Implementing an Integrated Mobility Strategy to Optimize Workforce Efficiency and Improve Service Delivery

15th – 16th April, 2015, Spindleruv Mlyn, Czech Republic
Agenda

- About EDP
- Why change?
- Mobility
- Implementation
- Results
- Lessons Learned
- Evolution
EDP – Electricidade de Portugal

Renewables

EDPR-NA
Installed Capacity 3,667 MW
Electricity generated 10,146 GWh

EDPR-EU
Installed Capacity 4,283 MW
Electricity generated 9,527 GWh

EDPR-BR
Installed Capacity 84 MW
Electricity generated 230 GWh

Portugal
Installed Capacity 8,911 MW
Electricity 22,723 GWh generated
43,858 GWh distributed
5,718 thousand Customers
Gas 6,938 GWh distributed
224 thousand Customers

Spain
Installed Capacity 3,853 MW
Electricity 9,961 GWh generated
9,147 GWh distributed
1,118 thousand Customers
Gas 51,535 GWh distributed
796 thousand Customers

Brazil
Installed Capacity 2,157 MW
Electricity 8,360 GWh generated
25,880 GWh distributed
3,045 thousand Customers
# EDP – Electricidade de Portugal

<table>
<thead>
<tr>
<th>EUR millions</th>
<th>2013</th>
<th>2012</th>
<th>Var. €M</th>
<th>Var. %</th>
</tr>
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<tbody>
<tr>
<td>Gross Profit</td>
<td>5.551</td>
<td>5.428</td>
<td>123</td>
<td>2%</td>
</tr>
<tr>
<td>Operating Costs</td>
<td>1.573</td>
<td>1.600</td>
<td>-26</td>
<td>-2%</td>
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<tr>
<td>Other Income/(Costs)</td>
<td>361</td>
<td>200</td>
<td>161</td>
<td>80%</td>
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<tr>
<td>EBITDA</td>
<td>3.617</td>
<td>3.628</td>
<td>-11</td>
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<tr>
<td>EBIT</td>
<td>2.085</td>
<td>2.143</td>
<td>-59</td>
<td>-3%</td>
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<tr>
<td>Financial Results</td>
<td>-703</td>
<td>-679</td>
<td>-25</td>
<td>-4%</td>
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<tr>
<td>Net Profit</td>
<td>1.005</td>
<td>1.012</td>
<td>-7</td>
<td>-1%</td>
</tr>
</tbody>
</table>
EDP – Electricidade de Portugal

Wind Power

25% of EBITDA
 Listed subsidiary: EDP Renováveis (EDP has 77.5%)
 IPO in Jun-08
 Wind & Solar Power: 7.8GW
 # 3 wind operator worldwide (present in 11 countries)

EDP Brasil

18% of EBITDA
 Listed subsidiary: EDP Brasil (EDP has 51%)
 Presence since 1996
 Power generation: 2.2 GW (from which 1.8GW is hydro)
 2 electricity distribution concessions

Portugal

40% of EBITDA
 Privatisation in 1997 (IPO)
 Single electricity distributor
 Power generation: 8.9 GW (ex-wind)
 (from which 5.4GW is hydro)

Spain

17% of EBITDA
 Presence since 2001
 Power generation 3.9 GW (ex-wind)
 # 2 in gas distribution
EDP – Electricidade de Portugal

Generation

Transport

Distribution

Supply

Regulated Market

Open Market

EDP – Electricidade de Portugal

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EDP – Electricidade de Portugal

EDP-Distribuição

Operational Areas
- Network Planning
  - Network and Connections Studies
  - Jobs and Budget Planning
  - Execution and financial monitoring
- Project Management and Network
  - Substations
  - HV/MV Networks
- Dispatch / Monitor
  - Service Quality
  - Network Studies
  - DM North
  - DM South

