

**SET
PLAN**
Conference
2015

Research, innovation
and competitiveness
for the Energy Union

TITLE

Antonio Vidigal,
CEO EDP Inovação

SESSION 1

Accelerating the energy system transformation
Monday 21 September 2015

TOPICS

- 1 WHO IS EDP
- 2 INNOVATION IN THE ENERGY SECTOR
- 3 INNOVATION AT EDP
- 4 SUGGESTIONS FOR THE SET PLAN

Business Portfolio



Wind & Solar Power

25% of EBITDA
(10% North America; 6% Spain; 4% Portugal; 5% Other)
Listed subsidiary: EDP Renováveis (EDP has 77.5%)
IPO in Jun-08
Wind & Solar Power: 8.1GW
A worldwide renewable market leader



EDP Brasil

17% of EBITDA
Listed subsidiary: EDP Brasil (EDP has 51%)
Presence since 1996
Power generation: 1.8 GW (hydro)
2 electricity distribution concessions



Portugal

44% of EBITDA
Privatization in 1997 (IPO)
Single electricity distributor
Power generation: 8.7 GW (ex-wind)
(from which 5.4GW is hydro)

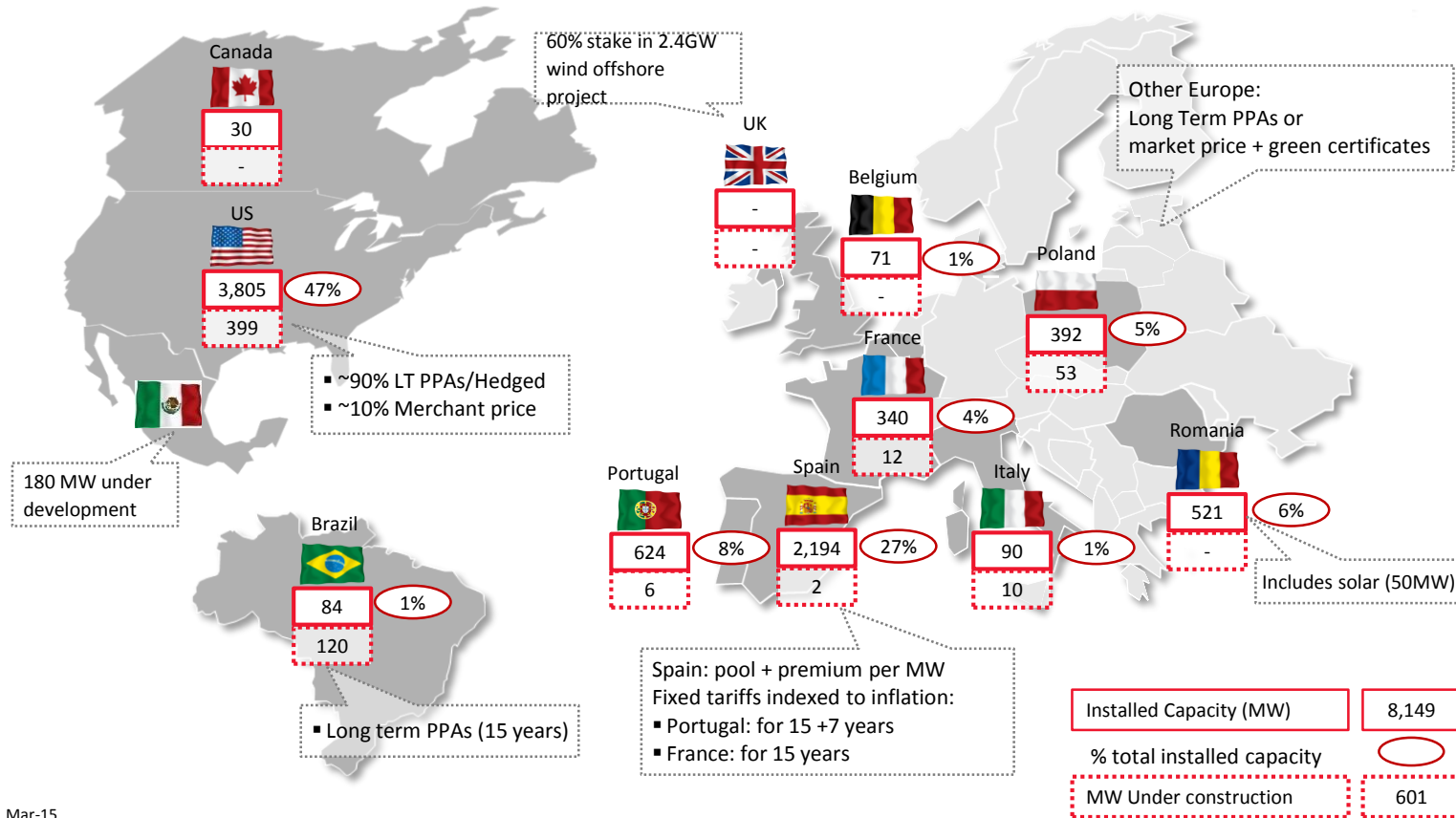


Spain

14% of EBITDA
Presence since 2001
Power generation 3.8 GW (ex-wind)
2 in gas distribution

