Thailand Delegation, November 7th, 2011

François HENIMANN
Agenda

III Company presentation
III Strategic issues
III International development
III Smart Grids and Linky Project
III Demand Side Management
ERDF: a regulated company, subsidiary of EDF Group, one of the leading joint stock companies in the CAC 40 index.

Main shareholder

Public policy

Laws & regulations

100% subsidiary

Set up 1st January 2008 (in compliance with EU 2003 Directive)

Regulation

“TURPE” proposal

Supervisory board

EDF

Energy

Envir’t

“TURPE” setting

COMMISSION DE REGULATION DE L’ENERGIE

100% subsidiary
The french electricity market: fully open since 2007

**Generation**

**Transmission**

**Distribution**

**Supply & Trading**

**Deregulated**
- Mainly EDF, GDF Suez, E-on, Poweo, ...

**Regulated**
- Mainly ERDF (+ 157 locals)

**Deregulated**
- EDF, GDF Suez, Direct Energie, Poweo... (19)

33,000,000 customers
250,000 producers

Under the rules of the « local authorities contracts »:

- Connects users to the network
- Designs and builds electrical infrastructure
- Operates and maintains the network
- Intervenes for the clients (meter reading, daily operations, outages)
- Reconstitutes electric flows for the market (in charge of metering and responsible for losses)
An independent DSO on which the proper operation of the French electricity market depends.

ERDF’s missions

1. Market operator
   - Guaranteeing access to the network under strict conditions of non-discrimination, objectivity and transparency through the code of good conduct
   - Metering electric flows
   - Providing quality services (customer relationship, lead times, technical quality, etc.)

2. Asset manager
   - Developing, operating and maintaining the distribution network assets
   - Ensuring the quality of the electricity supply and ensuring the safety of third parties near electric networks

3. Concession operator
   - Managing the public electricity distribution service
   - Negotiating and managing « local authorities contracts »
**ERDF key figures (2010)**

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<td>EBITDA</td>
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The 2010 energy balance on the ERDF network

- **Local generation**: 21 TWh
- **From the transmission grid**: 360 TWh
- **Distribution (customers+other GRDs)**: 359 TWh
- **ERDF network losses**: 22 TWh

**ERDF network**: 381 TWh
ERDF’s governance

EXECUTIVE COMMITTEE

President of the executive committee
appointed by the Supervisory Board

Supervisory Board
15 members appointed or elected for five years

8 Members
appointed by the General Assembly

2 Government Representatives
appointed by decree

5 Employee representatives
elected by employees

8 regions
&
corporate functions
(36,000 employees)

International subsidiary

Delegated management contracts
Industrial offer
Consulting

ERDF
Électricité réseau distribution france

International subsidiary
The agenda includes:

- III Company presentation
- III Strategic issues
- III International development
- III Smart Grids and Linky Project
- III Demand Side Management
Fundamental changes that put the focus back on distribution

The environmental challenge of “20/20/20” (% CO2 reduction, Renewables, Energy saving) adopted by EU is widely addressed to network distribution operators:

A new paradigm in network management: from a planned and centralised approach to a diffuse, random approach

- Development of **renewable energy** (wind, solar) and of new electricity usages (heat pumps, electric vehicles)
- Growing potential **risk of instability** in local networks (voltage drops, micro grid)
- Need to **reinforce networks** and to introduce new operating modes (including storage)
- Need to manage the **peak load** issue, both with new generation capacities and Demand Side Management

Faster innovation…. behind the “smart grid” concept

- Ongoing development of **more complex**, “**smarter**” electrical infrastructure
- Optimised management and enhanced technical performance of networks: operation and management (**self-healing network**), congestion management, smart meters, etc.
- Development of **more local, decentralised electric systems**, which must be optimised locally in terms of supply/demand balance, architecture and management

Putting local players back in charge of energy issues

- Growing expectations regarding “**Smart, green and sustainable cities**” and local energy policy, in a worldwide phenomenon of urban concentration
- Strategic role of electricity networks: development of local infrastructure and “eco-friendly” electricity systems, as part of the shift towards “**post-carbon**” cities and regions
- Development of **local, alternative models** (microgrids) and emergence of new players
Drawing on 2 natural development vectors and on ERDF’s leading role in EDF Group’s distribution business

INTERNATIONAL DEVELOPMENT
- Long-standing experience
- Unique added value
- Several development models

SMART GRIDS
- A network that is already “smart”
- An acknowledged lead, but competition is growing
- Several projects underway

ERDF is the leading player in EDF Group’s international distribution business
- Helping to improve its performance
- Fostering the EDF Group development
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As the leading player in EDF Group’s distribution business, ERDF is contributing to the international development of the Group.

