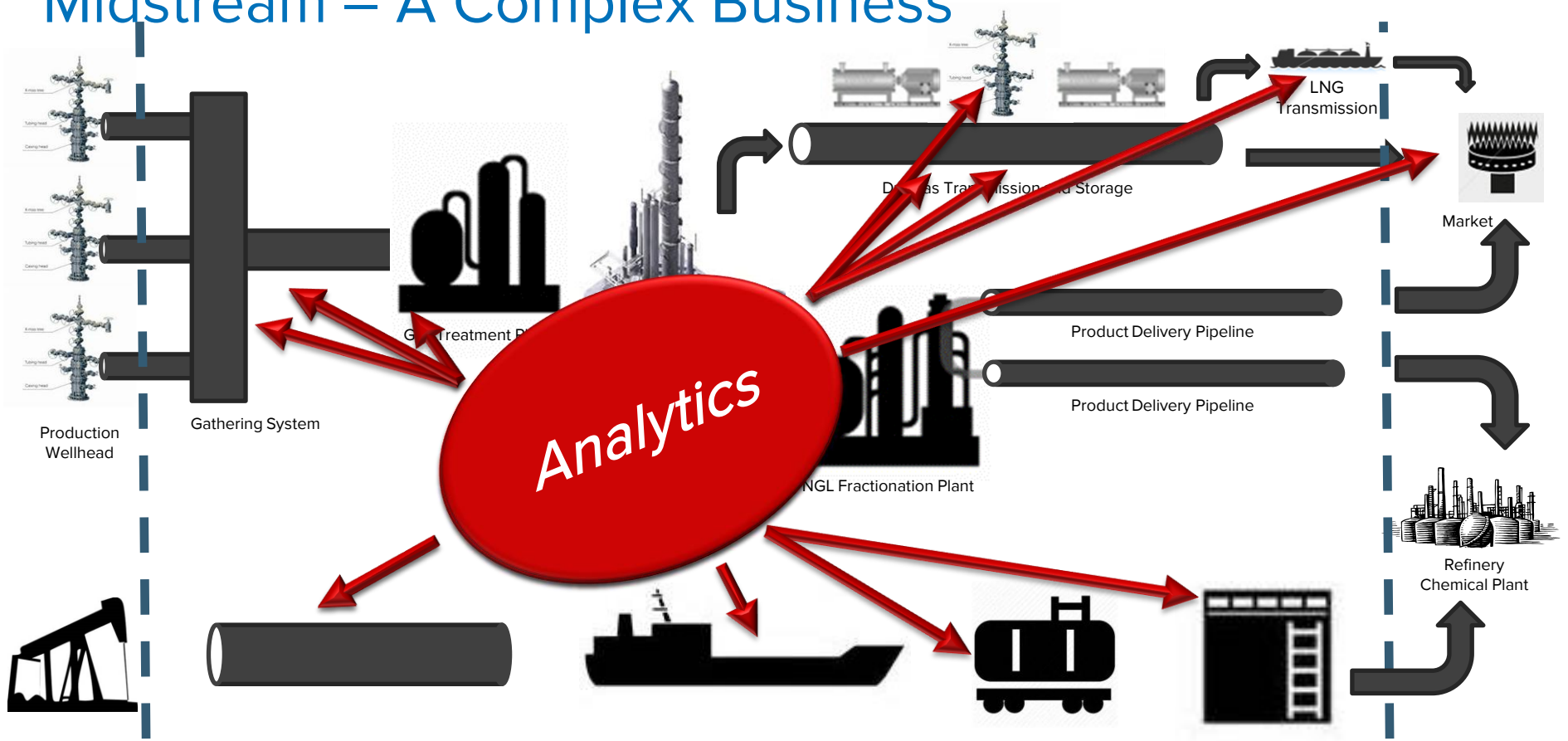
Diversity of the PI System in EMEA Midstream

