, *Opinion 04/2013 on the Data Protection Impact Assessment Template for Smart Grid and Smart Metering Systems ('DPIA Template') prepared by Expert Group 2 of the Commission's Smart Grid Task Force*, 00678/13/EN, WP205, 22 April 2013.
(6) Ibid. and Recommendation CM/Rec(2010)13 of 23 November 2010 of the Council of Europe Committee of Ministers to Member States on the protection of individuals with regard to automatic processing of personal data in the context of profiling.

- *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.*

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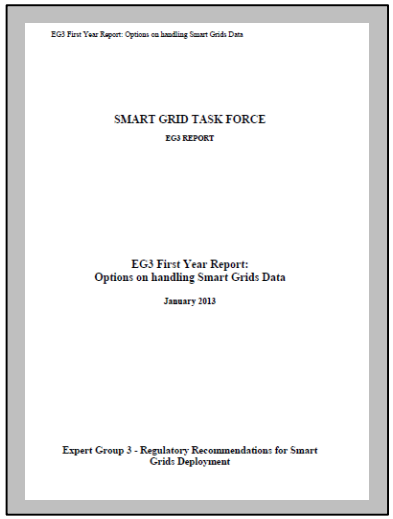
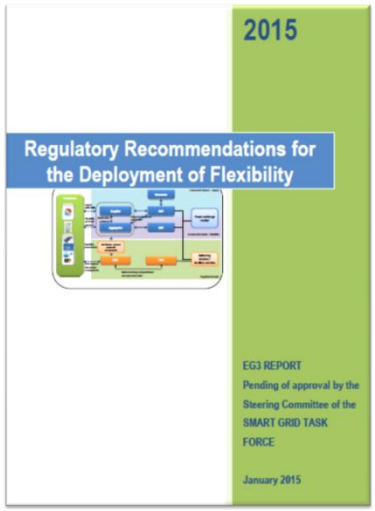
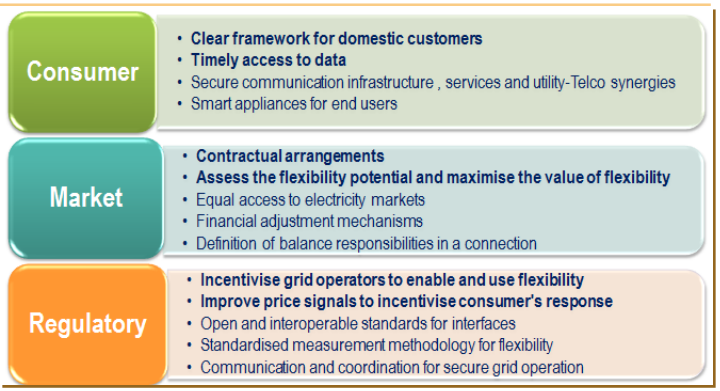
Regulatory Issues

European Commission

Regulatory aspects for SG deployment
SGTF on models for handling smart grid data & on deploying flexibility







In 2016:

Targeted workshops with relevant stakeholders:

- ***Demand Response & Self-consumption;***
- ***Smart homes and buildings;***
- ***Incentives for innovation;***

Next one:

On storage, incl. cross-sectorial solutions

https://ec.europa.eu/energy/en/topics/markets-and-consumers/smart-grids-and-meters/smart-grids-task-force

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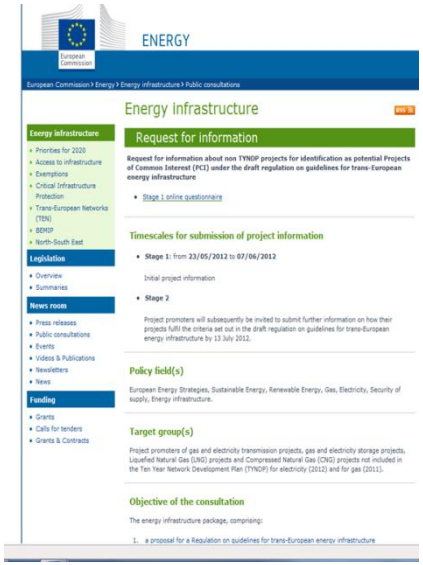
SG infrastructure

