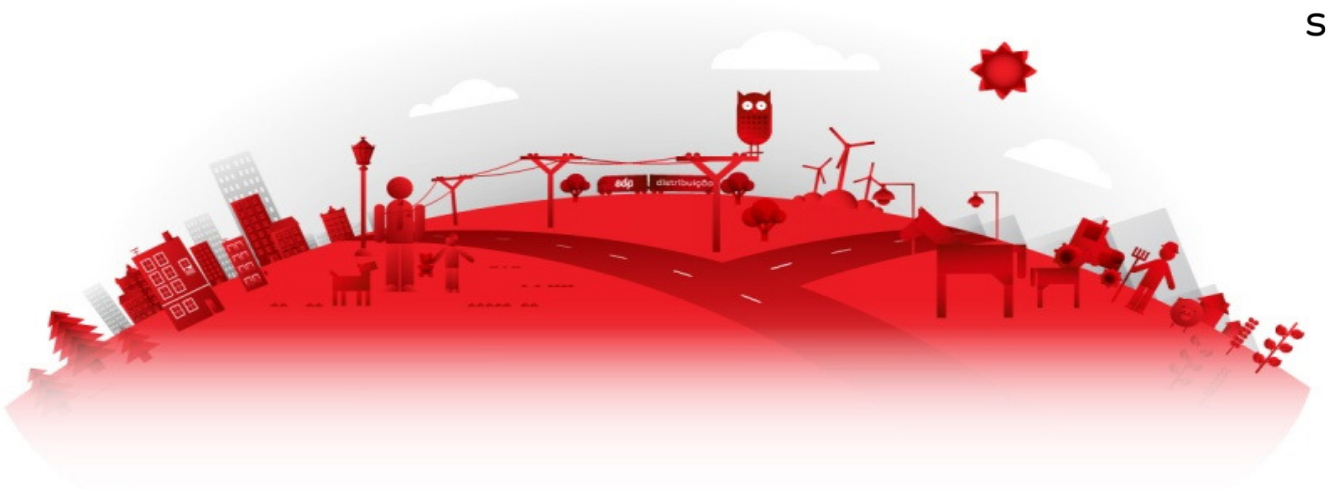
edp distribuição

inovgrid

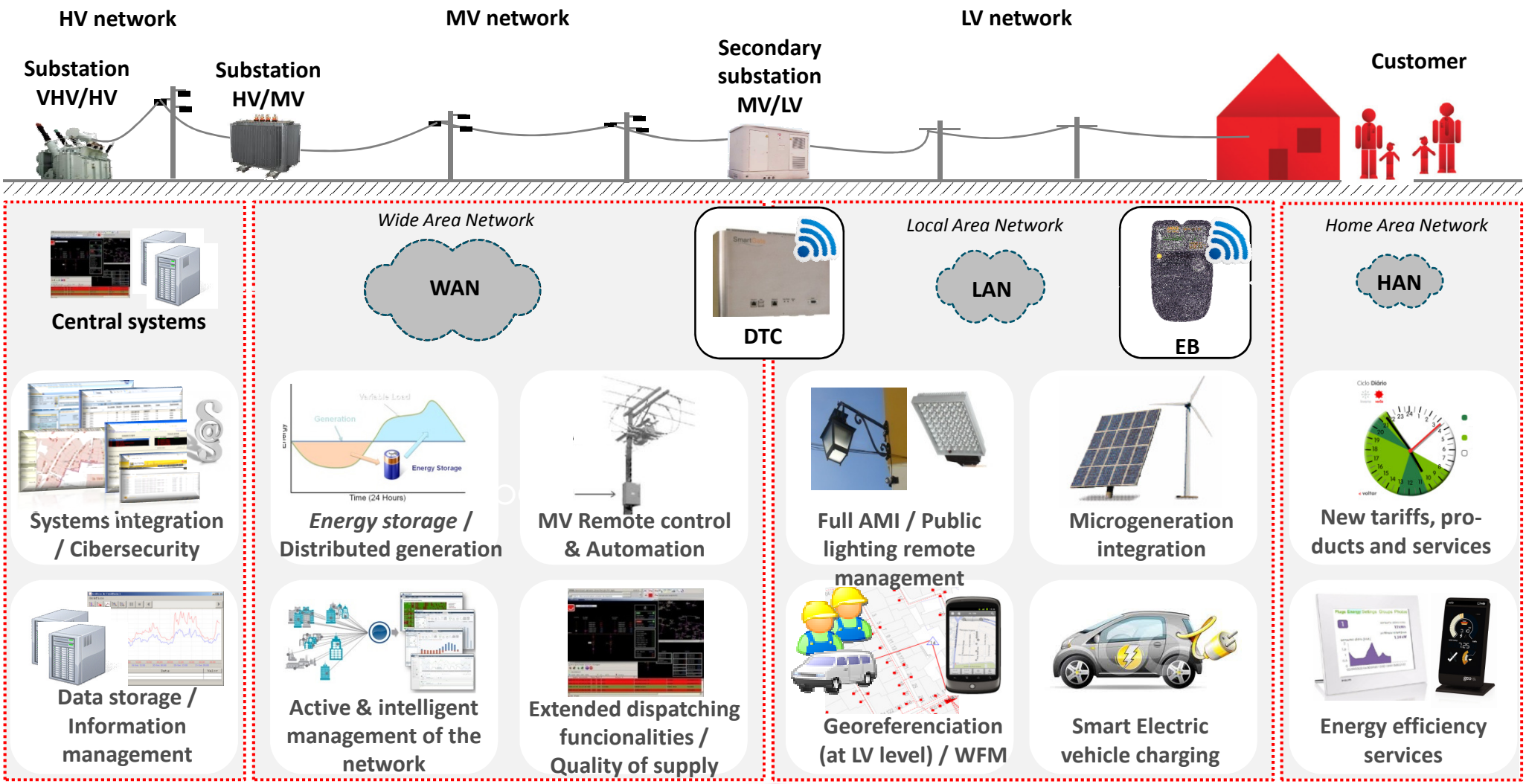
smart energy grid



Évora 2012 Symposium on Microgrids

3 & 4 September 2012