Highlights from 2015 Midstream Industry Forum

Presented by Michael Graves, Midstream Industry Principal

Midstream – A Complex Business



Midstream Industry Forum – Paris, May 2015

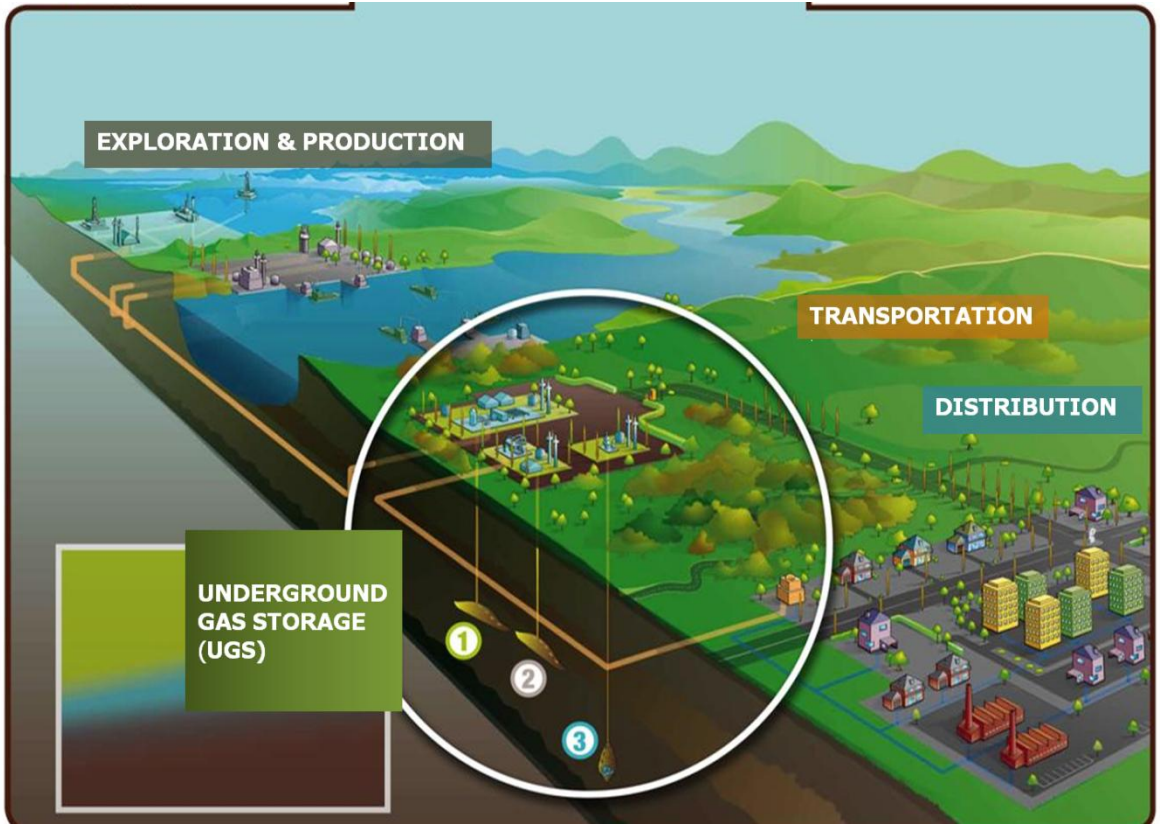
storengy — Operations Monitoring, CBM

GRTgaz — System Balancing, Leak Detection

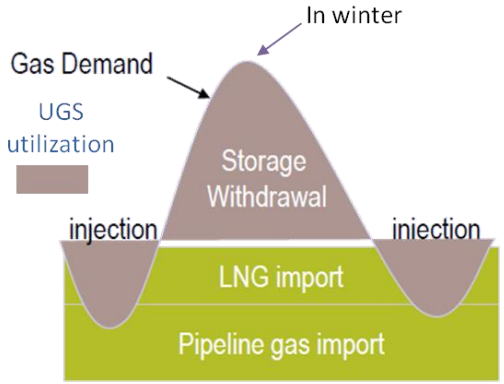
Dunkerque LNG GROUPE EDF — Situational Awareness, Analytics