SG industrial policy

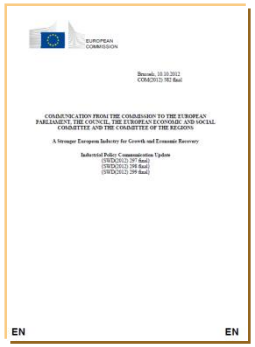
European Commission

Smart Grid infrastructure



Projects of
Common
Interest

Implementation of Smart Grid industrial policy



Expert Group 4 – Smart grid infrastructure deployment

Energy Infrastructure

Final report - Evaluation of smart grid projects within Smart Grids Task Force Expert Group 4

Inventory of EU Smart Grid projects – 2012 update

Information request for smart grid projects that aimed to be included in the EU's projects of common interest (PCI) under the draft regulation on guidelines for trans-European energy infrastructure:
Questionnaires/Templates for project proposals

Definition of an assessment framework for Projects of Common Interest in the field of smart grids

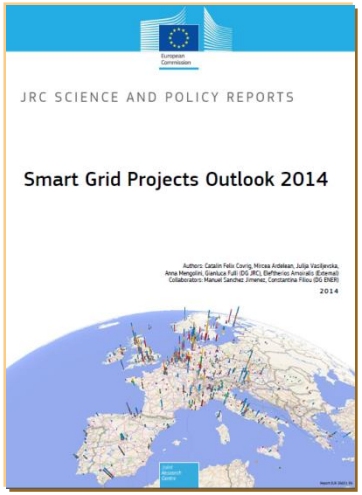
Telecommunications Infrastructure

Telecommunications issues covered by Expert Group 4

Expert Group 5 – Implementation of smart grid industrial policy

Smart Grids Project Outlook 2014 (Joint Research Centre)

Joint Research Centre survey for the collection of European smart grid projects



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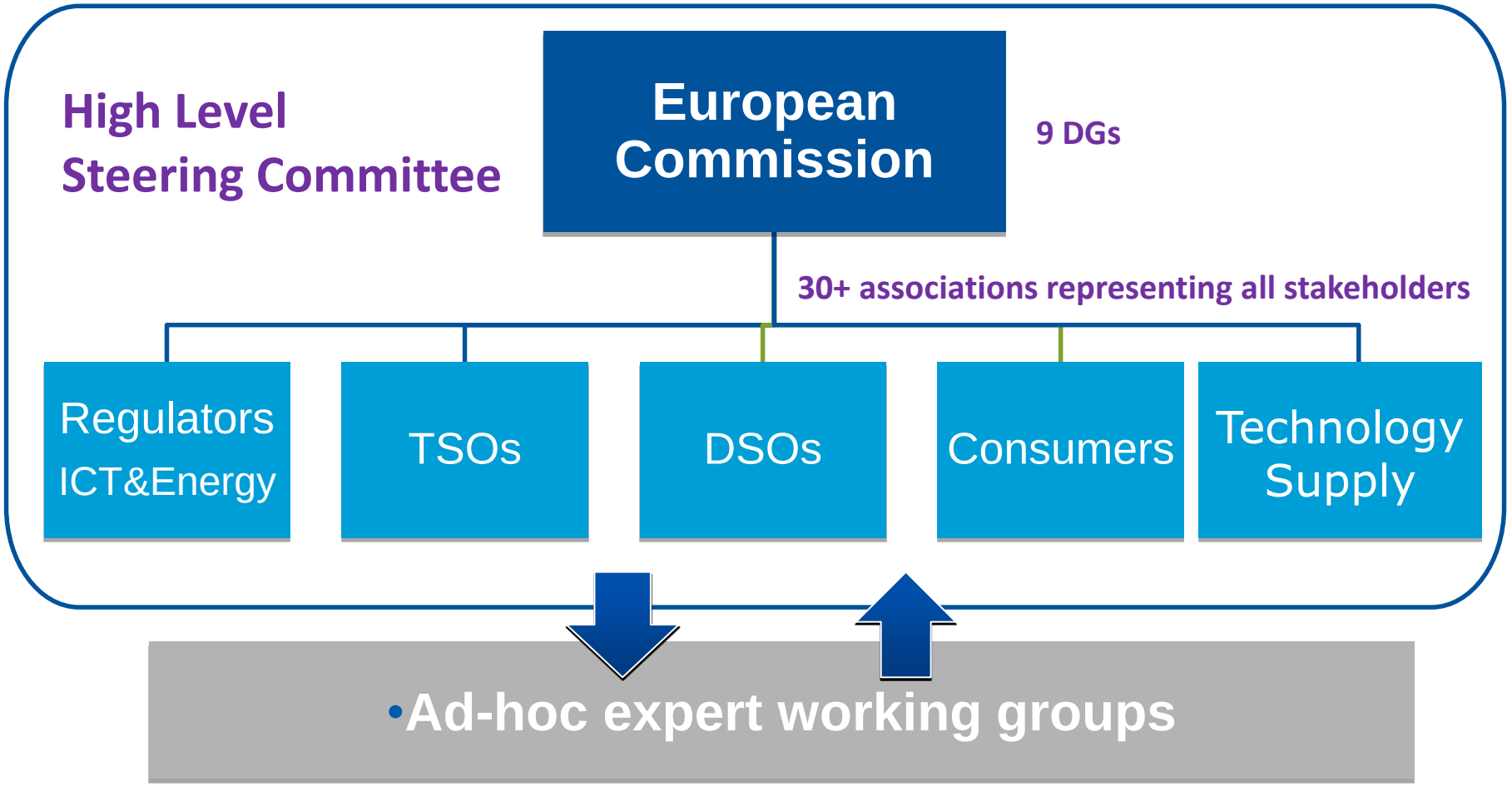
http://ec.europa.eu/energy/en