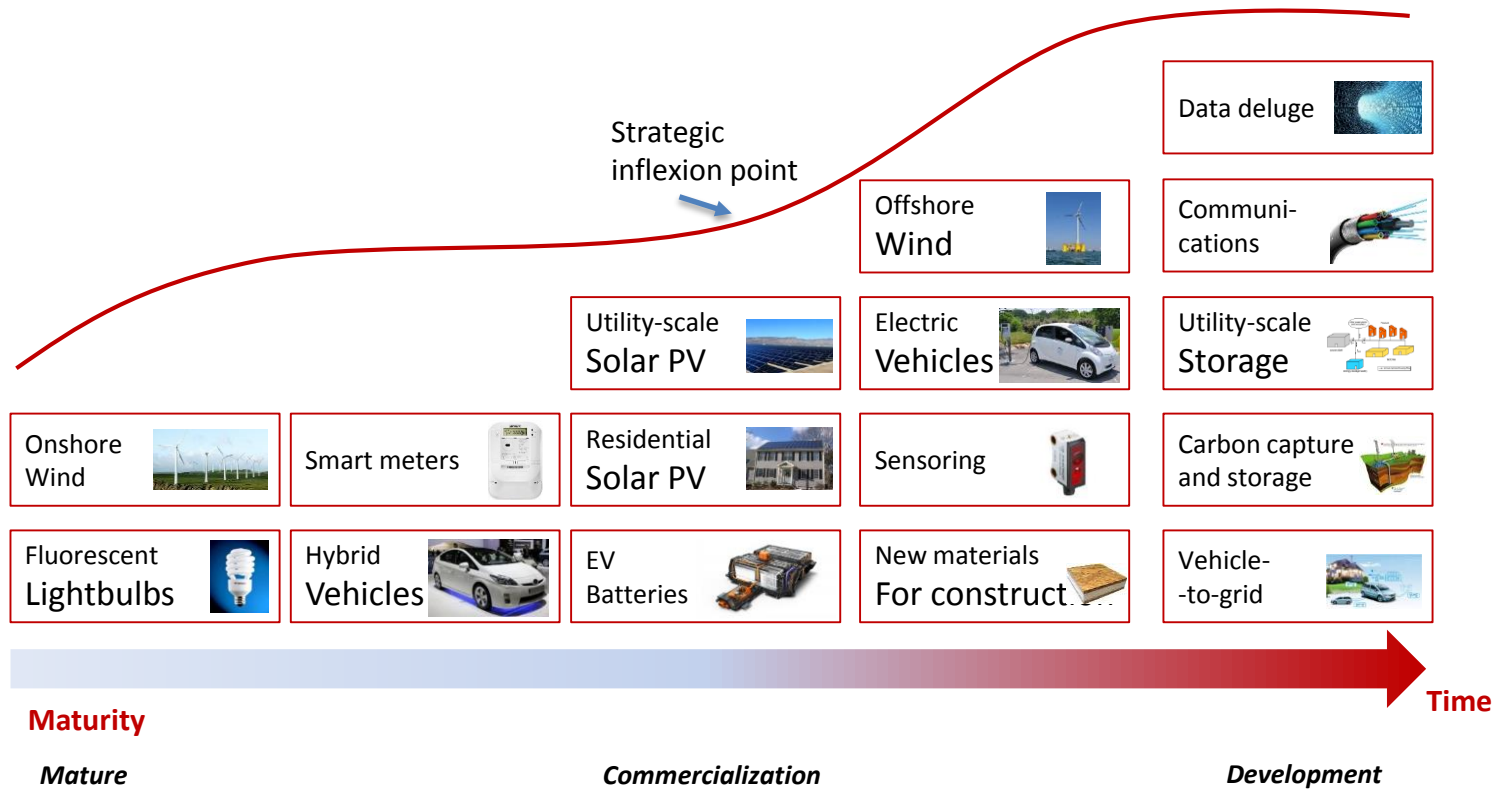


EDPR: Diversified portfolio and stable revenue stream



Note: Data as of Mar-15

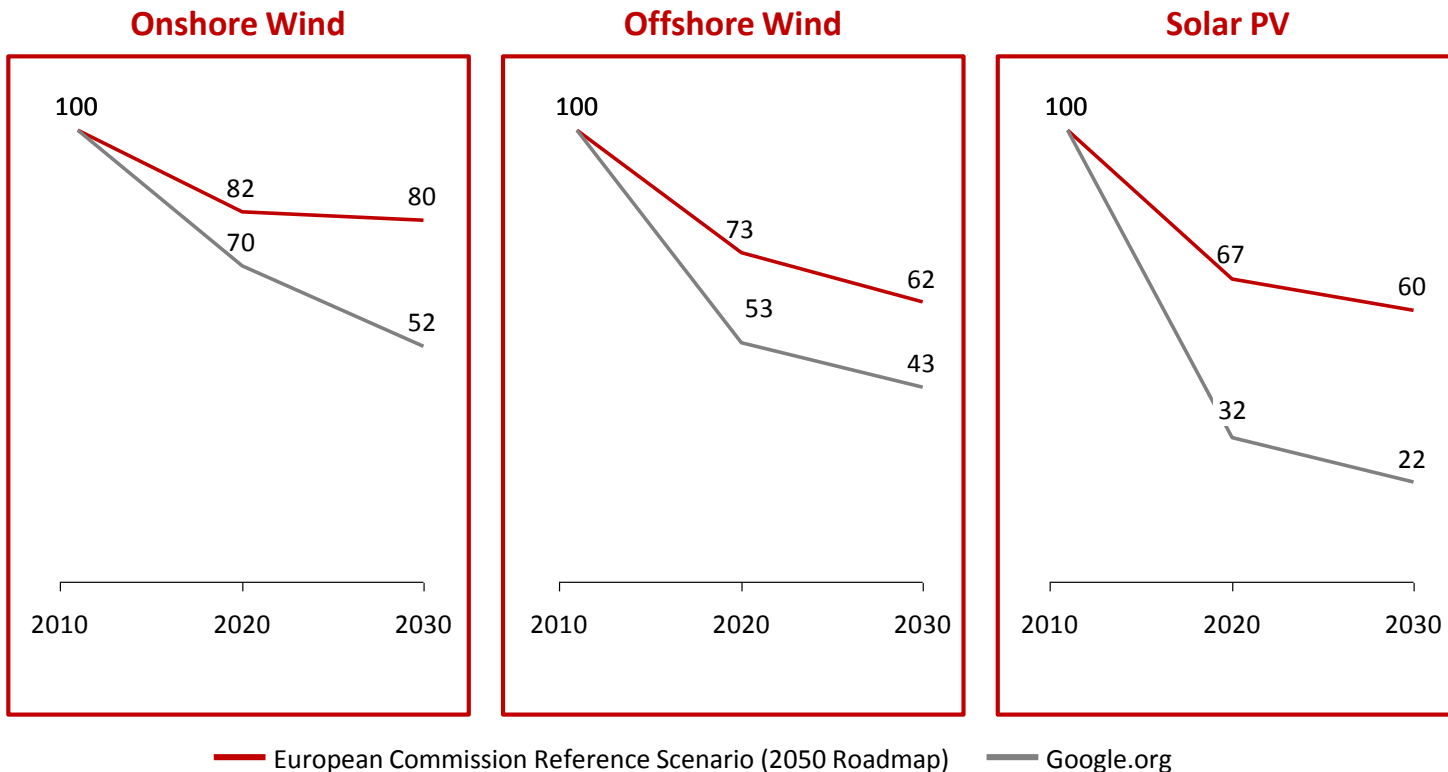
Innovation in the electric sector is advancing at a fast pace, changing the value chain paradigm and influencing the role of the stakeholders



