



# Smart metering : a comparative impact of European solutions

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## Content of the presentation

- Smart metering general situation and interaction with renewable and dispersed energy resources
- Focus on ongoing Smart metering project in France and perspectives



# General trends observed in Europe

- Following Enel specific realisation, a lot of projects are coming out, mainly in countries where initiatives are supported by law or regulation :
  - Some regulators are seeing AMM as an opportunity to foster the market and enhance the satisfaction of the customer;
  - Some governments consider the potential AMM impact on the energy consumption and peak demand reduction (=less CO<sub>2</sub>)
- In different European countries, many differences exist :
  - between regulatory frameworks and metering organisation ;
  - between industrial strategy and subcontracting approach ;
  - between costs (from 70€ to 350 €/ metering point).
- Similarity in AMM architecture and functions should leave space for standardisation and common solutions in order to cut down the costs.

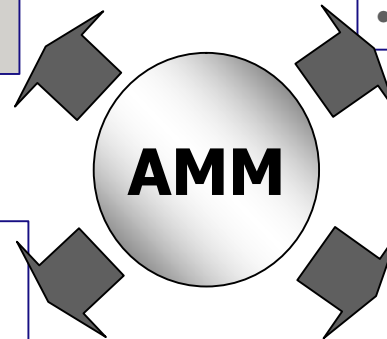
# AMM main beneficial impacts

## Distributors :

- Reduction of metering O&M cost
- Improved service to market operators
- Improved performance (losses, network operation, ....)
- Increased ability to monitor local production and DSM (defer investment and play a new role in the electrical system)

## Customers :

- Simplified relation for contractual change (inc. change of provider, ...)
- Access to several Energy services and tariffs inc. Price response
- Enabling energy management and savings
- Automatic load monitoring



## Producers and balance responsible party :

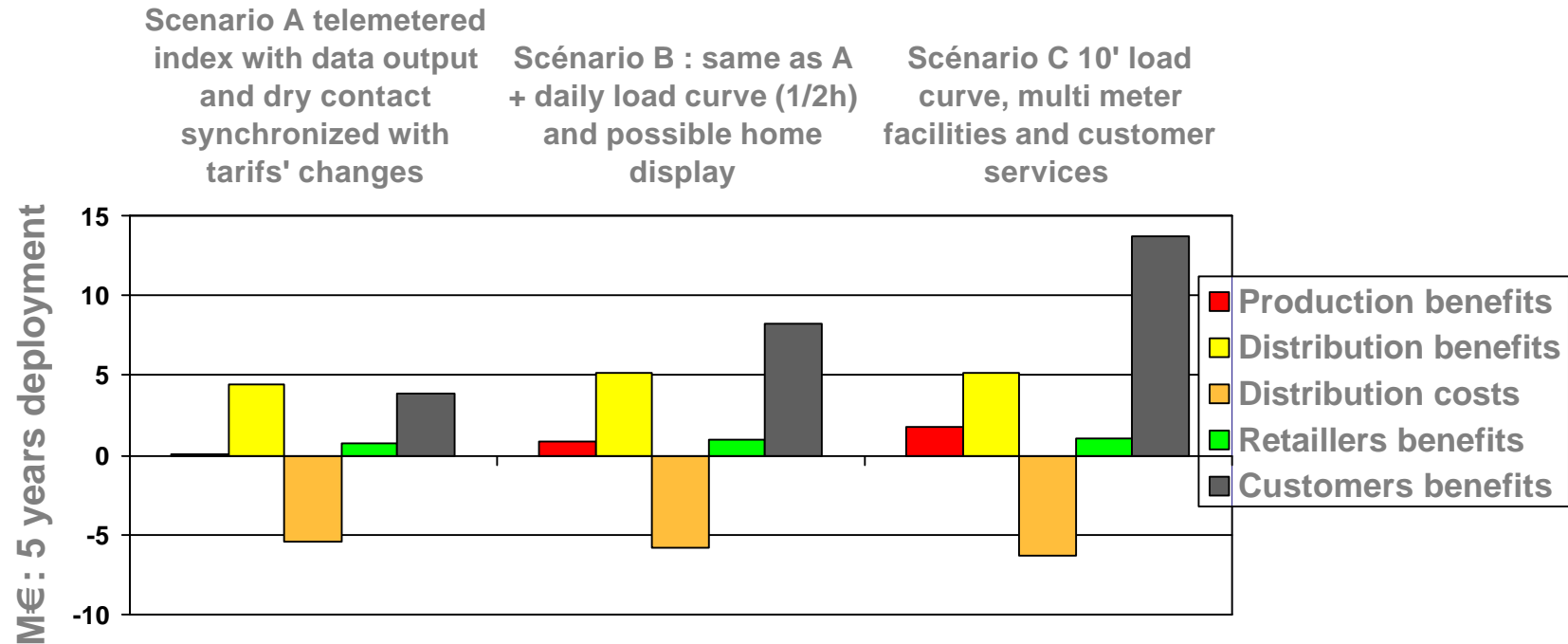
- Opportunity to find new economic feasibility to reduce peak production and increase CO2 saving
- Opportunity to introduce aggregate VPP in their portfolio
- Better ability to forecast load and DER production