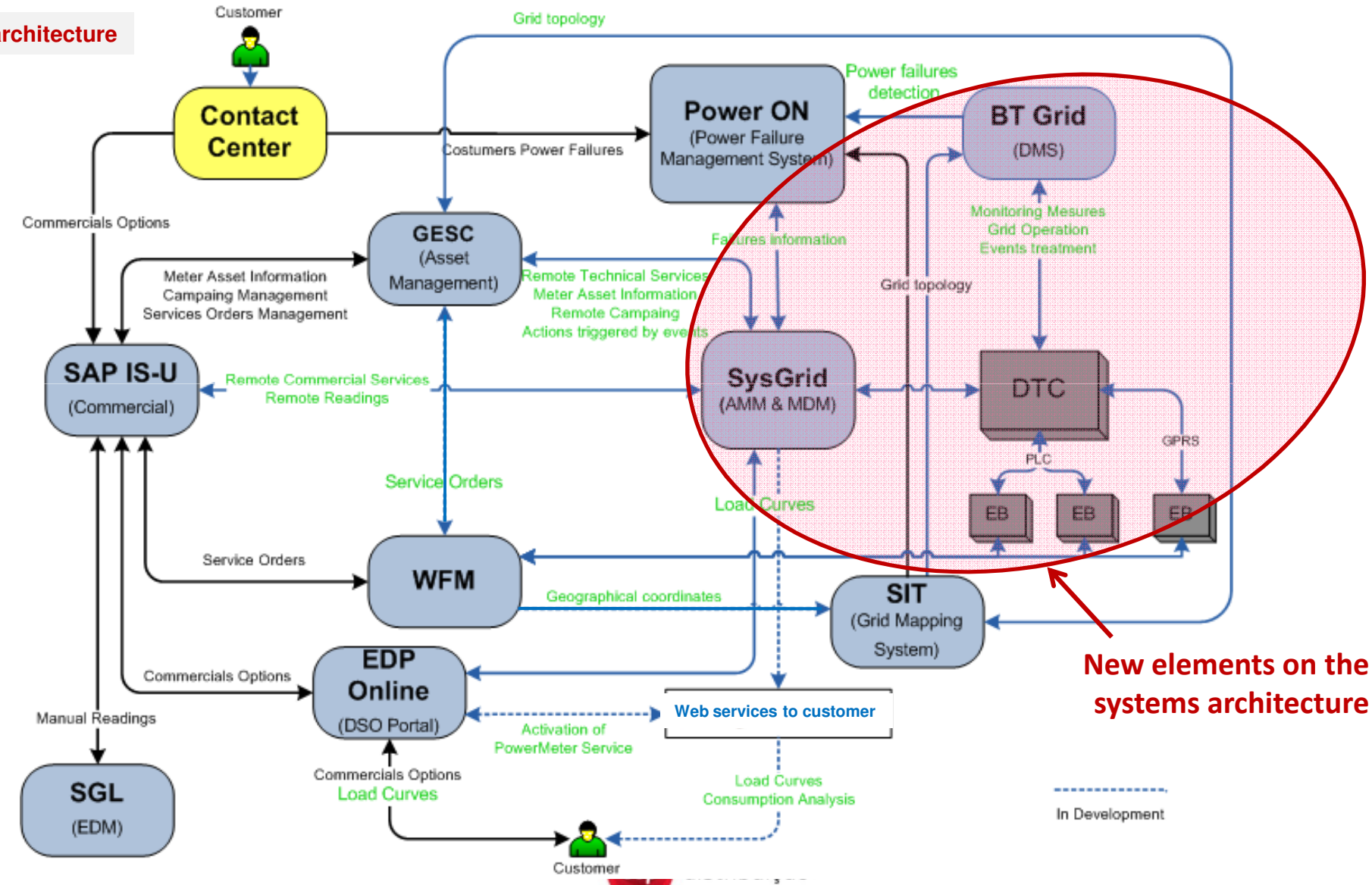
Main approach of EDP Distribuição on the smartgrid concept: all initiatives regarding smart grids must be aligned into Inovgrid Project …



