

The French experience of smart metering roll out

Smart utilities Forum
Bengaluru - India



Agenda

Enedis in a nutshell

1. Smart metering : towards the electricity needs of the future
2. Linky program key figures
3. Strategy and organization topics
4. And then ?

The image features a white background with several blue decorative elements. At the top, there are two rounded rectangular shapes, one on the left and one on the right, both with rounded corners. A horizontal blue line runs across the middle of the page, starting from the left edge and ending at the right edge of the larger rounded shape on the right. Below this line, the text "Enedis in a nutshell" is centered. At the bottom, there are two more rounded shapes, one on the left and one on the right, both with rounded corners. A horizontal blue line runs across the bottom of the page, starting from the left edge and ending at the right edge of the larger rounded shape on the right.

Enedis in a nutshell

Enedis, the main french DSO

100% owned
by EDF Group
(subsidiary
since
January 2008)

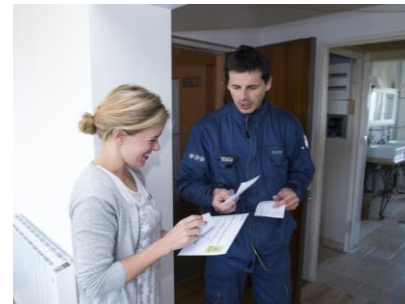
13.8 B€
turnover

€ 3.5 billion
EBITDA

Electricity
distribution, a
regulated activity,
overseen by the
French Energy
Regulatory
Commission(CRE)

**Enedis manages the public electricity
distribution network for 95% of France
mainland**

**Our public service mission: continuity and
quality of service with a non-discriminatory
access to the network, regardless of the
electricity supplier.**



1.3 million Km
Power Lines



35 million Connected
Customers



39,000 Employees



11 million Customer
Interventions / Year



355 636 generation
facilities connected
to the distribution
grid in France



1 Smart metering : towards the electricity needs of the future

1.1 The smart metering at the heart of energy transition



1.2 Smart meters for industrial customers



500 000 Meters

220 000 customers

40 % of the Enedis electricity market

35% of Enedis Turnover

Rollout status update

- Mass rollout from 2013 to 2017
- 100% of the meters in operation

Point to point communication

Daily basis data collection rate over 99%

1.3 Smart meters for the residential market



Linky

- 1 Metrological Led
- 2 Display
- 3 Push button
- 4 Serial Number & legal information
- 5 Sealing
- 6 LED
- 7 Time of Use (TOU) switch
- 8 Pulse output
- 9 Fuse