About Storengy

Gas storage: an essential link in the gas chain



Traditional storage needs

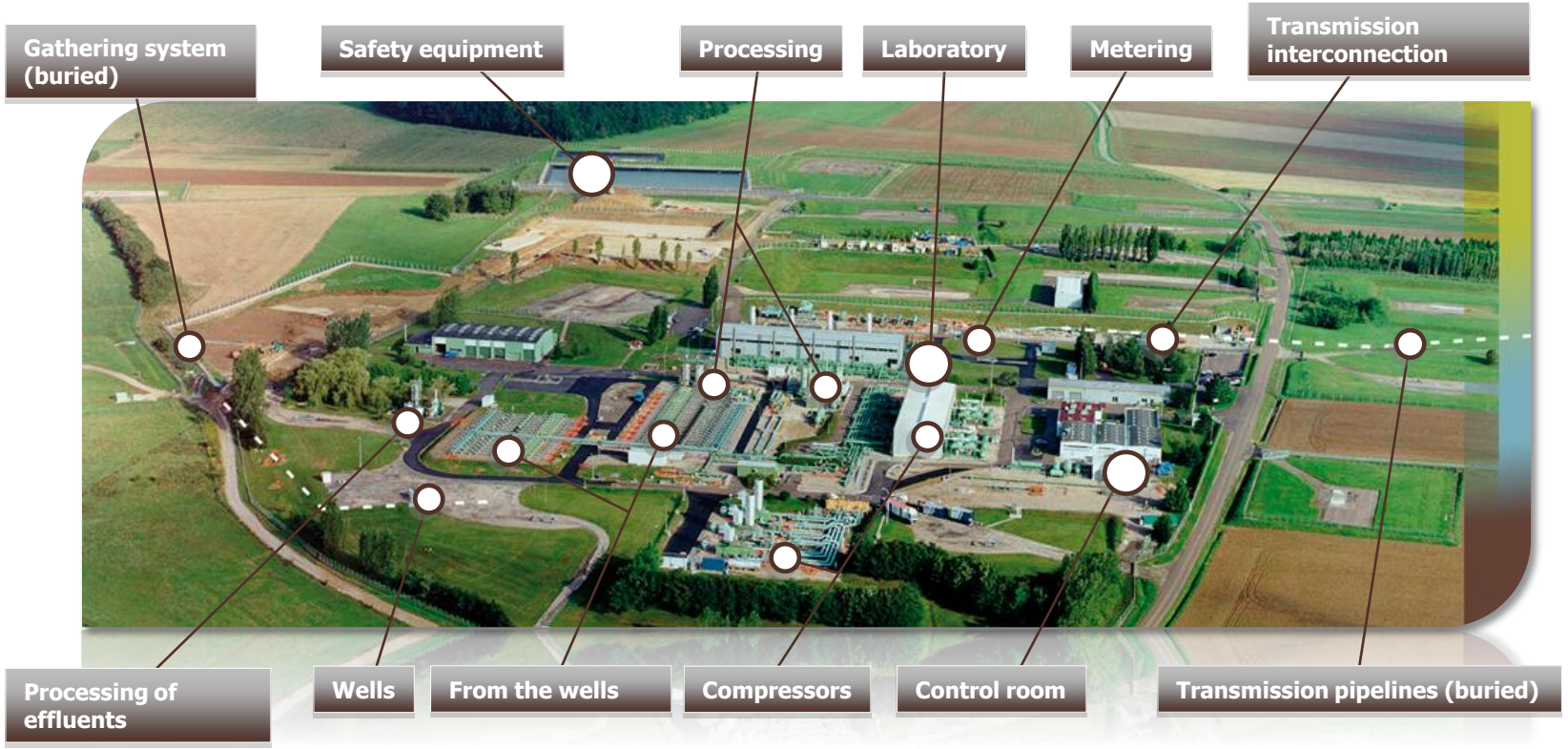


New needs

- Offering more flexibility
- Optimizing the management of gas power plants
- Developing arbitrage
- Seizing price opportunities / attenuating risks

About Storengy

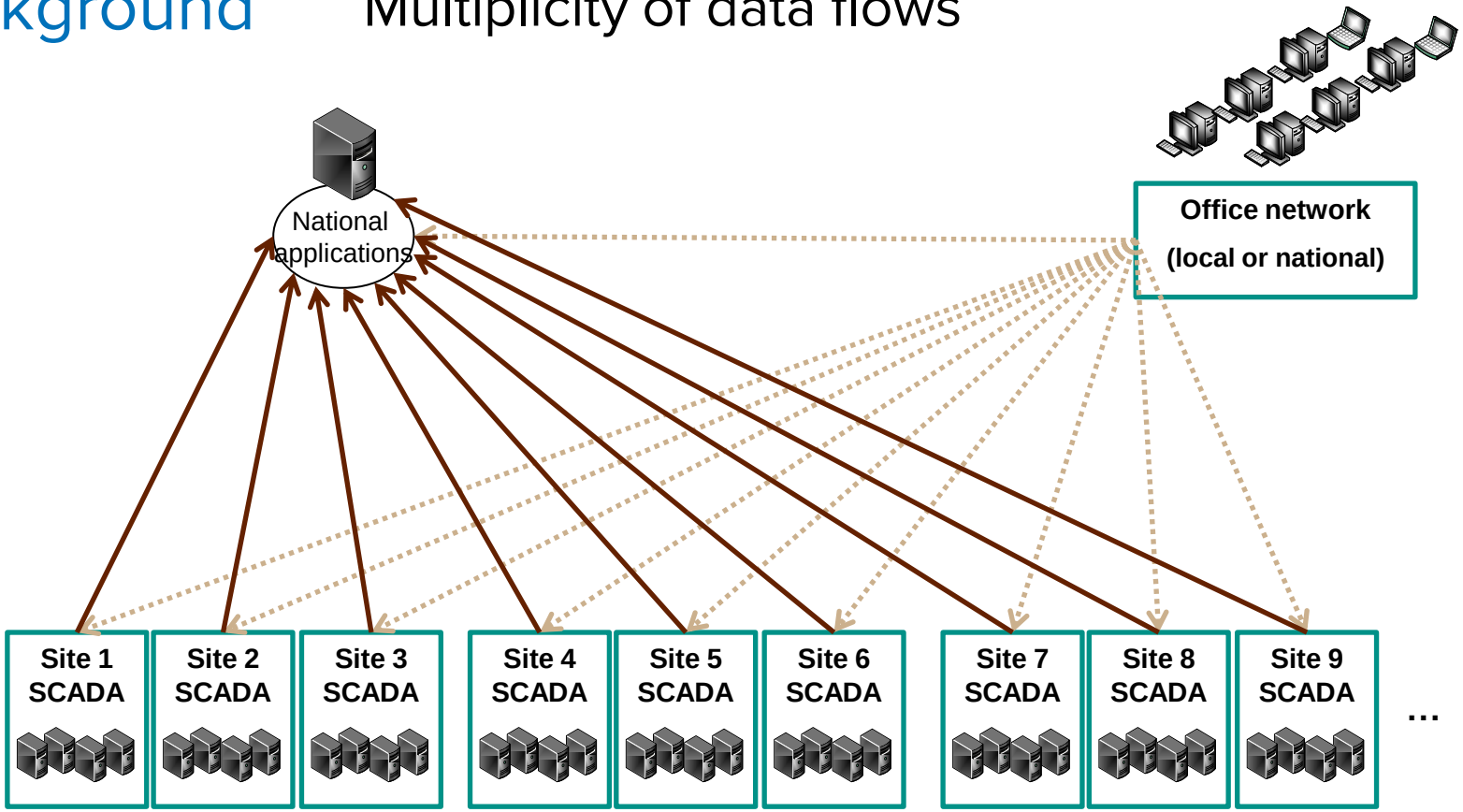
An underground natural gas storage in operation