- **EB**: *EDP Box*, that replaces the old meter
- **DTC**: *Distribution Transformer Controller*, to be installed in each secondary substation

… and fully integrated with core business processes and systems in order to capture increased benefits

Simplified architecture



New elements on the systems architecture

Inovgrid Project: Today, comprised customers have a new paradigm

Master-key: Accurate data, processed and integrated on DSO systems, delivered in the appropriate shape and time to grid managers, suppliers and customers

MAIN CHANGES ON THE RELATIONSHIP WITH CUSTOMERS

FOR ALL

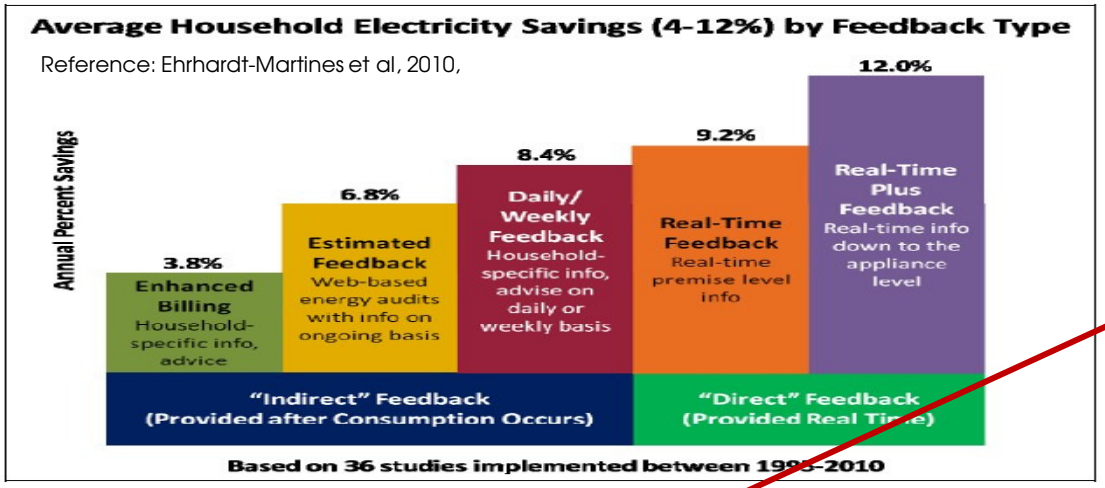
- Invoicing based on real and actual readings
- Remote services (connect/reconnect, contract changes…)
- Exhibition, on a webportal, of detailed historic data and load profiles
- Capacity to capture real time data through a HAN port
- Fast screening and troubleshooting for most part of shortages
- …

TESTED TRIAL

- Innovative tariffs
- Alerts by SMS and e-mail
- In-home devices, software and services oriented to energy efficiency (on PC, PDA and smartphones)

Several studies support energy efficiency gains for customers; In Evora InovCity there was a 3.9% reduction in household consumption

inovcity
smart energy living



Montemor (**)

GCMTN
Control Group
(#0,8k)

No Feedback **:**
- Only EB installation
- Customers without any information about the study and InovGrid