Data collection

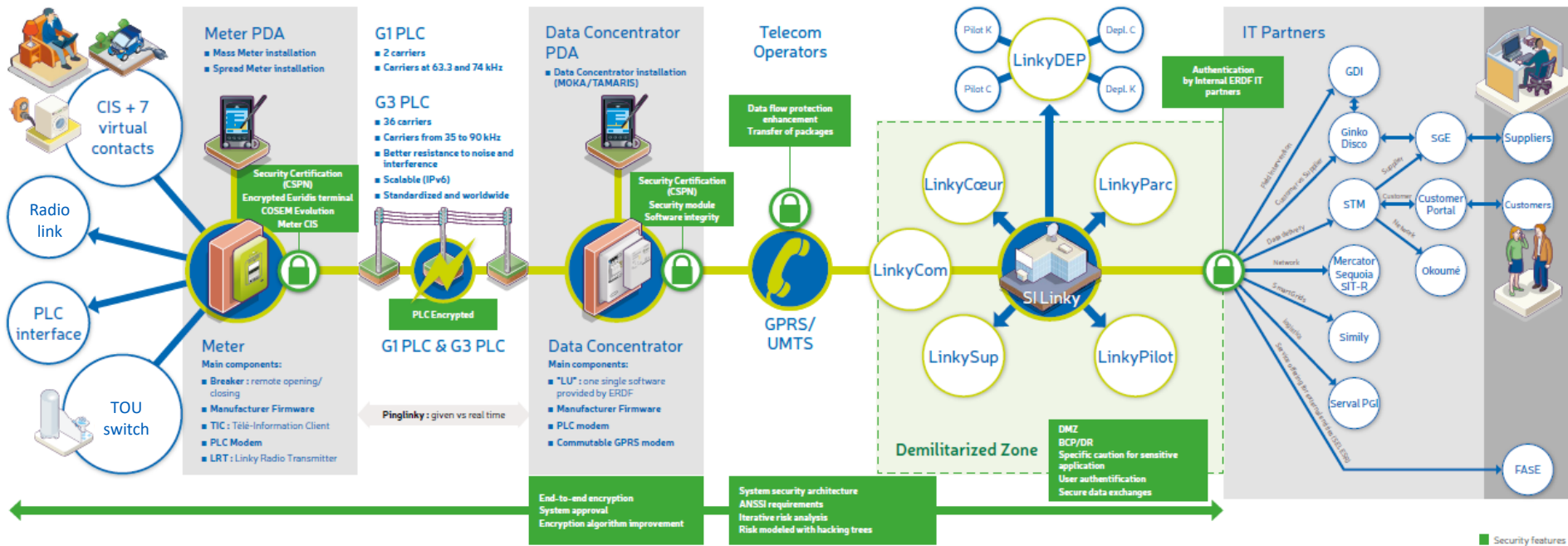
- 10 tariff energy registers for the supplier and 4 tariff energy registers for the distributor
- Producer and consumer load profiles (time resolution : 10 / 15/ 30 and 60 min)
- Maximum daily power
- Status data : breaker logbook, terminal cover opening logbook,...
- Quality data : voltage breakdown and abnormal voltage logbooks
- Status register, error register
- Up to 43 display messages

Remote operations

- Opening and closing of the breaker
- Opening and closing of the TOU switch
- Change of maximum allowed power

bidirectional, evolutive, interoperable, secured

1.4 The Linky system in detail



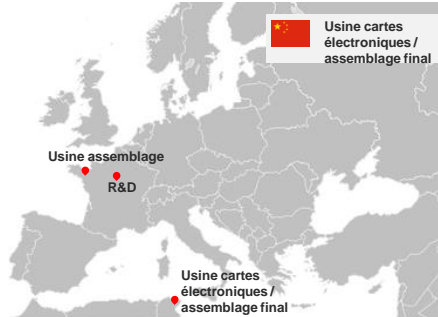
Security features



1.5 6 main partners for the manufacture of smart meters and data concentrators units

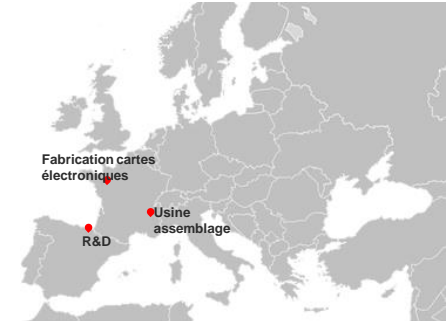
SAGEMCOM

- Single phase meters G1 / G3
- Three phase meters G3
- Data Concentrators G3



الفنار alfanar

- Three phase meters G1 / G3



Landis Gyr+

- Single phase meters G1 / G3
- Three phase meters G1 / G3
- Data Concentrators G1