## Retailers :

- Better knowledge of customers needs and habits giving opportunity for innovative tariffs ;
- Energy services giving access to white certificate (energy saving obligation)

# Is AMM business model beneficial ?

- Study made by Cap Gemini consulting for the French regulator :



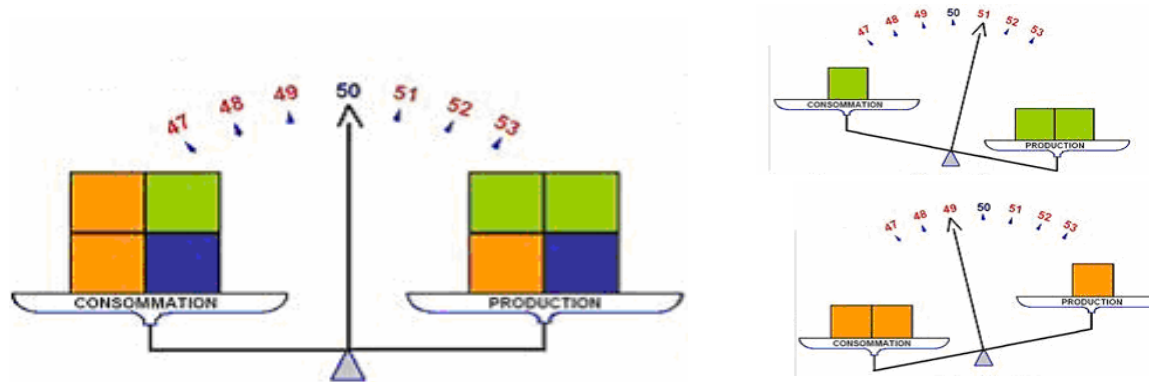
- Hypothesis and quantitative results could be discussed but the conclusion is there :

→ To be beneficial, AMM business model should generally consider non specific added value such as energy saving, peak load reduction, ... .

- This is confirmed by studies from Swedish Energy authority, AEP, PG&E, SCE, ...

# What has smart metering to do with Integration of Renewable and Distributed Energy Resources ?

- Large introduction of DER & Ren. bring a new paradigm to balance the system ;



- To increase their share, DER & Ren will have to enter into the common rules inc. :
  - participate in the market ;
  - provide ancillary services to the system and to the local network.
- It means :
  - to aggregate to reach a sufficient size
  - to find new flexibility (storage, dsm, ...)