Évora

GCE
Control Group
(#30k)

Indirect Feedback **(InovCity Effect):**
- Info about how to use the EB
- Real consumption invoicing
- InovCity initiatives
- EDPOnline Web access

GTE
Test Group
(#1,4k)

Direct Feedback **:**
- SMS and consumption reports
- Simulated Tariffs Prices
- In-home displays
- Applicational software + actuators

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✓ **3.9% Consumption reduction (*)**

✓ **Stong InovCity Effect (indirect feedback)**

- **InovGrid business case assumed only 2% reduction**
- **Direct Feedback results still under consolidation**

*** daily average GCE vs GCMTN: 95% confidence interval with 2.1% error, certified by Qmetrics/Universidade Nova de Lisboa**

**** neighbouring municipality**

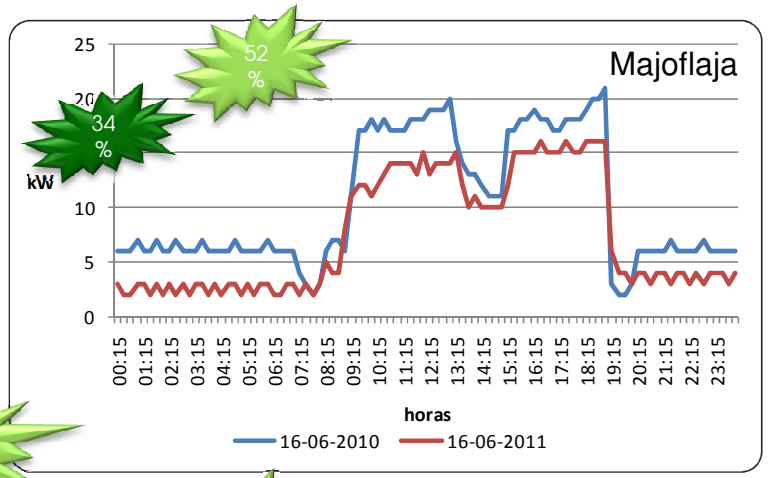
Some of the approaches made to Evora LV non-residential customers have shown that it is possible to achieve still more significant reductions in energy consumption

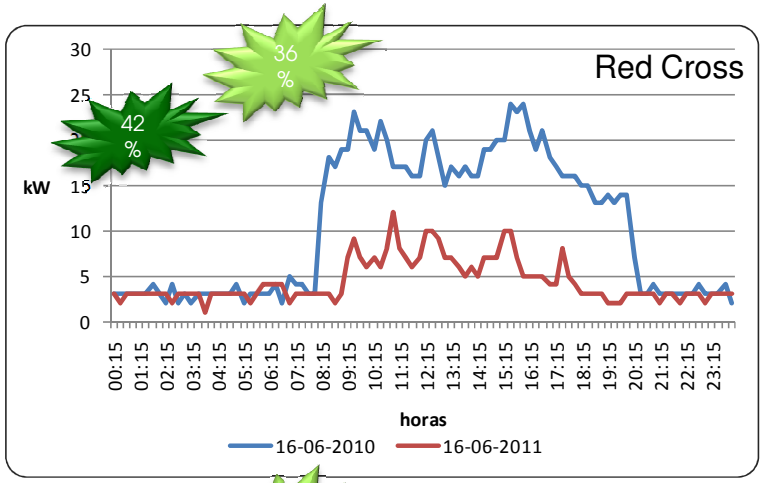
CISION
diário do SUL
14-07-2011

Leitura dos gráficos
permite uma maior racionalização do consumo eléctrico

- "Data made available by EDP, mainly the graphics with the consumption, have proven to be very interesting for all the team"
- Put big focus in communication to the 17 people that work in the Museum the potential benefits of the reduction in energy consumption
- "We started by solving the night problem… we have chosen to turn on the lights gradually and not fully during night watch"
- Maximize the use of natural light within the building