ERDF is drawing on its expertise to develop the Group’s distribution activities in the international arena, by offering an extended range of services to international utilities (operation, engineering, meter reading, etc.):

- Partnerships with local players in the distribution sector. For instance:
  - Russia: agreement with MRSK for the management contract of Tomsk (Siberia)
  - China: development, management and optimisation of electricity networks in Shaanxi Province (Xi’an)
- Developing an **industrial offer** (smart meters and smart grids infrastructure and systems)
- Laying the groundwork for a leading role for the Group in tomorrow’s distribution sector and **electricity networks**, by developing technological partnerships on an international level: Smart Grids, R&D, innovation, etc.
A continuum of solutions proposed by ERDF-i to its partners

A choice to be made according to the local context (regulation, tariffs, shape of the network, legislation,…) and to the level of risks assumed by the parties.
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France’s electrical system faces strong growing challenges, a lot are addressed to ERDF

250,000 local solar generation sites (2011)

Smart cities

Peak shaving / Demand Side Management

« 20/20/20 »
CO2 / Renewables / Energy saving

Investments management

Powergrid quality enhancement

2 millions Electrical vehicles (2020)
The distribution grid is split into two sections based on voltage:

- Medium voltage (MV)
- Low voltage (LV)

ACR* control the MV network remotely

* Regional control agency (Agence de Conduite Régionale)
ERDF is a length ahead: an MV network that is already “smart”...

- 30 MV CONTROL ROOMS 24h/24
- HIGH VOLTAGE LINE LOOPS (600,000 KM)
- 105,000 REMOTE CONTROLS DEVICES
- AUTOMATIC CONTROL IN THE PRIMARY SUBSTATIONS

A lower average in the time of power cuts from 1980 to 2010
ERDF is a length ahead: an MV network that is already “smart”...

- “SIT-R”, an efficient remote management tool
- 30 regional control agencies
- 500 dispatchers
- 105,000 remote-controlled switches
- Interfaced with the geographic information system
- Interfaced with the customer information system through “Inforeseau”, providing reliable information on the state of delivery and outages
- Automated management of load shedding, interfaced with RTE system
- Self-healing network
- Real time measurement of wind and solar generation connected on MV, interfaced with RTE system, remote action
« Linky » is the name of the answer designed by ERDF for bringing « intelligence » on LV network toward customer’s installations

This is not a meter...
2. It’s a system!

INTEROPERABLE (interchangeable equipments, standard communication protocols)

2-WAYS COMMUNICATION

UPGRADABLE (system and components, step by step)
As a general infrastructure, Linky brings numerous benefits to the society as a whole.

- More reliable grid
- Renewables energies
- Faster and remote interventions
- Electrical vehicles
- Better management of household equipments
- New business with electricity services
New advantages for the client, today…

**Without Linky**

- Invoices bases on estimations
- Be at home for the reading
- Be at home for interventions
- Time between a demand and an intervention

**Linky’s benefits**

- Daily remote readings
- 70% of work done remotely
- 24h vs. 5 days
- 7 Days a week

**Linky**
... and tomorrow!

Consumption management thanks to

① Better information

Through the Linky system

By wire or radio

On the web

On an IHD

② Equipments control

8 interfaces

Linky
The Linky Infrastructure and Grid Management opportunities

The infrastructure of the system Linky provides new functionalities to Grid Management IS:
- Load and quality of supply remote reading
- Alarms detection (overvoltage, etc.)
- On demand meter state
- Information on communication pattern
- etc.
Linky, an ambitious pilot...