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electricity network  
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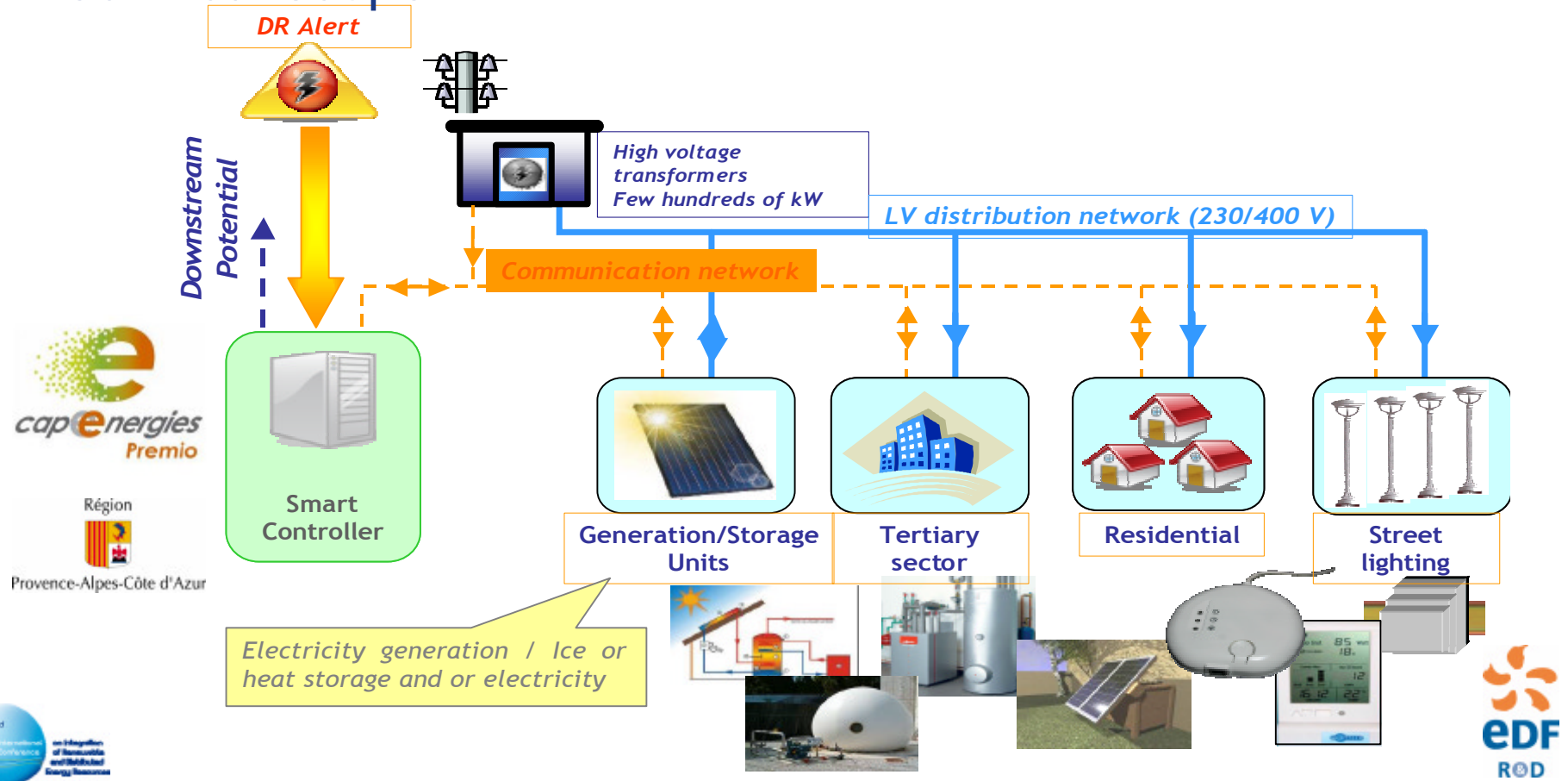
**AMM could be a key enabling  
technology to reach such a future**