Main activities: Maintenance of surface facilities, wells and control of process

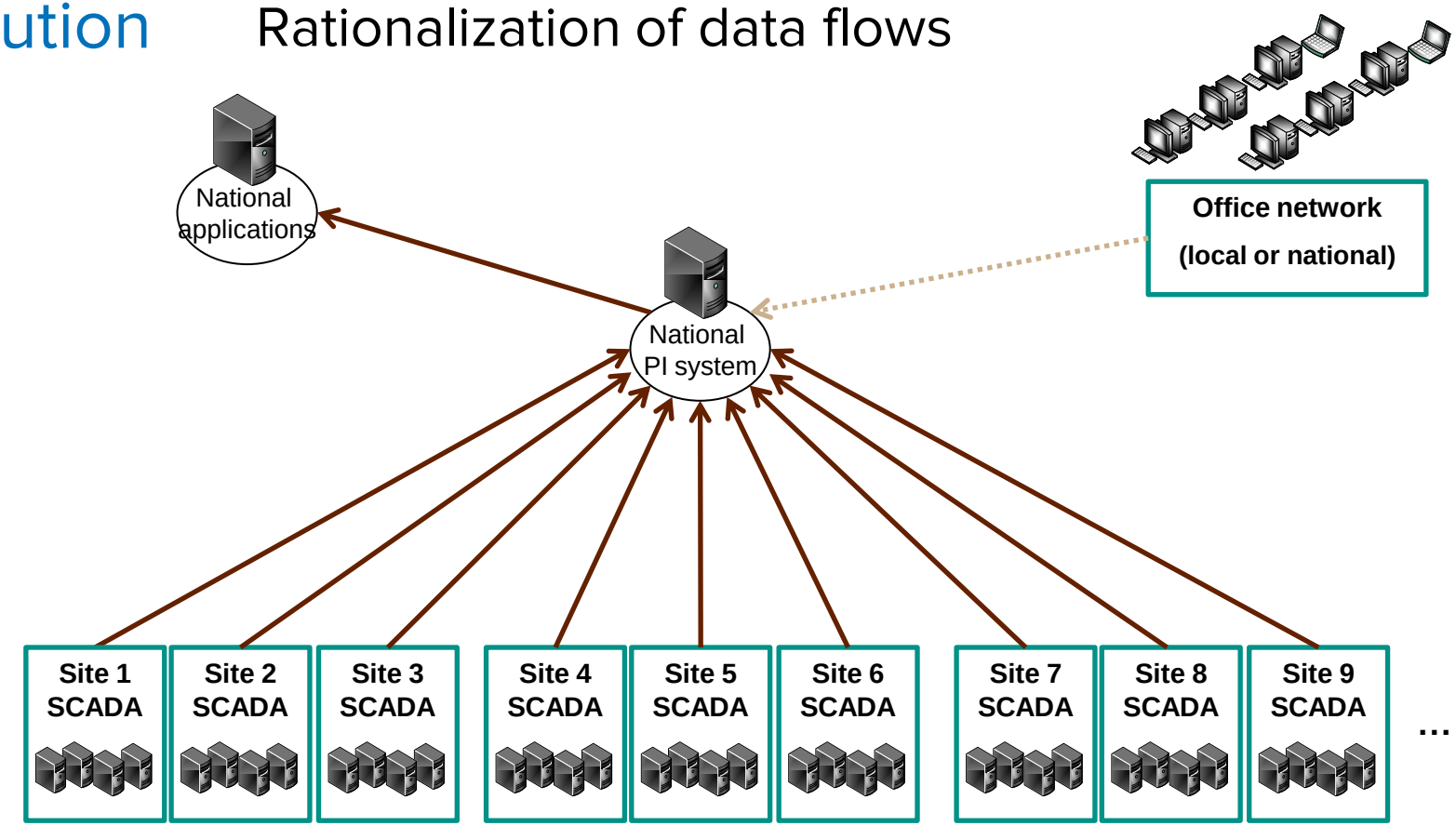
Background

Multiplicity of data flows



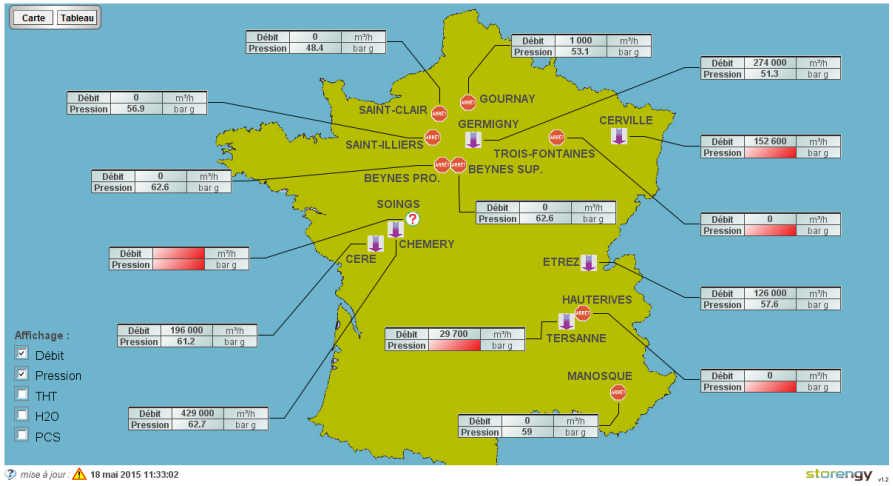
Solution

Rationalization of data flows



Emerging Needs @ Storengy

- Use of the PI System to enhance the existing gas storage pool visualization tool