### 3 main targets

- Check the roll-out processes
- Build the Linky IS
- Confirm financial hypothesis

### 300,000 customers & 2 regions

- **Touraine**
  - 100,000 customers
  - Mainly rural
  - 33 inh / km²

- **Lyon**
  - 200,000 customers
  - Urban
  - 1,750 inh / km²

### A 24 months pilot

- **2009 March**
  - Substations preparation

- **2010**
  - Data concentrators installation
  - Meters installation

- **2011 March**
March 31st, 2011: end of field operations. Main results

- 4,600 DC installed (99%)
- 250,000 meters changed (90%)
- 92% of the meters communicate
- 98% of tele-operations are achieved in less than 48 hours
- 30 mn (average) to replace a meter
- 1,500 meters changed per day (average)
- Less than 1% claims

... and a successful one!
Whatever the country and its organisation, the final problem to be dealt with remains the same...
Defining the benefits for ERDF

3 main domains benefit from Linky:

- Reduction of non-technical losses: 40 to 45%
- Performance of interventions: 40 to 45%
- Better asset management: 15 to 20%

% of each benefit brought by the project
On the side of the costs, our pilot gave us strong hypothesis
Conclusion: a viable business case

Linky « straight »
ERDF business

Benefits for
the society
(EV, renewables,
services, …)

0 IS & others

purchase

installation

asset management

performance of interventions

non technical losses
Next steps

III Start our generalised roll-out (from 2013)
   III Work with industrials ready to start quickly
   III Use the PLC « G1 »

III Prepare the future (2015 - 2018)
   III Confirm PLC « G3 » possibilities through a specific pilot
   III Develop the smart grids network functionalities for the system
   III Take part to the development of DSM services
   III Include Linky to ERDF international offers
From 2010: achieving the smart grids projects

III « Linky grid » project by ERDF (R&D)
- Geographical Information System
- MV / LV Grid operation management
- Network modernization
- Power quality

III Specific demonstrators with many partners
- Peak load management
- Load balancing on a regional scale
- Direct integration of renewable energy sources on the MV network
- Customer Information and services
From 2010: achieving the smart grids projects

Future developments based on PLC G3
- Real-time network operation
- Integration of IPv6 (M2M)

A new global partnership with major players
- Promote G3-PLC in Internationally recognized standards organizations (IEEE, ITU, IEC, ISO, etc.)
- Organize and operate the industry users group to maintain the G3-PLC specification and to insure interoperability
- Support utilities in its deployment
- Promote G3-PLC in further applications
From 2010: achieving the smart grids projects

- An extensive R&D programme
- The setting up of demonstrators in France and Europe
- Partnerships with a broad spectrum of companies, from the major distribution utilities to innovative start-ups
From 2010: achieving the smart grids projects

GRID4EU

- 6 major European utilities, 28 partners
- 6 demonstrators
- 4 years (2011-2015)

Work in coordination
- Define standards
- Guarantee the scalability of technologies
- Analyse smart grid cost-benefits
- Network optimization (supervision & automation)
- Renewables integration
- Peak load management
- DSM, EV, storage, micro grids
- Customer engagement
- Secure energy supply / network reliability
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Winter peak demand in France (RTE)

The winter peak demand is mainly due to a large use of electrical heating in France (-1°C involves +2000 MW)
The regulated tariff for small consumers (residents and professionals) has 3 options, each of them based on a binomial tariff (fix + variable components), the fix component depending on the power available:

1. A basic option with a single rate: a fixed energy price all the year long.

2. An option incentive for heating uses (homes and water), with 2 rates: full hours and slack hours. This tariff is intensively used in France.

3. A third option more sophisticated, based on three periods (300 blue, 43 white and 22 red days), with 2 rates for each day (full and slack hours): the « TEMPO » tariff, used by approximately 500,000 consumers: 6% of professionals (180,000) and 1% of residents. This tariff is no more applicable to professionals.
Regulated tariff as of 1 January 2011 (without taxes)

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About the TEMPO tariff

Generalized in 1995, after an experimental period

Technical point of view
Orders to shift the tariff, and information for the consumer (colour of the day and kind of period) transmitted by ERDF, via a 175 Hz modulation injected in HV / MV substations. “Notification signal”, a small box which can be plugged into any power socket and indicates the day’s colour and the current hourly rating. It also indicates the colour of the next day as from 8 p.m.;
Electronic meter able to manage the 6 tariff periods.
Various energy control systems to control indoor uses

Results (behaviour on experimental panel)
the daily consumption has been reduced by 15 % on a white day, and by 45 % on a red day compared with blue days (in average)
the transfer of consumption from peak hours to off-peak hours was 1.3 times higher on a white day than on a blue day. It was even higher for red days.
The major consumption reductions concerned electric heating.
90% of the customers are satisfied or very satisfied, and get saving on their bill

Tempo for “pro” (professionals) is in extinction since August 2005: for these customers, the tariff was mainly used as an windfall. They didn’t change their behaviour. So it was no gain at all from production standpoint.

