Digital transformation
A disruptive approach of the power system?
RTE, the French Transmission System Operator

Transmission grid owner
- 100000 km transmission line (63KV to 400kV) join local level to European level
- 2800 Substations
- 22000 km optical fibers
- 48 interconnectors

Transmission grid operator
- 8 control centers
- Founder member of CORESO coordination center
- Homemade software (adequacy, integrated study chain from development to operation, ...)

Market design
- Market coupling at European scale with flow-based method
- Market based capacity mechanism
- Most advanced market design for demand side management in Europe (SEDC* source)

* SEDC: Smart Energy Demand Coalition
Global demand expected to be stable, energy exchange through transmission grid in reduction
- Transmission grid role in the power system is moving
- Tariff doesn’t reflect this change
- Grid planning in a system in transition is a real challenge

Strong development of renewable
- Location of REN is the driver for grid development
- Grid planning and generation planning are de-correlated
- High volatility of the power flows in the grid

How to conciliate three territory scales
- Decentralization of the decision making for energy policy
- Energy Union: a big challenge for Europe
- What role for the state?

Inflation of players number
- Multiplication by 1000: tomorrow several millions
- New behavior: environmental commitment
- Global optimization is becoming a myth
What do you think about the future of the Grid?

Combination of power and digital a key feature for:
- Performance and resiliency
- Economical efficiency
- Reactivity in a power system in transition

Our ambition: to transform our substations in both electrical and digital nodes
- All substations connected through a private high speed data network (INUIT Project)
- Substations will become a node for low rate network for IOT (online monitoring)
- Advanced features based on «Smart Substation Pilot»

New components using electrochemical, power electrics and numeric
- Virtual power line concept (alternative to new lines)
- Frequency control in power system without inertia
- New concept in market design for RES integration

New solutions to manage and value the data
- Real time data platform, highly secured, to exchange services with third parties
- Optimization for grid planning using geo-localized flexibility
- New models for innovative asset management methods (MONA project with COSMO)
- High performance calculation for new risk models in grid operation
New Generation Substation will be adapted to the specific needs of the deployment area.

These “industrial tailor made” substations are based on the multi-systems interoperability allowed by the latest digital technologies.
Thank you for your attention