# PREMIO: a demand response coordination project

## General objective

- To demonstrate an innovative and replicable architecture (in the South of France) aimed at optimizing distributed generation, storage, renewable energy sources, demand response and energy efficiency measures and at reducing the constraints of a local grid and CO2 emissions

## Technical scope



# Projects with complementary objectives...



Enable **DER** to participate into the electricity supply system in a cost efficient, secure and sustainable way through aggregation into **Large Scale Virtual Power Plant (LSVPP)**

- Develop technical solutions to **integrate the LSVPP into the T&D network control** and information interface.
- Develop prototypes of new **EMS and DMS**.
- Design **commercial framework** to support system operation and quantify the costs and benefits of status quo and FENIX futures.

address

interactive energy



Project co-funded by the European Commission within the 7<sup>th</sup> Framework Programme

**Active Demand (AD)** = participation of **domestic and small commercial consumers** in markets and provision of services to power system participants

- Develop technical solutions to **enable active demand** both at consumer's premises and at power system level
- Design contractual and market mechanisms for the **exploitation of the benefits of AD**
- Propose **accompanying measures** for societal, cultural & behavioural aspects ...



Makes use of **communications, computing & power electronics** to create a system that is:

- **Self-healing and adaptive**
- **Interactive** with consumers and market
- **Optimized** to make best use of resources and equipment
- **Predictive** rather than reactive, to prevent emergencies
- **Distributed** across geographical and organizational boundaries
- **Integrated**, merging monitoring, control, protection, maintenance, EMS, DMS, marketing and IT
- **More secure** from attack



Région



Provence-Alpes-Côte d'Azur



**Local Energy management =**

local dynamic management of electric generation and consumption to:

- **Optimise local energy system** and achieve
  - **energy savings** (reduction of the bill), better **integration of local DG**, storage and Renewable Energy Sources, **reduction of CO2** emissions,
  - while taking into account **consumers comfort**
- **React to DSM signals and solve local grids constraints**





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## ***French law and energy regulation context*** **Heading to a massive roll-out in the next years ?**

Several European directives give objectives in term of monthly meter reading frequency and consumers information (Competition, Demand/Response, Carbon)