Commercial Areas
- Technical Support Areas
  - Maintenance
    - Politic, Planning and Control
    - Substations
    - HV/MV Networks
  - Management Support Areas
    - Clients and Network (C&N)
      - Management Support
      - Prevention and security
      - Third party relations
      - MT and LT network studies
      - Commercial Assistance
      - Network and Clients Units

Map showing distribution areas: DRCN, DRCP, DRCM, DRCT, DRCL, DRCS
EDP – Electricidade de Portugal

EDP Distribuição

Generation

UHV (RENT)

Substation UHV/HV

Substation HV/MV

Substation (MV/LV)

OCR

Display

Market

2013 Main Figures

- 9,303 Km
- 411 Subst. (~719 PTs)
- 17,094 MVA inst.
- 74,239 Km
- 66,023 Substs
- 141,324 Km
- 6,1M clients

Level of Automation and Remote Control

Today

With Smartgrids

EDP – Electricidade de Portugal

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Why change?
Why change?

Historic Challenges
- Quality of Service
- Operational Efficiency

New Challenges
- Distributed Generation
- Electric Vehicles
- Efficiency

Smartgrids
Why change?

Market Pressure

EDP Distribuição
Focus in Excellence

Mobility Project
New Challenge!

Liberalization
Regulator
Shareholders
Clients

Efficiency
Quality of Service
Inovation
Safety

SCI - GME
Mobility
Mobility

Field services management is associated with a high potential for optimization due: operational efficiency and customer service level.

"Do the work right" (the most productive and efficient way, with the lowest cost)
Mobility – First steps

SGI – Outage management

SCI First Mobility Project in EDP

SCI – Backoffice

SCI – Field workers
Mobility – First steps

**SCI Benefits Achieved**

**Dispatching/Operating Center**
- Dramatic decrease in operation time (reorganization & SCI)
- Resource optimization
  - Improved network management

**Unit/Field Areas**
- Decrease in operation time (reorganization & SCI)
  - Resource optimization and action
  - More effective outage management

**Main benefits:**
- Improvement and efficiency
- Faster intervention
- Quality of data
- Improved relationship between organizational units involved
- Enthusiasm from workers
- Proof the concept

**Impact:**
- **925 Users** (internal and contractors)
- **432 Teams** (internal and contractors)
- All outage contractors included
- Main maintenance contractors included (2nd segment)
Objectives

- Mobile platform to support operational excellence
- Effectiveness and efficiency of field services
- Client service improvement
- Partnership increase with contractors
- Back-office optimization
- Increase the Quality of the Information

Work Force Management solution, integrated with technical systems of network management and back-office, in EDP Distribution.
Mobility – WFM Project

What are the main processes and functional areas?

Customer Services Management

<table>
<thead>
<tr>
<th></th>
<th>Generation and planning</th>
<th>Scheduling and Dispatching</th>
<th>Execution and return</th>
<th>Closure / External Services Control</th>
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</thead>
<tbody>
<tr>
<td>Outages</td>
<td></td>
<td></td>
<td></td>
<td>SGI/PowerOn</td>
</tr>
<tr>
<td>PowerOn</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial Services</td>
<td></td>
<td></td>
<td></td>
<td>SAP IS-U</td>
</tr>
<tr>
<td>SAP IS-U</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
<td></td>
<td>SAP R/3 PM</td>
</tr>
<tr>
<td>SAP R/3 PM</td>
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<td></td>
</tr>
</tbody>
</table>

SAP R/3 PM

Outages

PowerOn

SAP IS-U

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Mobility – WFM Project

- Improved customer service
  - Resolution at 1st call
  - Optimized communication, traveling and execution times
  - Delay anticipation in schedule

- Improved service levels
- Reduced penalties
- Increased data quality
- Cost reduction

- Efficiency and work safety
  - Immediate transfer of work to the field
  - Increased predictability in day-to-day work
  - Reduced traveling time
  - Navigation support (Tom Tom)
  - Technologically up-to-date field devices

- Efficiency and effectiveness
- Improved contractor relationship
- Increased data quality
- Reduced paper work
- Environmental sustainability
Mobility – WFM Project