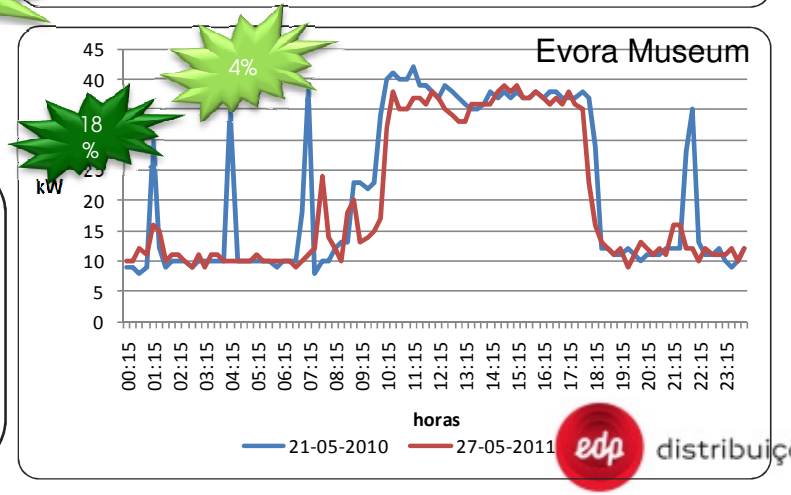
(Evora Museum Director on an interview to the newspaper *Diario do Sul)*

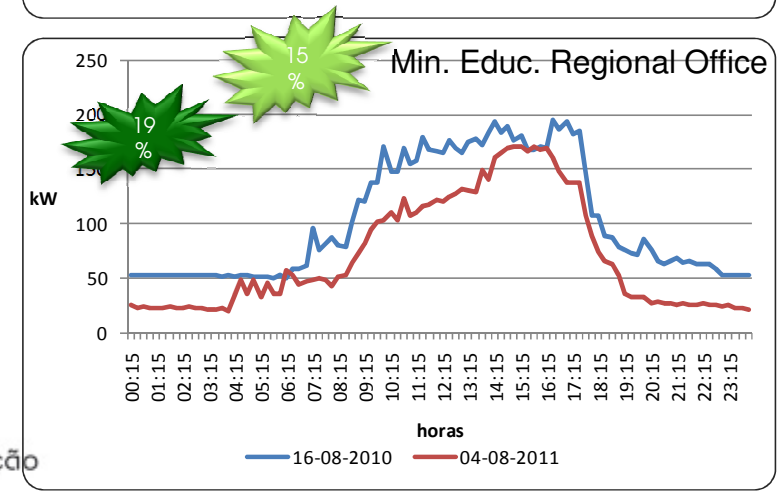




2012

2011





Important findings

- Small reductions in consumption have significant impact in the energy bill for small businesses
- Direct contact with the facility manager is crucial to guarantee the buy-in to reduce consumption
- High potential to standardize the approach to Customers

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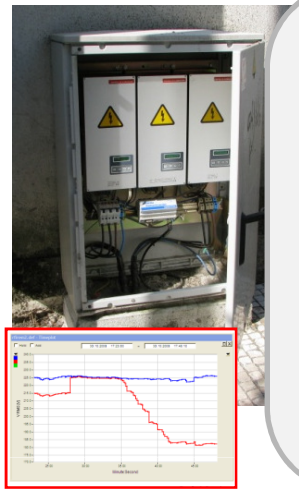
The Public Lighting initiatives taken jointly with Evora municipality completely corroborate this approach



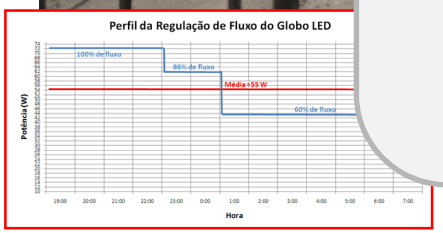
FLUX REGULATORS

Regulators placed at the origin of the PL circuits, close to 24 Secondary Substations;
Controlled lamps > 2.750

✓Global savings **24,5%**
✓In urban areas 22,9%
✓In industrial areas 29,6%

Main features

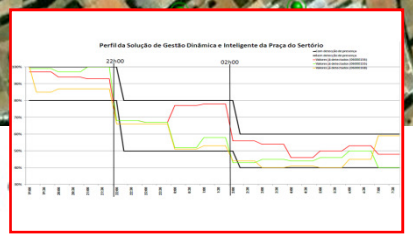
- Integration with InovGrid Project with additional specific HW and SW
- Operation based on Webservices
- Remote configuration
- Online supervision by EDPD and Evora Municipality



LED (ÉVORA "ECOPISTA")

Preservation of ancient poles and lamps;
Replacement of 233 bulbs by LED;
Implementation of a centralized control system based on time profiles

✓Global savings **50%**



LED (SERTÓRIO SQUARE)