http://ec.europa.eu/energy/en/topics/markets-and-consumers/smart-grids-

European Smart Grids Task Force (SGTF)



350+ experts from national regulatory agencies and industrial market actors

https://ec.europa.eu/energy/en/topics/markets-and-consumers/smart-grids-and-meters/smart-grids-task-force

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Standards & Interoperability

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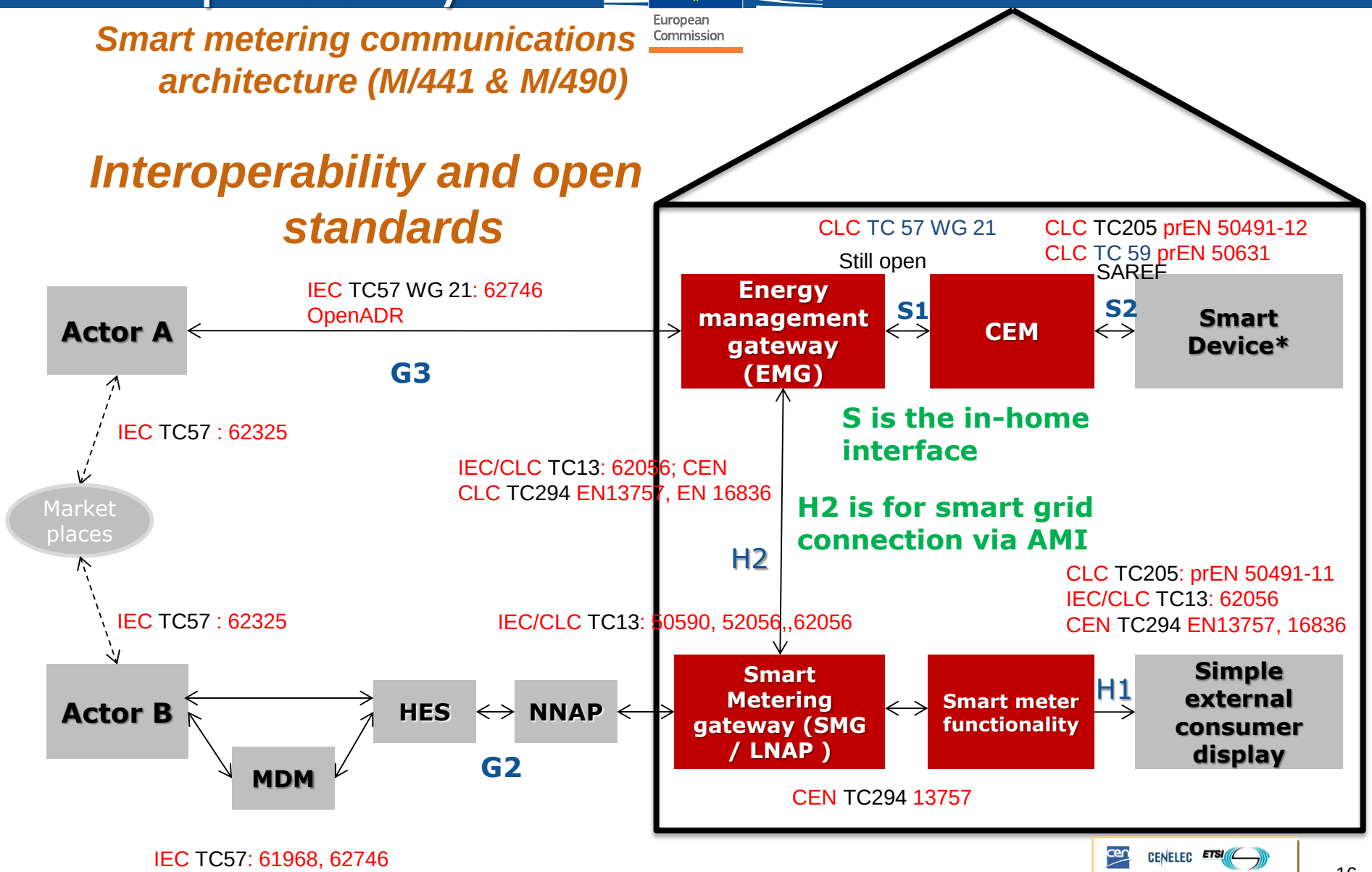
Smart metering communications architecture (M/441 & M/490)