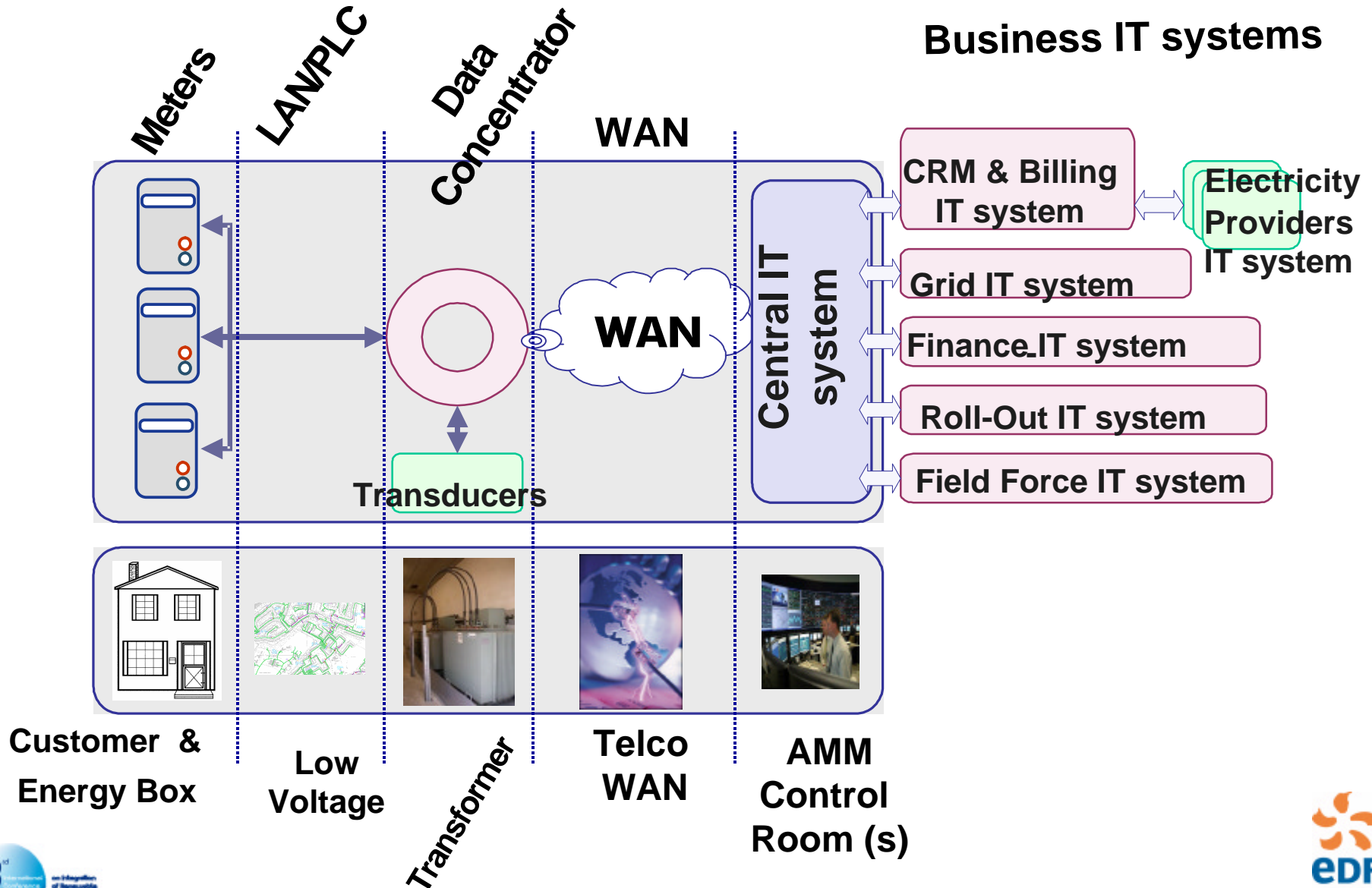
- **According to French energy regulator (CRE) :**
  - **From 1st January 2012, every new electrical meter installed must be “smart”**
  - **By the end of 2014, 50% of meters must be connected to the AMM system,**
  - **By the end of 2016, 95% of meters must be connected**



- **The decision of the final deployment is still to be taken and submitted to the government approval.**

Similar decisions are in preparation or adopted in others European countries such as Spain, Netherlands, Sweden,...

# AMM system : general architecture



## 2 steps in the AMM system deployment

### A pilot project

(now being implemented)

- The pilot is limited to residential customers for installation, takes into account higher range customers for the specification
- The deployment of the 300 000 meters will be planned over the area of 2 French departments out of 100, in 2 different regions

### A generalization project

(roll out planned to be started in 2012)

- Taking advantage of the pilot experience, AMM system generalized to all commercial and residential meters, on all the ERDF footprint :
  - Residential customers
  - Professional customers
  - Light industry customers



# Evolution foreseen in French AMM system

## Distribution Operator

## Suppliers

*Short  
Term*

- Automation of metering functions, productivity improvements

- New customers offers

*Mid  
Term*

- New tools for the operation of the distribution network

- Optimized customer management

*Long  
Term*

- Performance improvement (new services for the suppliers)

- Demand side management in relation to the sourcing

**Regulated**

**Non-Regulated**

# Conclusions

- Smart metering is a source of improvements in the short and mid-term for the distribution operator, improvements that will enhance its capacity to integrate Ren. & DER (smart grid enabler) .
- The feasibility of industrial-size deployments is already proven and the challenge is now to cut down cost and harvest non metering benefits.
- Evaluation of customer acceptance for high-value added services is needed
- AMM as aggregation enabler still needs to be proven at full scale

Strategies around metering and services will continue to evolve  
→ industrial AMM systems should keep some flexibilities !