Source: Eurelectric Innovation Action Plan Taskforce analysis

In generation, wind and solar technologies present a high potential for cost reduction, which will have impact in its future mass adoption

Reference year 2011 = 100



Source: McKinsey Clean Technology Performance Initiative, European Commission "Roadmap 2050", Google.org, Eurelectric Innovation Action Plan Taskforce analysis

The development of smart grids will improve supply reliability and enhance new products and services

Smart grids

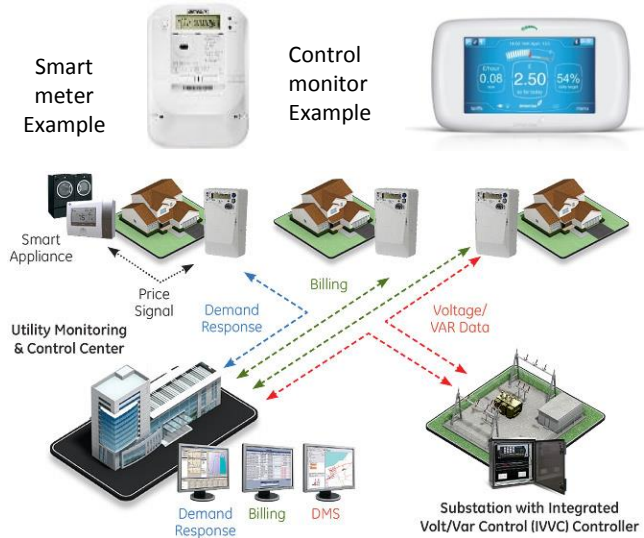
Smart grids differ from traditional grids by allowing bidirectional communication and flows between utilities and consumers, working through a set of controls, automation and interconnected equipment in order to give a quick response to demand needs



Source: Smartgrid.gov, Smartgridtech, GE Digital Energy, uSwitch, British Gas

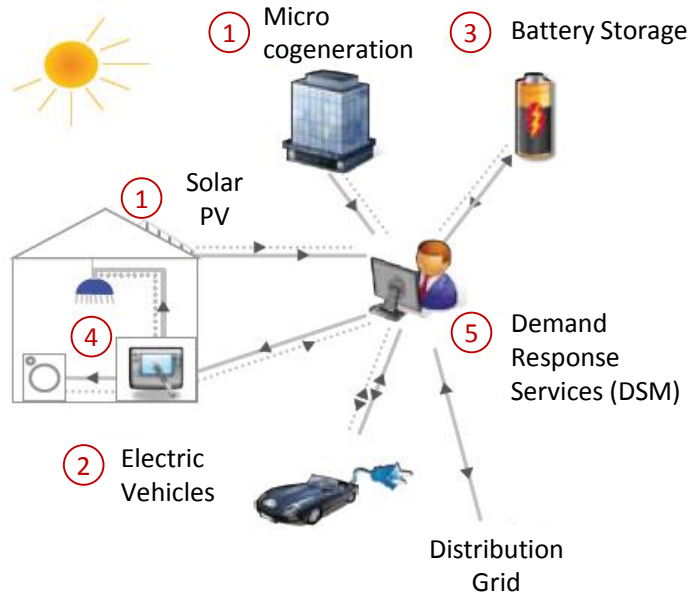
Smart meters

Intelligent meters that allow a bidirectional flow of energy and information and real time consumption monitoring