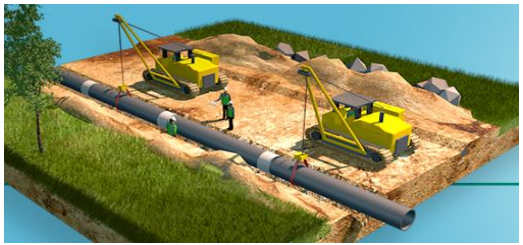


- Better data organization using Asset Framework (AF)

I- GRTgaz

A- General missions

- Natural gas Transport on behalf of its customers, ensuring optimum safety, cost and reliability
- Delivery to recipients directly connected to the transmission network
- Development of transmission capacity in order to meet market demand and enhance security of supply

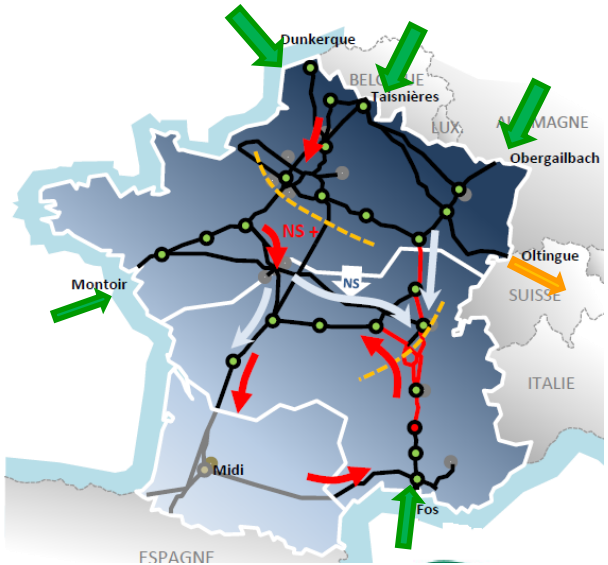


I- GRTgaz

B- The Gas System = Gas + Network + IT

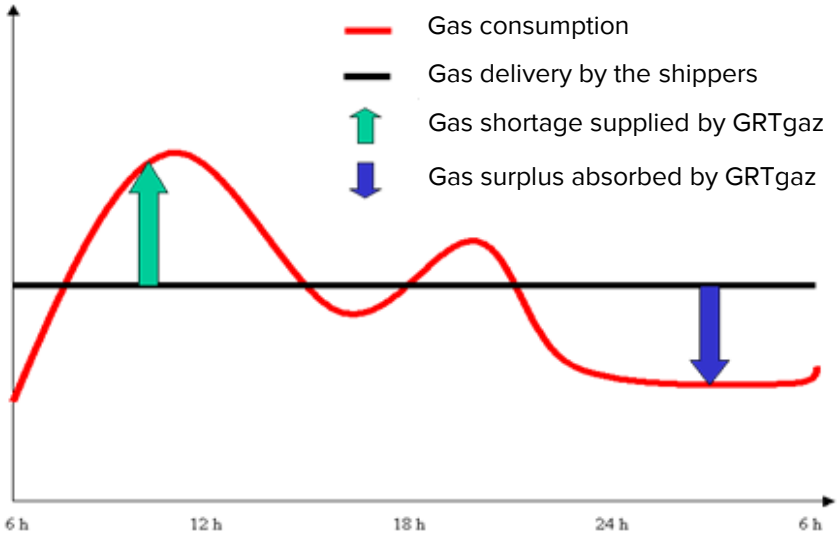
Using transmission capacities

✓ One of the most interconnected network in Europe



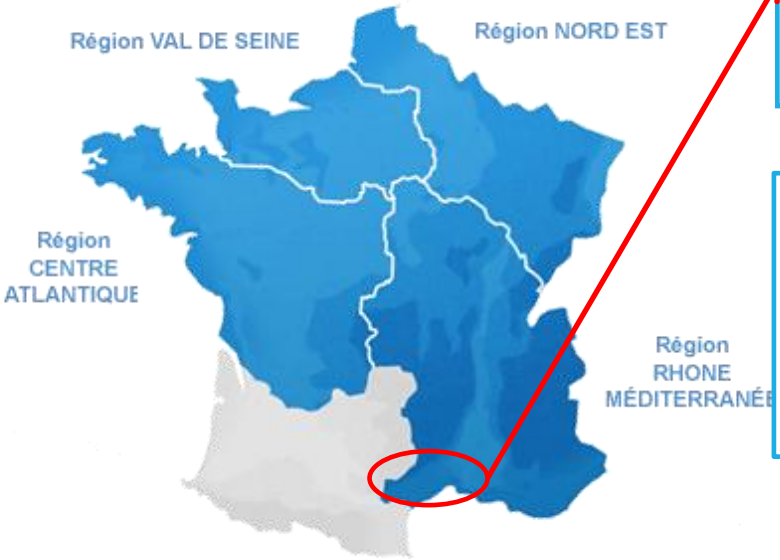
✓ **32200 km** of high pressure transmission system
✓ **26** compressor stations
✓ **4465** delivery points
✓ **22** interconnections