CAHORS

- Data concentrators G1 / G3



Honeywell

- Single phase meters G3



Itron

- Single-phase meters G1 / G3
- Three phase meters G1 / G3

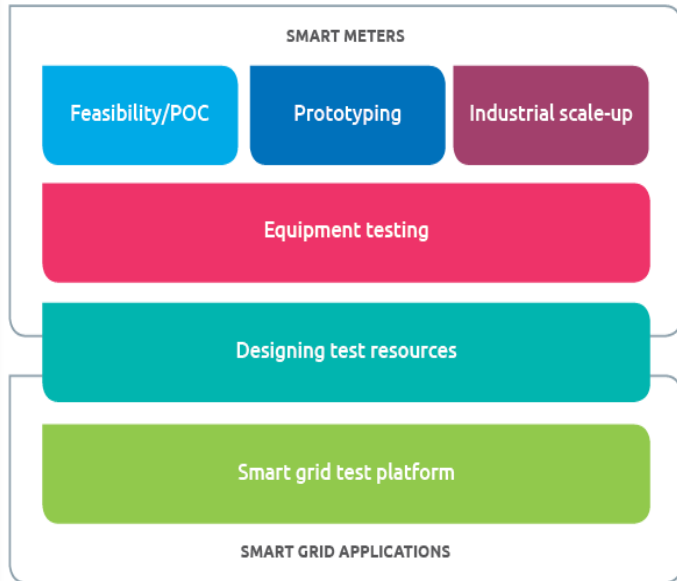


1.6 The Enedis qualification center

The Enedis Qualification Center was designed to overcome quality and reliability issues, such as :

20-year equipment lifetime, tight deadlines for design and qualification of devices, equipment interoperability (meters and DC units), technological innovations, complex purchasing strategy and industrial volume of devices.

It is the largest smart meter system center in Europe, composed of five distinct departments, occupying an area of 1 700 m².



KEY FIGURES

- 50** engineers and technicians working daily at the lab
- 45** products tested
- 400** test racks



Experts in design and testing

Detailed knowledge of electronics, mechanics, software, telecoms and cyber-security technology.



Test equipment

Industrial product creation tools and test facilities.



An industrial innovation space

A renowned laboratory in Europe.



Proven experience

Projects for major international manufacturers.

1.7 The control room of the end to end communication system

Structure and purposes

Production

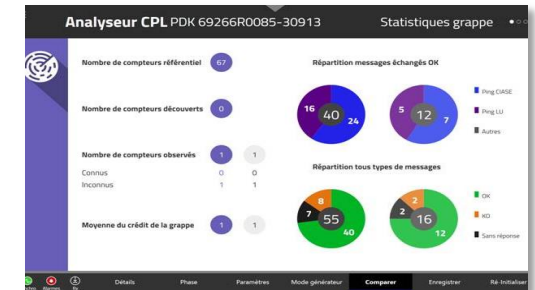
- Supervise Linky meters to ensure the **smooth operation** of the end to end communication system
- Manage business units **remotely**
- Follow key indicators to **comply with external requirements**

✓ **Five teams : Hypervision
Prod management,
Operation, Deployment,
Reporting**

Performance

- **Analyse** processes and issues
- Ensure the **continuous improvement** of Linky processes

✓ **Real time experiments
with “on the ground”
equipment**



Daily use A.I. algorithms to fix issues encountered during the process

And also :

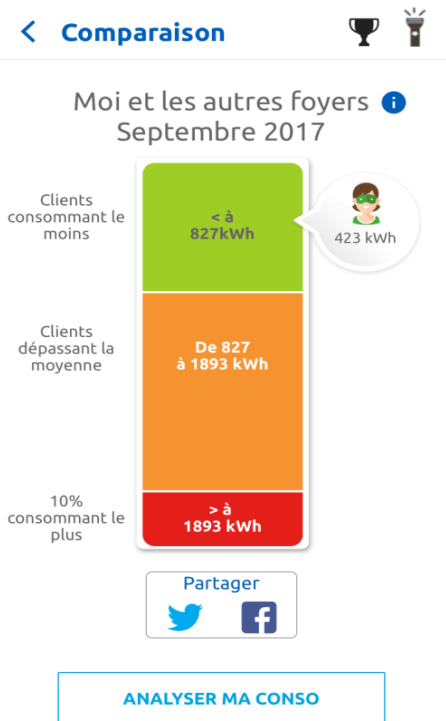
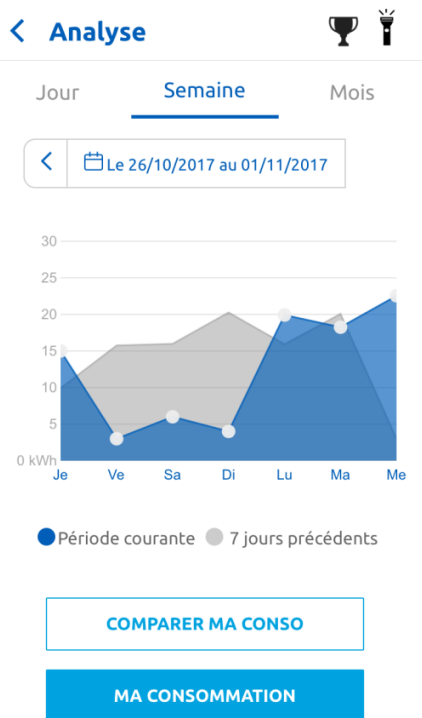
*LinkySup
&
Expresso*