In what concerns distributed and retail resources, the changes: consumers as producers, storage and new products & services

Downstream Trends



Description

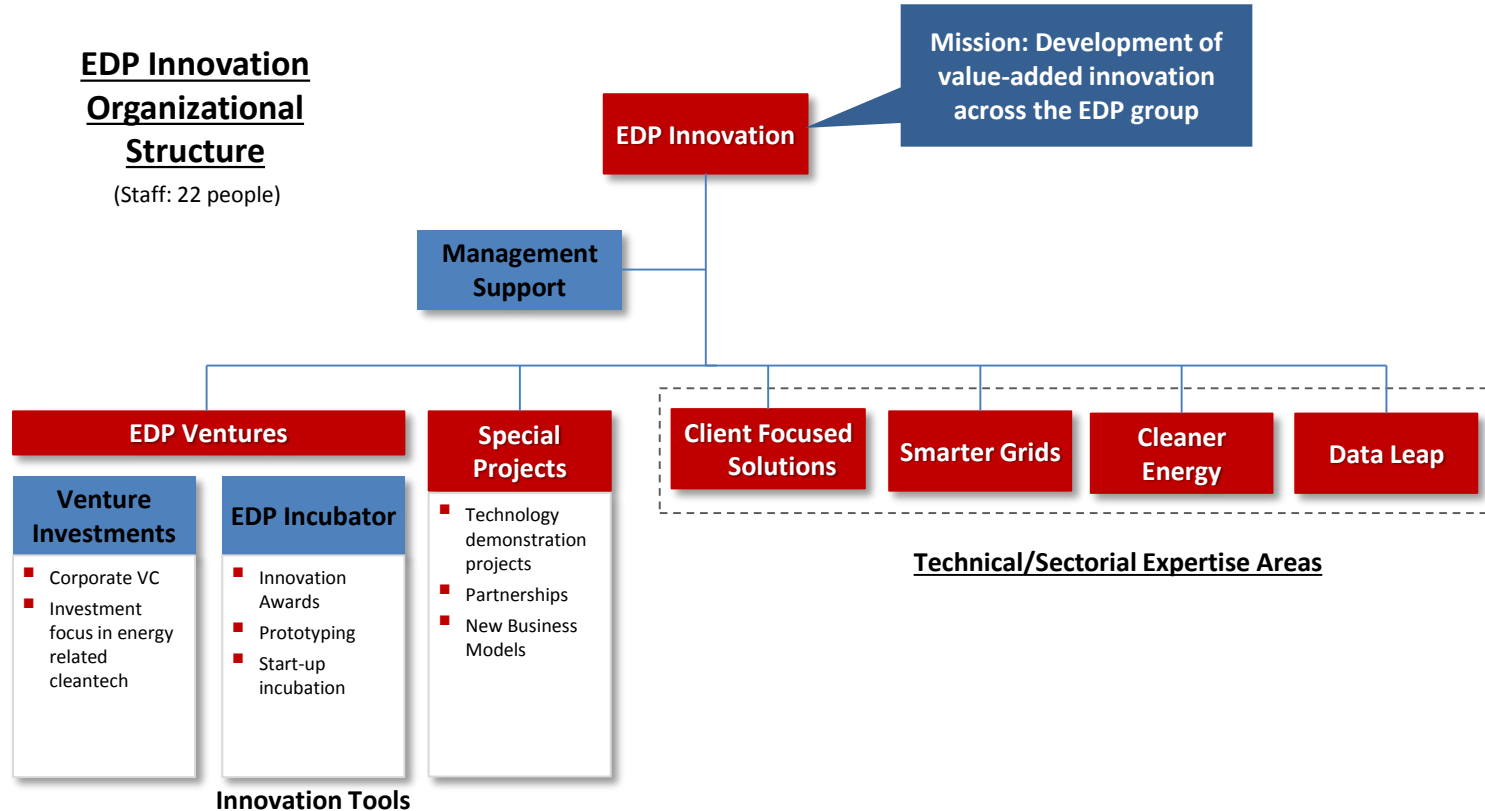
- 1 Micro-generation/Distributed generation**
  - > Growing installation and operation of distributed generation systems, including solar PV and mini cogeneration
- 2 Electric Vehicles and infrastructure**
  - > **Electric vehicle** adoption and development of the **charging infrastructure**
- 3 Storage**
  - > **Battery installation and operation** for electricity storage at **local distribution** level
- 4 New products and services**
  - > Providing new products oriented to **promote energy efficiency** and **client well-being**
- 5 Energy flow optimization**
  - > **Exploitation of local resources for grid load management** (DSM, EV, storage) in order to:
    - Optimize energy flow
    - Capture arbitrage opportunities (ex. changing consumption to cheaper hours)
  - > Implementation of **Energy Efficiency** measures