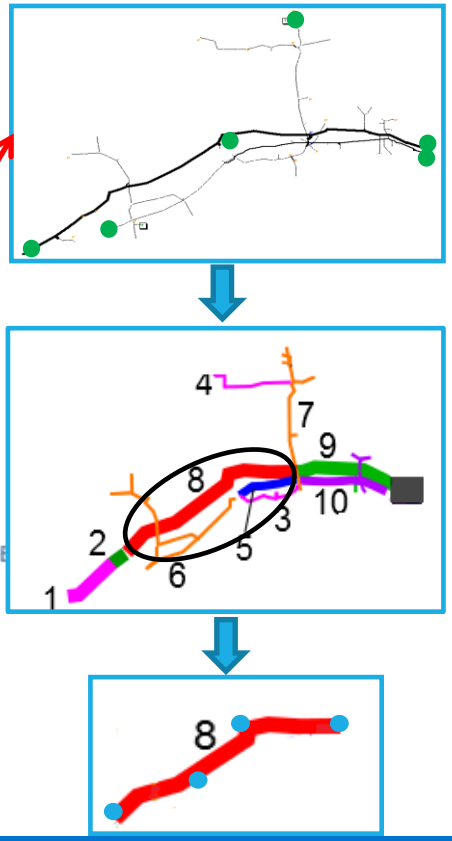
Using flexibility sources



V – The solution

The Grtgaz network is divided into 4 operating **areas** with each about 15 **sub-networks.**





High Heating Value and Density sensor

Pressure sensor

Model's Hypothesis

A **Sub-network** : set of pipelines with homogeneous higher heating value and gas density