Replacement of 44 lantern-lights by LED (keeping the antique style);
Judicious choice of color temperature and LED matrix to fit world heritage requirements;
Implementation of a control system based on sensors (light, movement, temperature, fog, stroke)

✓Global savings **67%**

Conclusions on energy efficiency (true, but perhaps too simplified …)

IF YOU CAN HAVE

Advanced Metering Infrastructure
(HAN recommended)

with DSO Processes and Systems Integration

+

Relevant stakeholders commitment

- Regulator
- Government
- Municipalities
- Retailers
- Energy agencies
- Customer associations
- Some NGOs
- Media…

+

Consistent strategies and action plans

(at national, local and business levels)

+

Information + Solutions + Intelligible signs for customers

-Tariffs
-Services
-Support
&
"big causes/purposes" they can buy-in

THINGS HAPPEN !

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EDP Distribution is starting the installation of additional 100k EDP Boxes in 7 locations with different grid characteristics and different technologies

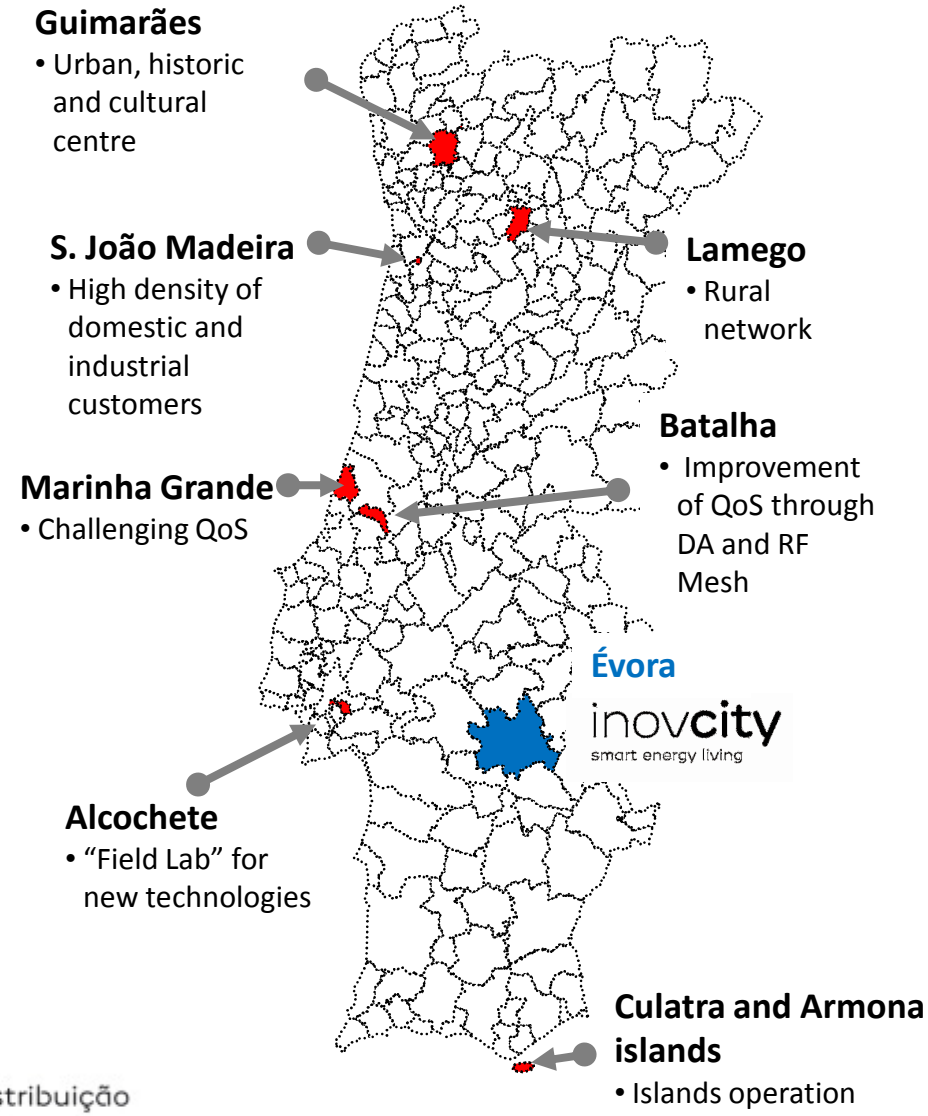
A large-scale pilot is fundamental to validate communication technology, escalate operations and ensure integration of multiple suppliers, systems and equipments:

Technology
- Validate Communications Technology: PLC PRIME and GPRS in larger scale, option on RF Mesh

Operations
- Consolidate lessons, processes and large-scale procedures/operations, targeting a "*plug and play*" solution

Integration
- Integrate different suppliers, communication technologies and IT systems
- Guarantee interoperability among equipments of different suppliers

In parallel Inovgrid Project keeps a big focus on upgrading grid management and on automatizing or optimizing field and back office operations

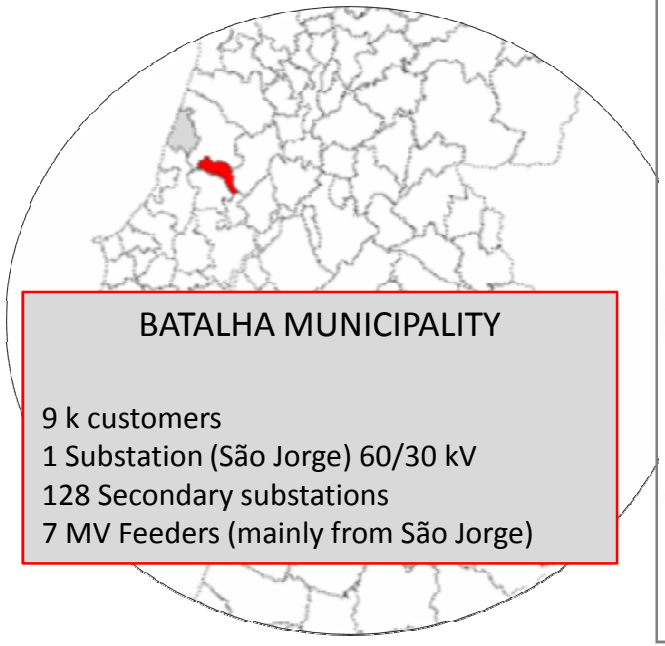


edp distribuição

The entire network in the municipality of BATALHA shall be involved in a DA pilot integrating real time data acquisition, protection, control and monitoring

Batalha implementation will permit to test a new generation of components, devices and applications, in order to bring the Inovgrid solution closer to its strategic objectives

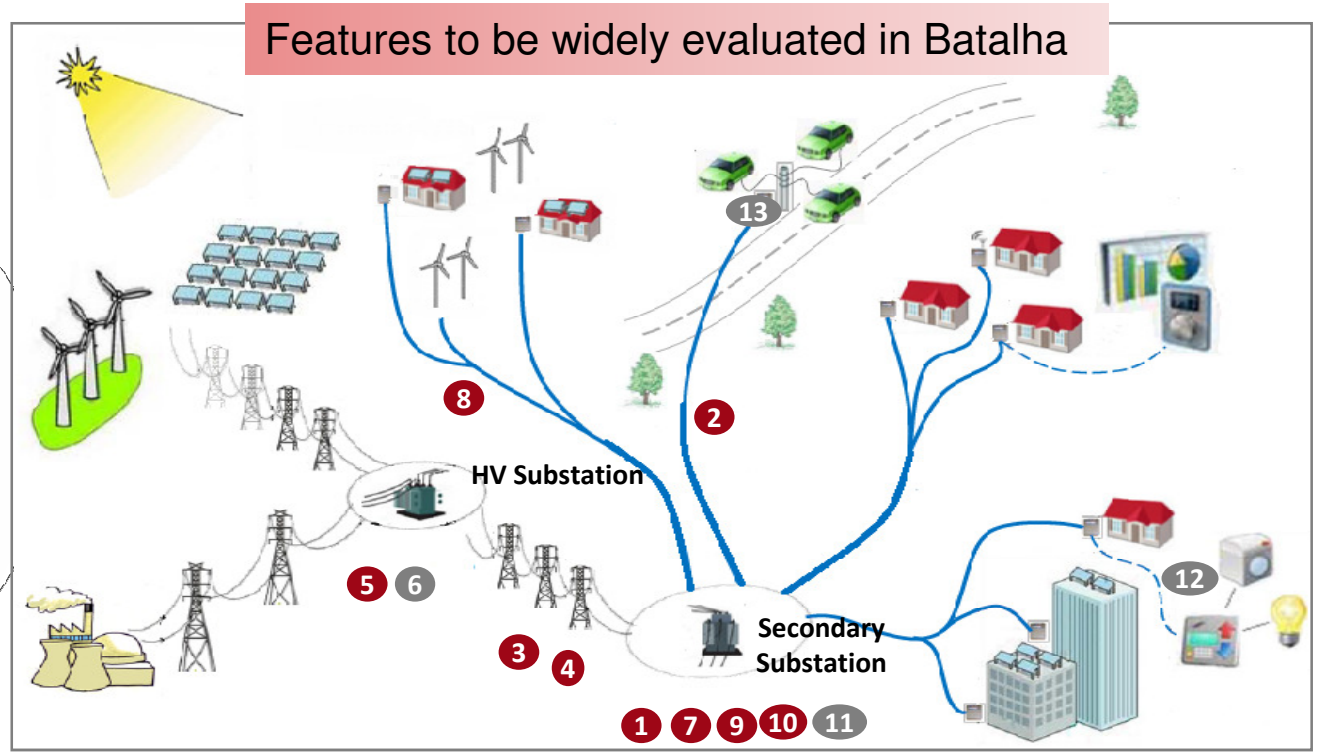
MAIN COMPONENTS: Automation (DA), SCADA, AMI Infrastructure, RF Mesh and PLC/PRIME Communications