Interoperability and open standards



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Smart Metering

European Commission

Commission Benchmarking Report Adopted on 17 June 2014

EUROPEAN COMMISSION

Brussels, 17.6.2014
COM(2014) 356 final

REPORT FROM THE COMMISSION

Benchmarking smart metering deployment in the EU-27 with a focus on electricity

{SWD(2014) 188 final}
{SWD(2014) 189 final}

"Benchmarking Smart Metering Deployment in the EU-27 with a focus on electricity"

- **Commission Report** (COM(2014) 356) *http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1403084595595&uri=COM:2014:356:FIN*

- **Country fiches** (SWD(2014) 188) *http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1403084595595&uri=SWD:2014:188:FIN%20*

- **Cost-benefit data analysis** (SWD(2014) 189) *http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1403084595595&uri=SWD:2014:189:FIN%20*

EN EN

Electricity Smart Meters Roll-Out Timelines in MS (at least 80% coverage)

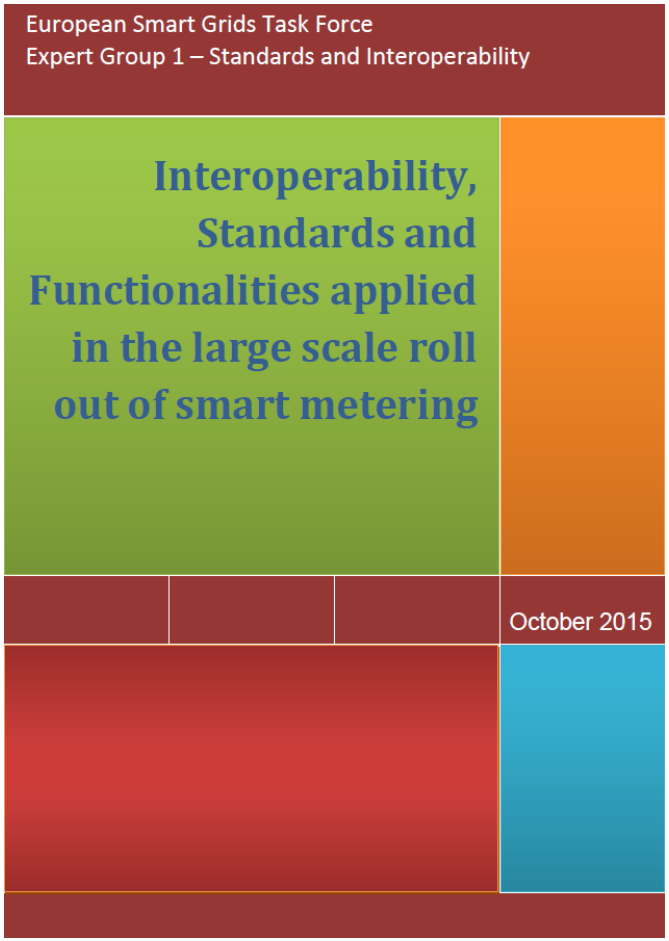
Sweden		2003	2009	Completed
Italy		2001	2011	Completed (ENEL: 2001-2006)
Finland	Mandated	2009	2013	
Malta	Mandated	2009	2014	
Spain	Mandated	2011	2018	
Austria	Mandated	2012	2019	
Poland	Under Discussion	2012	2020	
UK	Mandated	2012	2020	
Estonia	Mandated	2013	2017	
Romania	Under Discussion	2013	2020	
Greece	Mandated	2014	2020	
Netherlands	Mandated (timetable TBC)	2014	2020	
Denmark	Mandated (>1.5mn SM already installed)	2014	2020	
Latvia	DSO decision	2014	2020	
France	Mandated	2015	2020	
Luxembourg	Mandated	2015	2018	
Ireland	Mandated	2016	2019	