Block : set of pipelines with homogeneous pressure

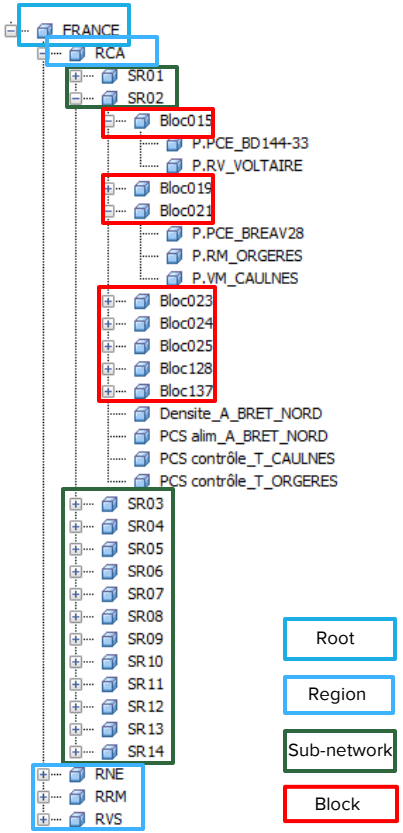
$Z = f(HHV_{ave} ; Density_{ave})$

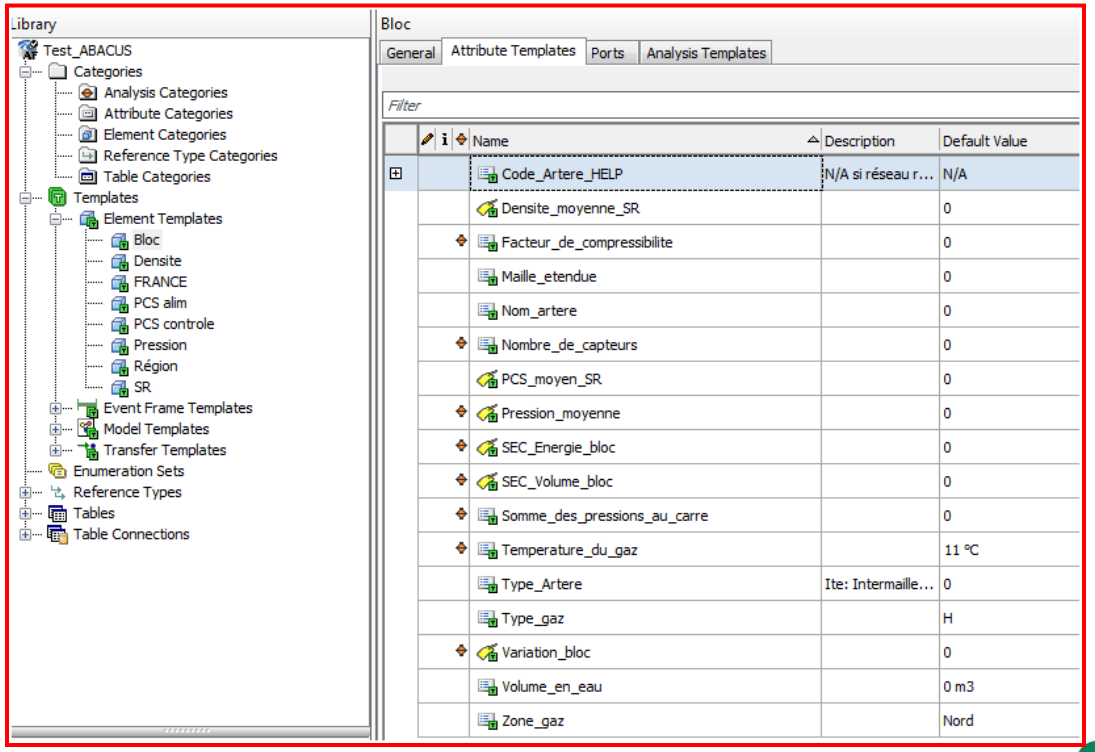
$LP = f(Pressure_{ave} ; Z)$

figures:

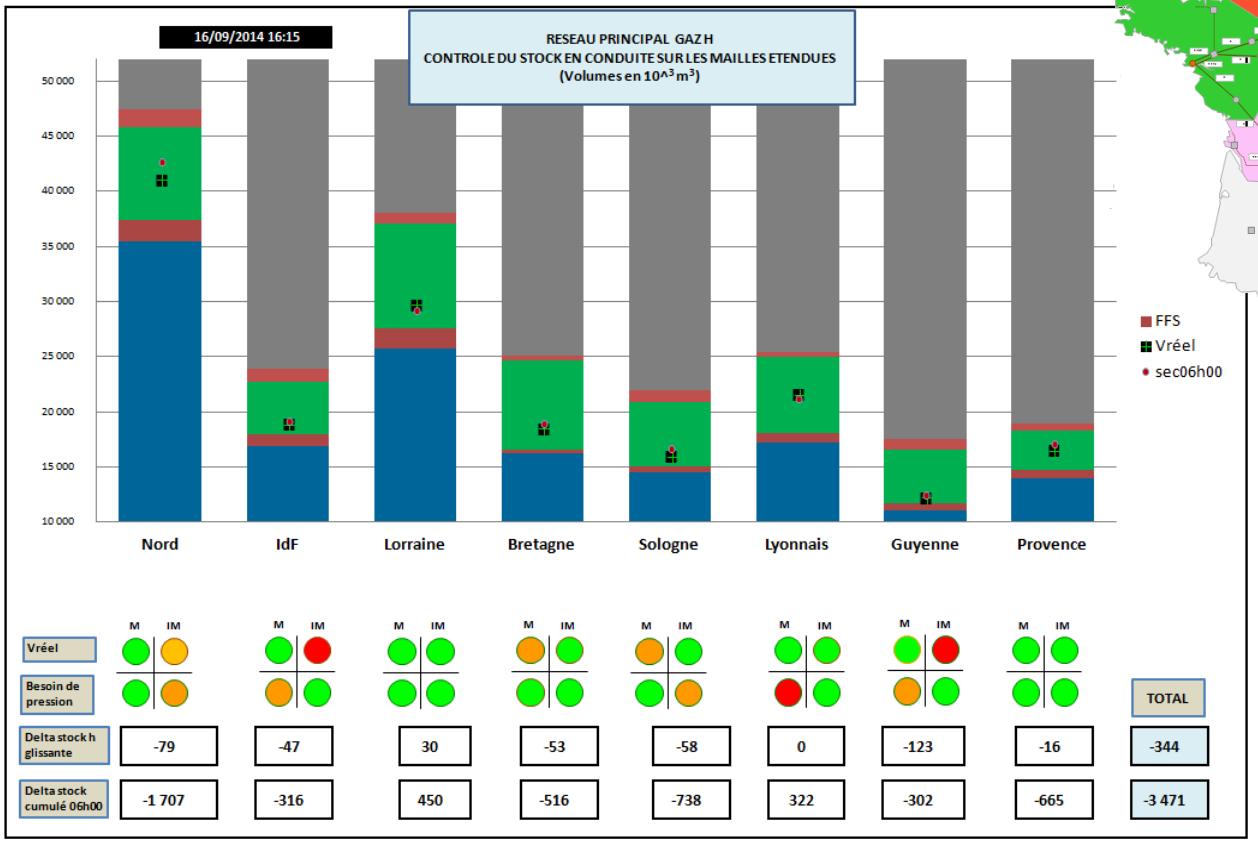
- **60** sub-networks
- **500** Blocks
- **1500** pressure sensors
- **250** HHV sensors
- **150** density sensors