WFM/GME: Workforce Management

Corporate Systems

- Rede Activa PowerOn
- SGCC - SEP SAP/IS-U
- SIAG PM SAP R/3 PM
- SIT RD SmallWorld
- SCADA GENESYS

Scheduling and Dispatch

Sending work order

Reception

Travel

Return

Returning information to close work orders

Execution

Sending

Returning

Execution

Mobility – WFM Project

Dow Jones Sustainability Indexes

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Mobility – WFM Project

Mobility Platform mBPM

- Multi-channel access
- Dynamic and natural evolution of the terminals, responding to business requirements, with implemented processes continuity (no cost in addition to the terminal)
- On-line e off-line
- Work optimizer (resources and routes)
- Compatibility with Microsoft .NET e Java 2 Enterprise Edition

Modelation and execution of business processes in multi-channel environment, interfaces for integration with other corporate systems.

![Diagram of Mobility Platform mBPM](image)
Implementation
Implementation - Change Management

Risks and Challenges

Key success factors:
- Capacity to effective change
- Effectiveness and efficiency
Implementation - Change Management

Processes Analysis

Redefine

Links between different users

Comunication

Technical training

Change Management
Implementation - Change Management

- Procedures Revision
- Analysis Tools Revision
- Acting Profile adaptation
- Refining Indicators
Implementation - Change Management

Integration

Vision of the Benefits
Implementation - Change Management

Backoffice: Redefine, Supervision, Scheduling / Dispatching
Implementation - Change Management

Before WFM/GME:

Paper

Checklist PT's

Now with WFM/GME:

Automatic data integration
In SAP-PM

Ex: Preventive Maintenance
Implementation - Change Management
Results
Results

Before

After
Results

Before

After
Results

Finalized Workorders

<table>
<thead>
<tr>
<th>Year</th>
<th>Total WO's</th>
<th>WO's/Year</th>
<th>Outage</th>
<th>Comercial</th>
<th>Maintenance</th>
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</thead>
<tbody>
<tr>
<td>2008</td>
<td>253,391</td>
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<tr>
<td>2009</td>
<td>1,527,393</td>
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<td>2010</td>
<td>1,781,384</td>
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<td>2011</td>
<td>2,081,138</td>
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<td>2012</td>
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<td>2013</td>
<td>3,369,892</td>
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<tr>
<td>2014</td>
<td>4,045,882</td>
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<tr>
<td>2015</td>
<td>3,829,382</td>
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</table>

WFM-GME - # Teams January 2015

<table>
<thead>
<tr>
<th>DRC</th>
<th>EDP</th>
<th>PSE</th>
<th>Total</th>
</tr>
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<tr>
<td>Total...</td>
<td>431</td>
<td>1,400</td>
<td>1,831</td>
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Results

OUTAGE

<table>
<thead>
<tr>
<th>Year</th>
<th>Finalized WO's</th>
<th>Canceled</th>
<th>Other</th>
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<tbody>
<tr>
<td>2008</td>
<td>97,288</td>
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<td>331,797</td>
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<tr>
<td>2011</td>
<td>36,956</td>
<td>8,522</td>
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<tr>
<td>2012</td>
<td>23,815</td>
<td>3,578</td>
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</tr>
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<td>2013</td>
<td>21,822</td>
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<td>2014</td>
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<tr>
<td>2015</td>
<td>23,254</td>
<td>4,377</td>
<td>417</td>
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COMERCIAL

<table>
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<tr>
<th>Year</th>
<th>Finalized WO's</th>
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<tr>
<td>2008</td>
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<td>852,867</td>
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<td>2011</td>
<td>1,168,854</td>
<td>8,522</td>
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<tr>
<td>2012</td>
<td>1,630,978</td>
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<td>3,057,911</td>
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<td>2,990,423</td>
<td>2,990,423</td>
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<tr>
<td>2015</td>
<td>668,375</td>
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MAINTENANCE