ref. COM(2014) 356; SWD(2014) 189

Smart Grids Task Force
Expert Group 1 – EG1

European Commission

Positive evolution since the 2014 smart metering benchmarking report



2015 EG1 Report on interoperability:

- All 17 MS plan to provide reading directly to consumers (USB, web, etc.)
- 14 MS frequent update readings (85% from EU)
- 12 MS support advance tariff systems
- Majority MS intents to roll-out standardised interfaces, but not improve interoperability

2016 focus on two streamlines:

- Investigate delivery of "demand response ready" interfaces
- Prepare the ground for a **"Green Button" at EU level** to standardise the type and format of consumer data

https://ec.europa.eu/energy/sites/ener/files/documents/EG1_Final%20Report_SM%20Interop%20Standards%20Function.pdf

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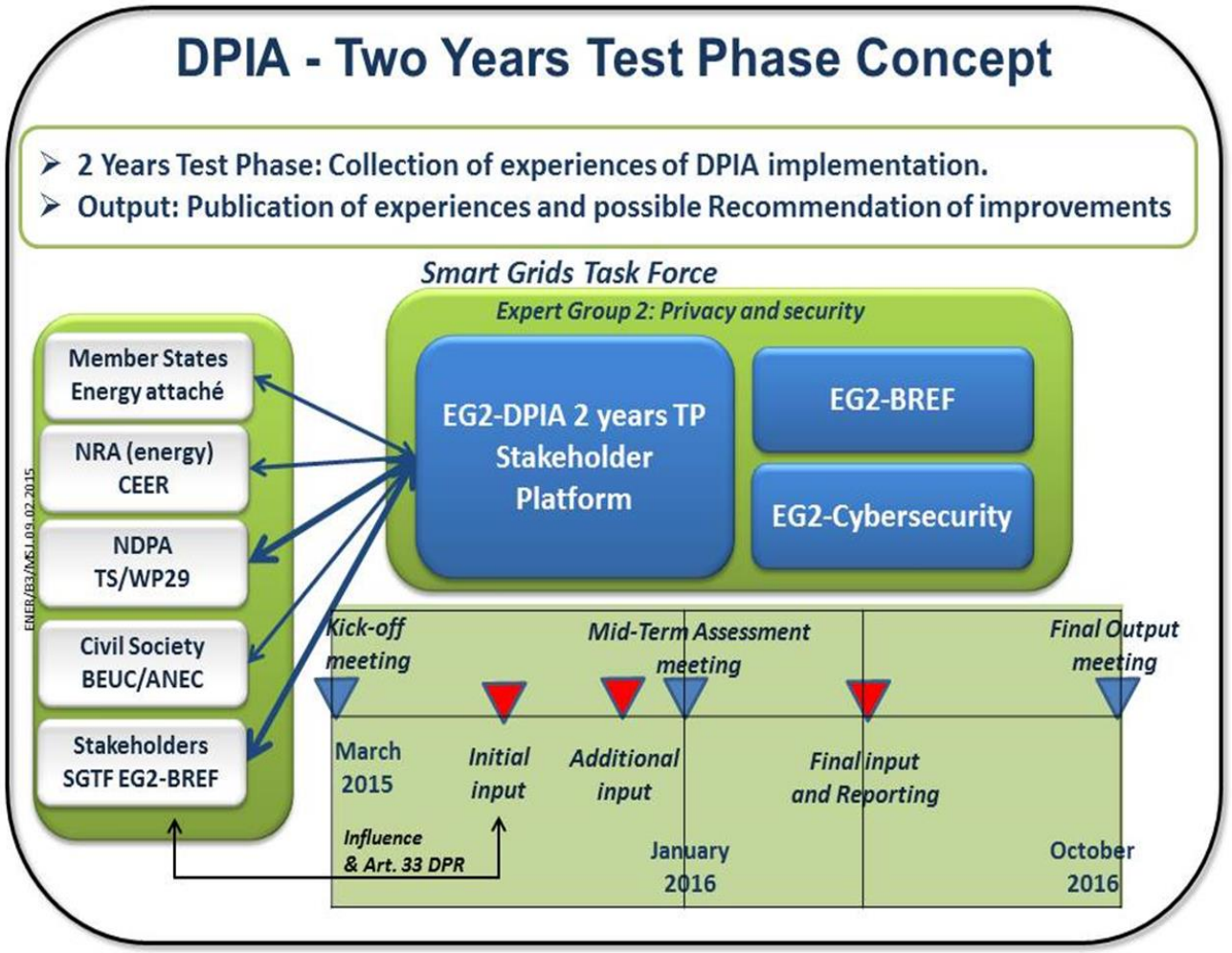
Data Protection



https://ec.europa.eu/energy/en/topics/markets-and-consumers/smart-grids-and-meters/smart-grids-task-force