BATALHA MUNICIPALITY

9 k customers
1 Substation (São Jorge) 60/30 kV
128 Secondary substations
7 MV Feeders (mainly from São Jorge)

Features to be widely evaluated in Batalha



Self-healing, larger microgeneration integration and demand side management will be great challenges

1. LV network alarms
2. LV fault detection
3. MV fault detection
4. MV fault isolation
5. Self-healing & reconfiguration
6. Energy balance
7. Public lighting control
8. Microgener. integration
9. Fraud detection
10. QoS analisys
11. Voltage regulation on SS
12. Load control
13. EV integration

International projects are a very srong way to share experience and risks, evaluating different solutions, strengthening cooperation and consolidating concepts and models

EDPD participates in several projects in EU mainly into the scope of FP7. Besides new technologies and systems, projects related with customers, market models and grid services, like EcoGrid, Reservices and SuSTAINABLE, are assuming more and more a crucial importance in order to shape next generation utilities

EcoGrid Project

Topic: ENERGY.2010.7.1.1

Duration: 4 anos

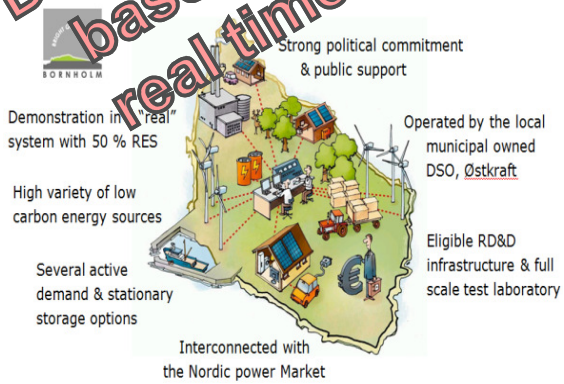
Budget: 21M€ (EU 13.0M€)

EDPD: 200k€ (EU 100k)

Leader: SINTEF (Norway)

Objectives:

Demand Response based on a near real time market



Bornholm Island (DK)

Reservices Project

Topic: CIP-IEE-2011

Participation: through EDSO4SG

Duration: 2 years

Budget: 2.3M€ (EU 1.7M€)

EDSO4SG: 170k€ (EU 130k€)

Leader: EWEA - European Wind Association

Objectives:

Ancillary services on a market basis

1) Short term: direct outcome is a European harmonised cost basis for developing mechanisms for market based provision of ancillary services by wind and solar PV;

2) Medium/Long term: more efficient network management with high shares of renewables by providing expert guidance for: i)the implementation of cost efficient European network connection requirements; ii) the design of markets for ancillary services; iii) techno-economic development strategies for grid-friendly renewable generation.

SuSTAINABLE Consortium

Topic: ENERGY.2012.7.1.1

Duration: 3 years

Budget: 5.8M€ (EU 3.8M€)

EDPD: 1.1M€ (EU 0.7M€)

Leader: EDF

Objectives:

Operation considering short-term localized predictions

The SuSTAINABLE project will develop and demonstrate a new operation paradigm, leveraging information from smart meters and short-term localized predictions to manage distribution systems in a more efficient and cost-effective way, enabling a large-scale deployment of variable distributed resources.

edp distribuição

The future has already begun. Do not be left behind!

Thank you !

inovgrid
smart energy grid

Évora 2012 Symposium on Microgrids

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