Source: Eurelectric Innovation Action Plan Taskforce analysis

EDP Innovation was created in 2007 to provide innovative solutions across the EDP Group. EDP has budgeted 200 m€ for innovation until 2020.

EDP Innovation
Organizational
Structure

(Staff: 22 people)



EDP PRESENTLY HAS FOUR KEY AREAS FOR INNOVATION

Key innovation areas

1. Client-focused solutions

Smart Pricing and Bundling

- Develop innovative pricing schemes that leverage on technology / SG
- Explore synergies with innovative gas / electricity bundles

Energy Efficiency

- Home / office / industry Energy Management solutions
- Efficient Lighting Solutions

Increase Electrification

- Electric Mobility
- Other

2. Smarter Grids

Smart Grids

- Adequate smart grid infrastructures
- Software applications leveraging on SG elements to improve operational excellence

Energy Management / Storage

- Energy Storage Solutions
- Other energy management solutions such as DSM, etc.

3. Cleaner Energy

Renewable Energy

- Wind Onshore, Offshore and new concepts
- Solar: current and new concepts
- Quest for disruptive renewable concepts

Thermal & Big Hydro Generation

- Flexibility & interface with Smart Grids
- Impact mitigation solutions

Access to Energy

- Leverage renewables and storage to create off-grid and mini-grid solutions

4. Data Leap

Cloud computing

- Provide agility in leveraging IT resources by enabling dynamic management of infrastructure, lowering capital investments

Big data

- Generate business and customer intelligence to help optimize operations and drive creation of new products and services

Web 3.0

- Bring people and technology seamlessly together, bridge business and social and increase productivity in collaborative work

Examples of what we are doing: WindFloat

Cleaner Energy

Offshore demonstration project in deep waters using a floating platform inspired in years of knowledge from the oil & gas industry



- Demonstrate the technical and economic viability of the WindFloat Technology
- Leadership in floating deep offshore wind

Examples of what we are doing: re:dy

"Unlock downstream innovation".

Client-focused Solutions

Re:dy is a system that allows the user to have full remote control over his home, as well as analyzing electric consumption of one's home appliances. Controllable over web or smartphone app.