SG infrastructure

European Commission

Smart Grid Projects of Common Interest

10. Priority thematic area Smart Grids Deployment

	Definition	Details on location	Promoter(s)	Type / technology employed	Implementation status	
N/A	North Atlantic Green Zone Project (Ireland, United Kingdom/Northern Ireland) aims at lowering wind curtailment by implementing communication infrastructure, enhanced grid control and interconnection and establishing (cross-border) protocols for Demand Side Management.	The North Atlantic Green Zone Project is located in the north west of the Republic of Ireland and West of Northern Ireland UK.	Electricity Supply Board - ESB Networks Ltd. Northern Ireland Electricity plc – NIE EirGrid Plc. System Operator (SONI)	A major cross border network infrastructure project delivering a 'smart grid'. This project comprises of intelligent distribution networks with increased cross-border capability, overlaid with high speed communications, enabling operational excellence and leveraging the involvement of all users will be the blueprint for future network deployment on the island of Ireland, and across Europe	Detailed specification and planning - on-going Interaction with regulatory authorities – on-going	2019
N/A	Green-Me (France, Italy) aims at enhancing RES integration by implementing automation, control and monitoring systems in HV and HV/MV substations, including communication with the renewable generators and storage in primary substations, as well as new data exchange to allow for a better cross-border interconnection management.	The project is located in a large cross-border area, involving: - three French administrative regions: Languedoc Roussillon, Midi-Pyrénées and Provence Alpes Côte d'Azur - two Italian administrative regions: Piemonte, Lombardia, Friuli-Venezia-Giulia, Veneto, Emilia Romagna	ENEL DISTRIBUZIONE SPA TERNA SPA ERDF - Electricité Réseau Distribution France RTE – Réseau de Transport d'Electricité	Through the implementation of "smart technologies" together with innovative system tools, the RES generation (in particular PV) will be made more observable, predictable and controllable, improving: - the load and generation forecast at primary distribution level - the hosting capacity of further RES maintaining quality and system reliability. - the communication between TSO and DSO automation systems	Feasibility studies and design phase (project scale was revised, compared to PCI 2013)	2019
N/A	SINCRO.GRID (Slovenia/Croatia) aims at solving network voltage, frequency control and congestion issues enabling further deployment of renewables and displacement of conventional generation by integrating new active elements in the transmission and distribution grids into the virtual cross-border control centre based on advanced data management, common system optimisation and forecasting involving two neighbouring TSOs and the two neighbouring DSOs.	The SINCRO.GRID project influence area is entire Slovenian and Croatian network.	ELES d.o.o. (Slovenian TSO) HOPS d.o.o. - Hrvatski operator prijenosnog sustava d.o.o. (Croatian TSO) SODO d.o.o. (Sistemski operater distribucijskega omrežja z električno energijo) (Slovenian DSO) HEP-ODS d.o.o. (HEP Operator distribucijskog sustava d.o.o.) (Croatian DSO)	• A virtual cross-border control centre for renewable energy in Slovenia and Croatia which will consist of dedicated IT infrastructure and software to be used by system operators for the efficient and coordinated management of RES, using advanced algorithms for VVC optimization, secondary reserve, managing battery storage, advanced real time operation of the grid with advanced forecasting tools and using dynamic thermal rating. Furthermore, telecommunication support for RES control and communication platform for the DSM will be established. • Reactive power sources (substations Divača, Beričevo, Cirkovce/Krško) in Slovenia and in Croatia (substations Konjsko, Melina, Mraclin) using SVC at each TSO involved. • An advanced dynamic thermal rating system • In Slovenia a set of storage (batteries) and DG sources for relieving local power flows and alternative source for secondary control. • Activation of wind power plants in Croatia into the VVC optimization process.	Feasibility studies and design phase	2021

https://ec.europa.eu/energy/en/topics/infrastructure/projects-common-interest

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