- *Develop tools to make the **supervisor’s job easier***
- ***Automate** systems*
- *Improve IS to ensure **better performance***

- ✓ *100 users*
- ✓ *Remote update of each equipment*
- ✓ *A large range of action to analyse and fix system issues*



A new smart phone app for the customers to track their electricity consumption



Tous les challenges

- A free access to data consumption so customers can monitor their electricity consumption (on a monthly/weekly/daily/hourly basis)

- Customers can compare their consumption with similar households and be alerted in case of excessive consumption.

- Some “challenges” games to learn “eco-gestures” in order to save energy.

« Enedis à mes côtés » is free and available on Apple Store and Google Play



2 Linky Program key figures



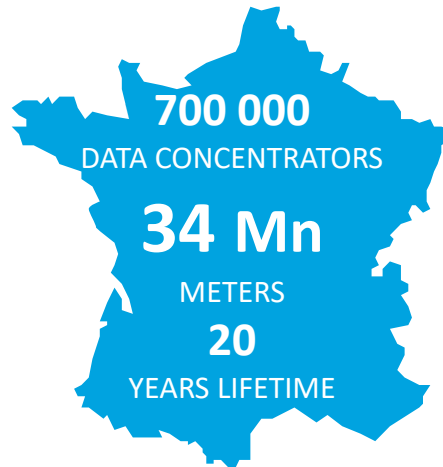
2.1 Main targets

6 years



2015 → 2021

MASS ROLL OUT



5 Bn



CAPEX BY 2021



10 000 JOBS CREATED (5 000
OPERATORS IN THE FIELD)



6 COMPANIES WITH FACTORIES
BASED IN FRANCE

700 000 METERS PRODUCED PER
MONTH

>3 Bn



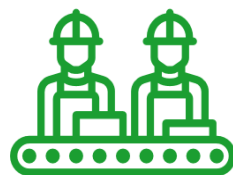
DATA COLLECTED / TRANSFERRED /
STOCKED PER DAY

2.2 Key figures (cut off date : November 2017)



> 7 300 000 METERS
INSTALLED

> 28 000 METERS INSTALLED
PER DAY



700 000 METERS
PRODUCED **PER MONTH**



> 3 000 OPERATORS IN
THE FIELD **PER DAY**



97% SUCCESS RATE
OF REMOTE OPERATION
(WITHOUT RETRY)



98 % DAILY
COLLECTION RATE
(23h59)



> 700 Mn DATA
COLLECTED / TRANSFERRED /
STOCKED PER DAY

2.3 Main risk factors

The most critical industrial risks relate to :

Equipment & supplies topics :

- Insufficient **means of production** to meet expected volumes of equipment
- **Breakdown** of supply for critical components

IT infrastructure & cybersecurity aspects :

- **Performance & scalability** of the system, to cope with the data traffic generated by the progressive roll out of 35 million smart meters
- Anticipation, assessment and brake from **potential attacks**

To overcome these risks, dedicated organizations were implemented :

▶ Supply chain methods

- in order to control the roll out progress, monitor production aspects, and anticipate any difficulty (crisis scenarios)

▶ Continuous monitoring of the IT network

- in order to detect and remedy any security incidents that may occur

▶ Modular Linky application architecture

- in order to be able to identify scalability issues and to provide a targeted response

▶ An "elastic" infrastructure

- able to adapt to the requirements of upward and downward volumes, almost in real time