re:dy box

The core of the product
Communications: ZigBee, PLC and Ethernet



re:dy plug

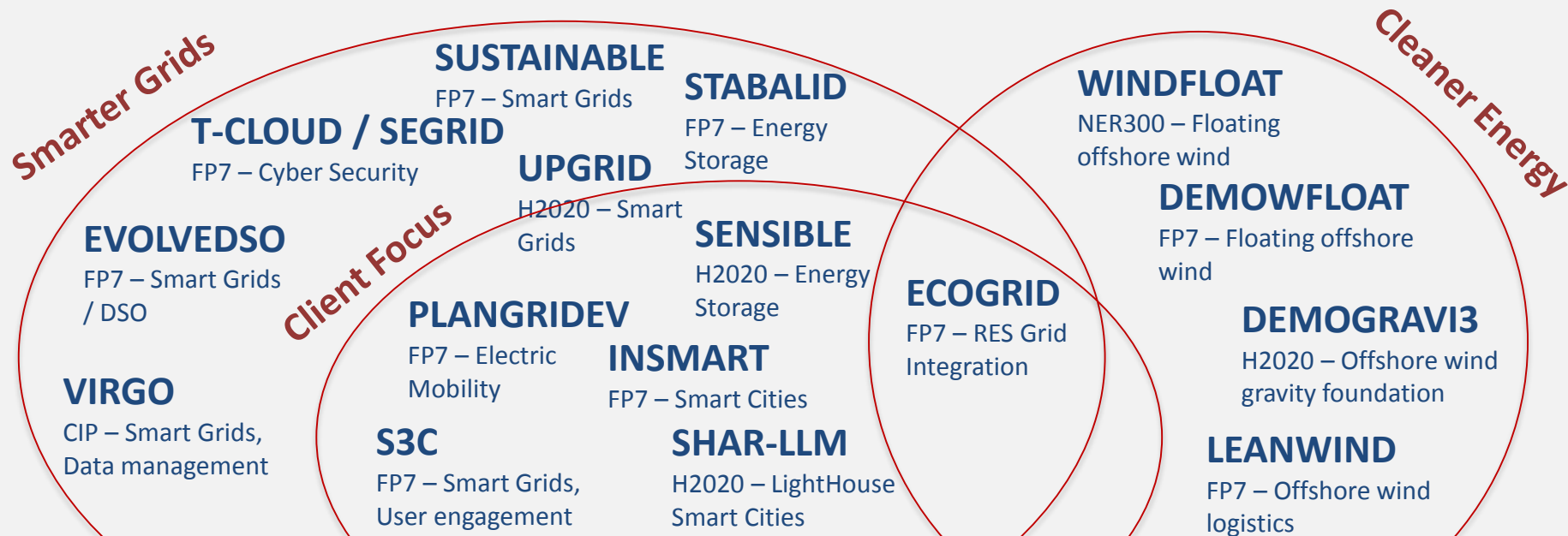
Individual appliance monitor
Communications: ZigBee;
On/off local button



re:dy meter

Circuit meter: allows measuring up to three different single phase circuits or a three-phase one. As a stand-alone device, it can act (on/off) over two circuits.
Communications: PLC;
Buttons for on/off/auto on the two actuation circuits

EDP's R&D is strongly leveraged by EU Funding. FP5/6/7 and more recently H2020 have been and continue to be important R&D and innovation drivers



- Innovation is one of the 5 dimensions of the Energy Union Strategy, and cuts across all elements of the Strategy - it is at the heart of the Energy Union.
- EDP, as a Member of EURELECTRIC, welcomes the SET Plan Communication as a basis for future work and consultation.
- We agree that innovation is key to achieve the transformation of the energy system, therefore new investments at all stages of the innovation chain are needed.

Some preliminary comments and recommendations :

- We welcome the emphasis put on Public-Private Dynamics, system approach as well as demonstration and commercialisation and more downstream innovation approach. More coordination among Member States and more joint projects are seen as necessary.
  - It is most important to establish a functional and efficient supportive Governance structure. Streamlined processes should be achieved, making it easy for all stakeholders to understand them and to interact minimizing fragmentation and duplication of efforts.
- Set Plan and the Electricity Market Design
They are closely connected and their consistency should be ensured.



Antonio Vidigal,
CEO EDP Inovação
antonio.vidigal@edp.pt

**SET
PLAN
Conference
2015**

myenergy
Luxembourg



LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie



LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère du Développement durable
et des Infrastructures

Département de l'environnement



LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère du Logement

With the
support of



Co-funded by
the European Union



Presidency of
the Council of the
European Union

GRAND DUCHÉ DE
luxembourg

This conference has received funding from the European Union Horizon 2020 research and innovation programme under the grant agreement No 681163