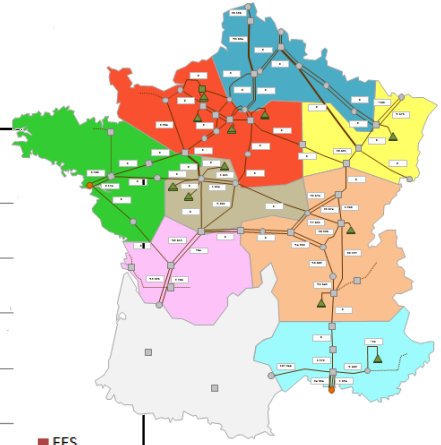
V - The solution





VI – Exploitation of results

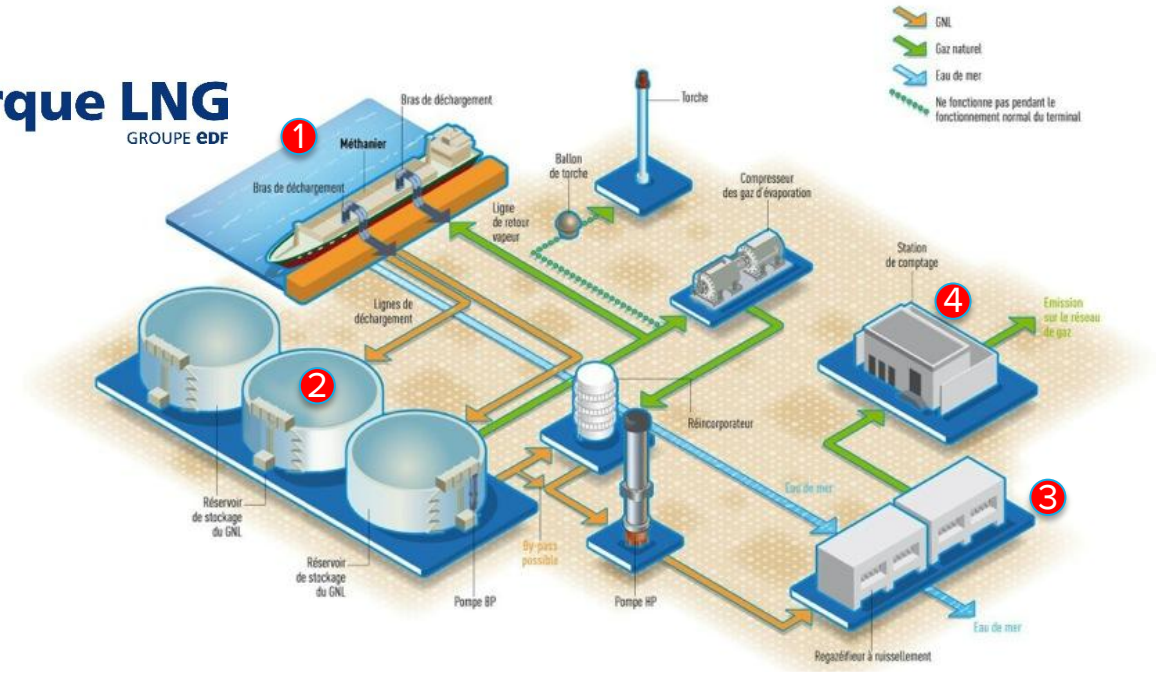




GRTgaz

A reliable industrial model : 4 steps process

Dunkerque LNG
GROUPE EDF



1. Unloading → 2. Storage → 3.Regasification → 4.Metering & Sendout

GAZ-OPALE – Dunkerque Operator

Gaz-Opale performance is evaluated through several Key Performance Indicators

- TERMINAL BUDGET KPI
- TERMINAL SAFETY KPI
- SERVICES KPI
  - LAYTIME KPI
  - PLANT AVAILABILITY KPI
  - PLANT RELIABILITY KPI
  - ENVIRONMENTAL KPI
- ASSET PRESERVATION KPI
  - 1 YEAR ASSET PRESERVATION KPI
  - 5 YEARS ASSET PRESERVATION KPI
  - UPDATED DOCUMENTATION KPI

What the PI System Infrastructure could bring us ?

- Urgent needs linked to commercial operation. Feed Commercial IT System
- Assistance and situational awareness for operators (performance gauge widgets, manual logger…)
- Operations follow-up (automatic daily reporting, shift performance assessment)
- Maintenance management in relation with our CMMS
  - Maintenance KPI (MTBF, MTTR, MPDT, MUDT, Availability)
  - Failure analysis
  - Maintenance division workload and performance (manhours spent/WO, ratio per type of maintenance)
- Plant thermal performance analysis
- KPI Management
- Automatic Reporting (daily, monthly, yearly)
- External access to plant key process indicators for management team
- Real time overview of plant performance for Commercial dpt and Shippers

Innovation for the Midstream

Contact Information

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Questions

Please wait for the **microphone** before asking your questions

State your
name & company

Please don't forget to…

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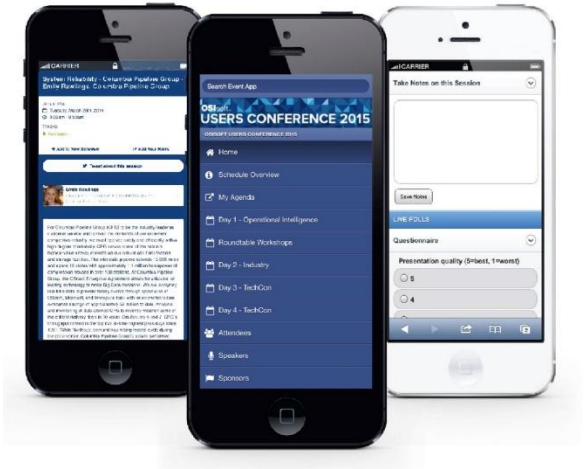

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감사합니다

谢谢

Danke

Gracias

Merci

Thank You

ありがとう

Спасибо

Obrigado