<table>
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<tr>
<th>Year</th>
<th>Finalized WO's</th>
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<th>Other</th>
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<tr>
<td>2008</td>
<td>31,399</td>
<td>8,132</td>
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<td>2009</td>
<td>138,567</td>
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<td>2011</td>
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<td>2012</td>
<td>217,617</td>
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<td>2013</td>
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<td>2014</td>
<td>334,609</td>
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<tr>
<td>2015</td>
<td>52,599</td>
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## Results

### Finalized Workorders – February 2015

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Outages</th>
<th>Commercial</th>
<th>Maintenance</th>
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<tr>
<td>EDP</td>
<td>10.818</td>
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<td>256.277</td>
<td>18.440</td>
<td>223.661</td>
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<td><strong>Total</strong></td>
<td>267.095</td>
<td>20.251</td>
<td>228.098</td>
<td>18.746</td>
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![Pie charts](image.png)
Lessons Learned
Lessons Learned

Pragmatism

I MIRACLE

KISS  “Keep It Simple and Supported”

Innovation

(take the opportunity...)
Lessons Learned

Phase 1
- Rollout
- Working!

Phase 2
- Prototype
- Working!

Kick-off
- Setup
- Pilot
- Prototype

Lessons Learned
Lessons Learned

Final Requirements

Testing

Presentation/Release

Roadshow

Prototype

Involving the organization

Communication

Final Requirements

Testing

Presentation/Release

Roadshow

Prototype

Involving the organization

Communication

Dinamism

SharePoint

Follow Up

Sessions

Implementation

Training

Pilot
Lessons Learned

- support for mobile operations
- information generator
- campaign enabler
- integration platform
- outage response enabler
- link with the clients
- smartgrid integration
- partnership enforcement

- optimizer
Mobile Devices Selection Process

Select the most adequate equipment to the business reality and daily activity of EDP-D field teams.

Challenge

Selection Process

Business Requirements

Technical characteristics

Technical tests

Equipment Short-List

Cost Analysis

Tests in the field

Selection

- Field teams needs
- Mobile equipments characteristics:
  - Screen
  - Portability
  - Rugged
  - Autonomy
  - Ergonomics
  - Usability
  - Processor
  - Performance
  - GPS

- Equipments technical tests
- Pre-selection of equipments to test by the field teams

- Tests made by teams, in the field
- Negotiations with mobile equipments suppliers

WFM/GME field teams mobile equipments
Evolution
Evolution - Smartgrids

InovCity

Smart Energy Living

http://www.inovcity.pt/
Evolution – Mobile Platform

WFM I

2008

2010 - 2011

WFM II – Evolution Mobile Platform - New business needs

Barcoding

Mobile Platform

Rugged

Android…

PDA

PC

Tablets
Evolution

Main Strategic Orientations

**WFM I**

- **Focus in LV**
- **Area:** Outages, Maintenance; Commercial Services
- **Mobile plataforma** to support field work team management
- **Better service** for the client
- **Improved** relationship with our partners
- Effectiveness and **efficiency** of our field services
- Backoffice **optimization**
- **Systems:** Power ON; SAP IS_U; SAP-PM; SIT

**WFM II**

- **Focus in HV e MV**
- **Improvements** from WFM I
- **New:** Investment
- **Systems**
  - SAP-PS
  - Asset Management
- **End to end vision**
- **Cloud Computing**
- **Mobile Platform**
Evolution

Some new functionalities

- Integrated and optimized management of multifunctional field teams HV and MV
- Different status for different types of orders
- Panic button
- Adapt the Backoffice and PDA for the best funcionality/ergonomy
- Alarm management in Backoffice and PDA (workorders with SLAs)
- Google maps type solutions
- Commissioning
- Asset Management integration
- Materials and accessories management
- GIS tools (mobile platform)
- Meter multivendor tool (mobile platform)
Evolution – Mobile Platform

Mobility is the new front end to business applications

SAP AG
Execution
Simplicity
Involvement
Innovation

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Questions?

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Thanks!

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