Tempo for residential customers is kept, but no more promoted. Customers are satisfied with it, and the tariff trigger off load shifting or load shedding (other kind of energy for heating). So it fits its goal, but with limited impact on load shedding: saving of 100 W per customer and per degree on a “red” day (35 MW per degree with 1% of customer involved).

EDF loses money because of the sourcing reference. But it doesn’t invalidate the interest of this kind of tariff, il a way of adaptation can be find with the regulator.
EcoWatt Britany

- Unsufficient electricity generation in Britany (8% of the needs), is creating transmission network constraint, especially during peak hours in Winter, due to lighting and electrical heating.

- Since 2008, RTE (French transmission company, affiliate of EDF) and partners (government, local authorities, ERDF) have initiated the EcoWatt approach toward the consumers, in order to cut the peak demand during the most critical days, when consumption assumption exceed availability, and so avoid power cuts.

- Process based on voluntary enrolment and communication basis:

  www.ecowatt-bretagne.fr
Cet hiver, face aux risques de coupures, apprenons à modérer notre consommation d'électricité.

POURQUOI ECOWATT ?

La région Bretagne, qui ne produit que 8 % de l'électricité qu'elle consomme, est une véritable péninsule électrique. Outre les actions élémentaires, le site propose des alertes pour vous alerter en cas de risque de coupures.

Devenez ECOW'ACTEUR !

1. Je m'inscris
Remplissez le formulaire d'inscription pour recevoir les alertes EcoWatt.

2. Je relais
Lire la suite...

3. Je m'engage

4. J'agis

© EcoWatt  I Nous contacter  I Mentions légales  I Plan du site

Site réalisé en partenariat avec :
CHOISISSEZ VOS ALERTES
Sélectionner UN ou PLUSIEURS mode(s) d’alerte.

Suivez EcoWatt en continu.

Facebook
Suivez nous sur Facebook

Twitter
Suivez nous sur Twitter

Flux RSS
Recevoir les flux
Guide d’utilisation

Widget
Télécharger

Appli mobile
Windows Mobile
Télécharger
Guide d’utilisation

Android
Télécharger
Guide d’utilisation
EcoWatt: results

18,500 participants during 2009/2010 winter, with an estimated 1.5% peak demand impact (60 MW for Brittany, based on pool):

30,500 participants during 2010/2011 winter, with an estimated 2.5% peak demand impact (100 MW for Brittany).

The same approach has also been developed in Provence Côte d'Azur area.
Linky is also an essential building block for the DSM

- Information to the customer facilitating demand control
- A range of tariffs and incentives, offered by the suppliers
- Indirect load shedding, to reduce peak demand
- Making consumption data and associated services available
- Advanced tariff scheme for suppliers: tariff schedule + mobile peak tariffs
- Control of remote devices and associated services: 8 contacts for electrical equipments remote control
Consumption management thanks to:

1. Better information
   - Through the Linky system
   - On the web
   - By wire or radio
   - On an IHD

2. Equipments control
   - 8 interfaces

Linky
Triggering infrastructure from informations delivered by smart meters – 1st level

→ Optimisation of electrical devices functioning (tariff based triggering)
→ No home energetic system global optimisation, possibility of peak shaving broadcast signal
Triggering infrastructure from informations delivered by smart meters – 2st level

→ home energetic system global optimisation, according to present and future tariff, intelligence of electrical devices, meteo, local generation, …

Electricity supplier

Energy box:
- Electric use triggering, local or distant display

3: supplementary informations and signals (tariff calendar, peak shaving, …)

Flexible Electric Uses

Linky Meter

Load curves, tariff scheme

tariff grids

Distributor

tariff signal

WWW ADSL