▶ A load-volume test trajectory



3 Strategy and organization topics

3.1 Key strategic issues



Governance and
management



Security, efficiency,
reliability and scalability
of the whole system



Stakeholders adhesion
and public acceptance



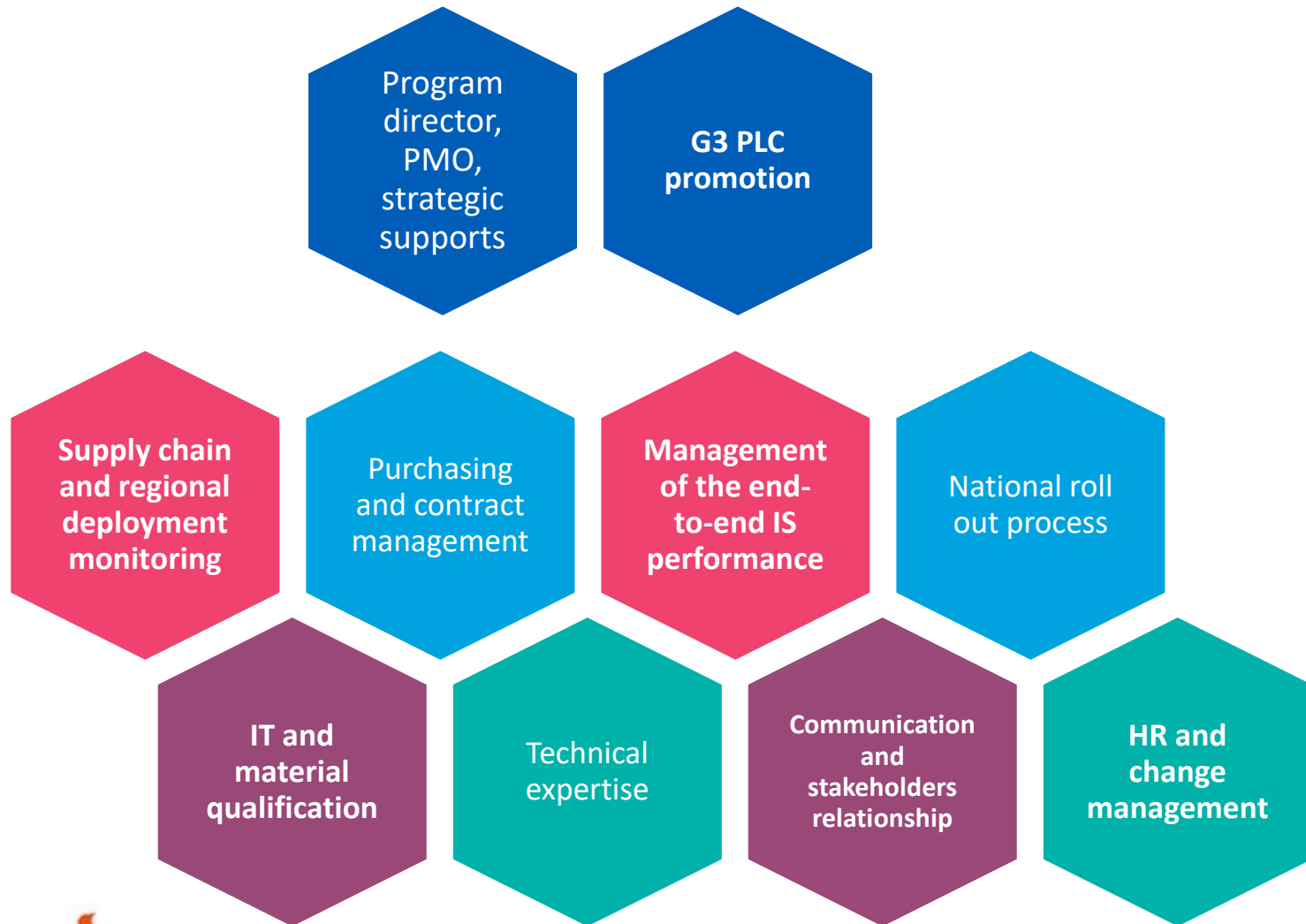
Human and financial
factors



Supply chain and roll out
management

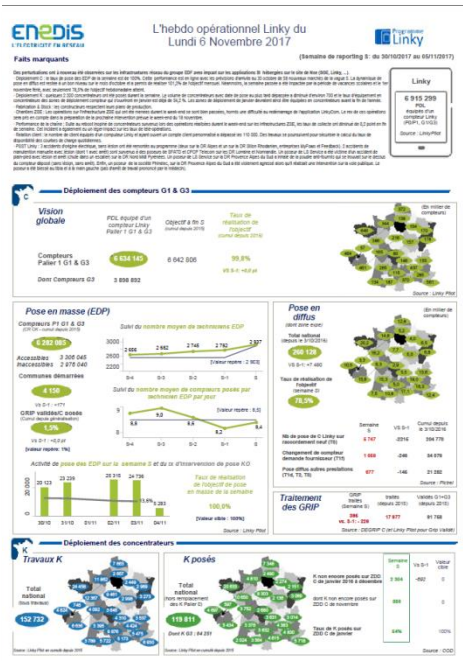
Smart metering roll out encompasses a wide range of challenges

3.2 Linky program team



3.3 Reporting tools: dash boards overview

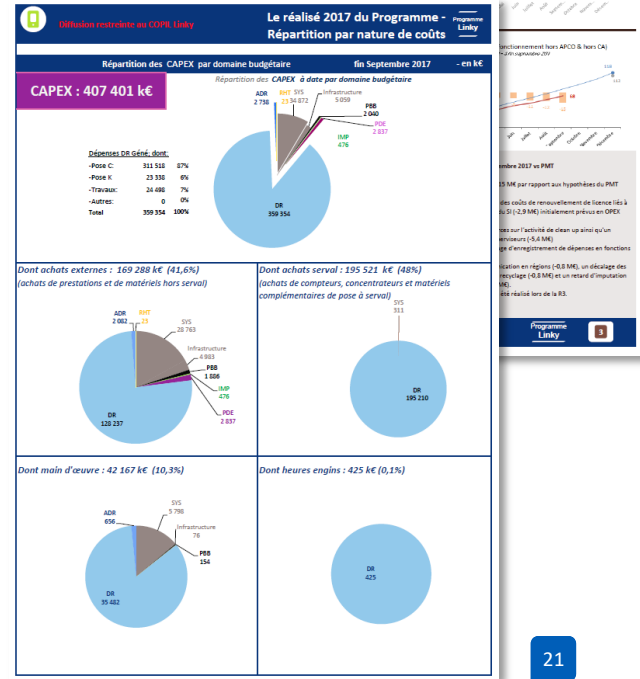
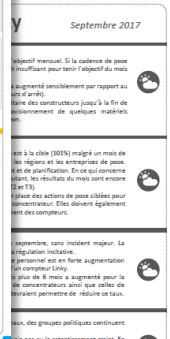
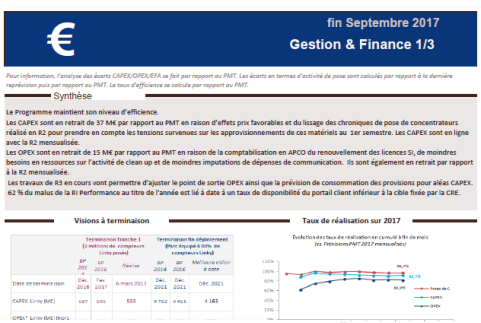
Weekly operational monitoring



Monthly strategic monitoring



Monthly financial monitoring



4 And then ...?

4.1 Enedis, as an international reference

Thanks to its experience in supervising massive smart metering roll out and managing with success a large-scale industrial project, Enedis expertise is requested by numerous actors all around the world : Europa, Africa, Asia, ...

Austria



Belgium



Luxembourg



Switzerland



South Africa



China



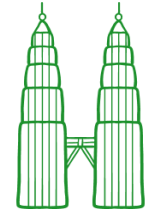
India



Japan



Malaysia



Any question ?...

...Thank you for your attention !



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Chairman of the G3 PLC Alliance

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