

storengy

Storengy

Storing energy, Supplying flexibility

WOC 2 Storage – Triennium 2012-2015

Kick off Meeting

Bratislava, Slovakia

1. Storengy within the GDF SUEZ Group
2. Storengy, European leader in natural gas storage
3. A unique combination of expertise
4. Our vision, our ambitions

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1. Storengy within the GDF SUEZ Group

Key figures of GDF SUEZ

- ✓ **€90.7** billion in 2011 revenues
- ✓ **€16.5** billion in 2011 EBITDA
- ✓ **1st** company in the “utilities” sector worldwide (*Top 100 Forbes Global 2011 + PFC Energy 50*)
- ✓ Most valuable brand in the “utilities” sector worldwide (Brand Finance Global 500»)
- ✓ **€11** billion invested per year over 2011-2013
- ✓ **217,750** employees throughout the world
 - Inc. 60,700 in power and natural gas
- ✓ **1,100** researchers and experts in 9 R&D centers

Key figures of GDF SUEZ

Natural gas

- ✓ A supply portfolio of 1,260 TWh
- ✓ No.2 buyer of natural gas in Europe
- ✓ No.1 natural-gas transport and distribution networks in Europe
- ✓ **No.1 vendor of storage capacity in Europe**
- ✓ 344 exploration and/or production licenses in 16 countries
- ✓ 789 mboe of proven and probable reserves

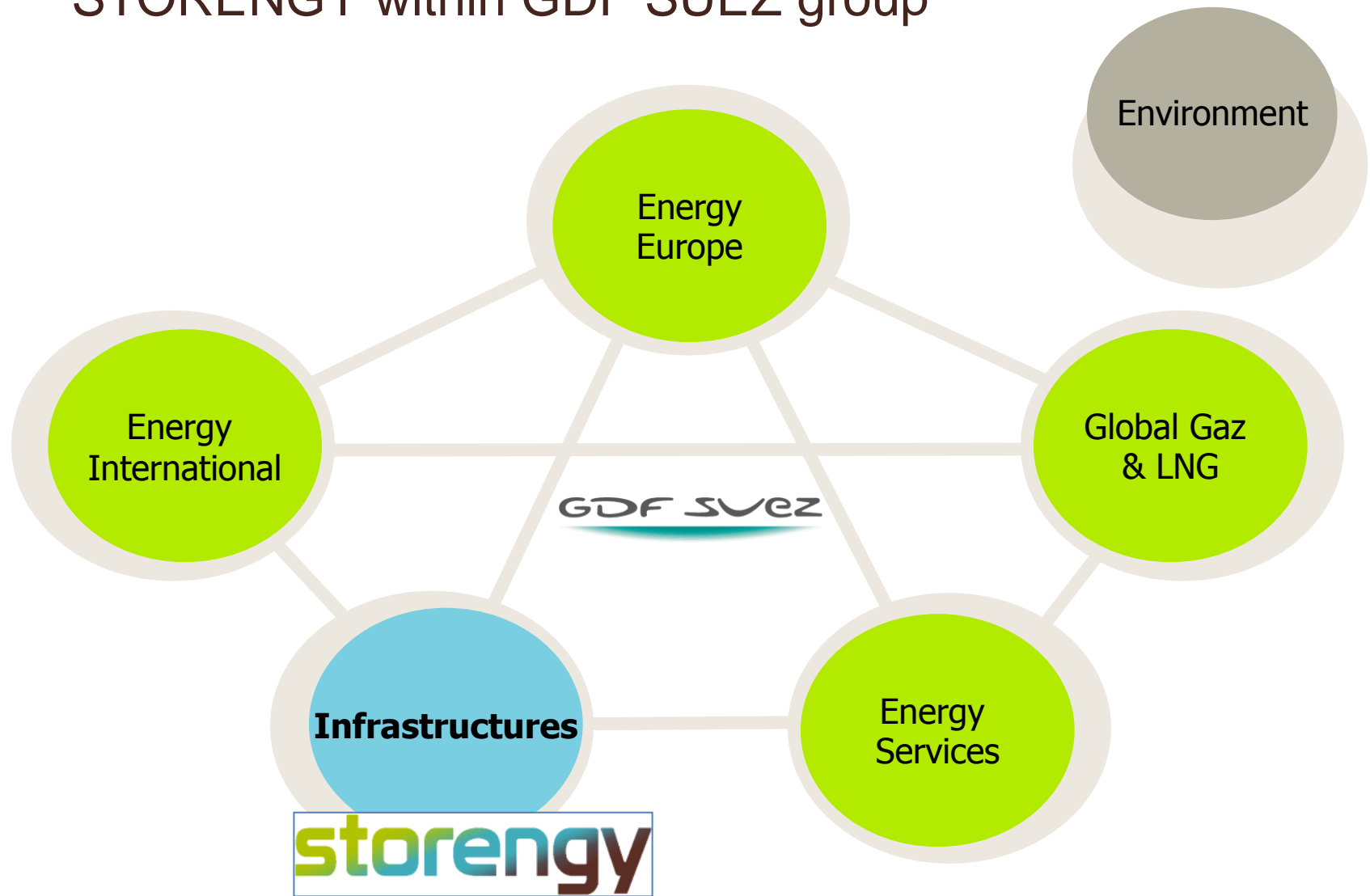
LNG

- ✓ No.1 importer of LNG in Europe
- ✓ No.3 importer of LNG in the world
- ✓ A fleet of 18 LNG tankers inc. two regasification vessels

Electricity

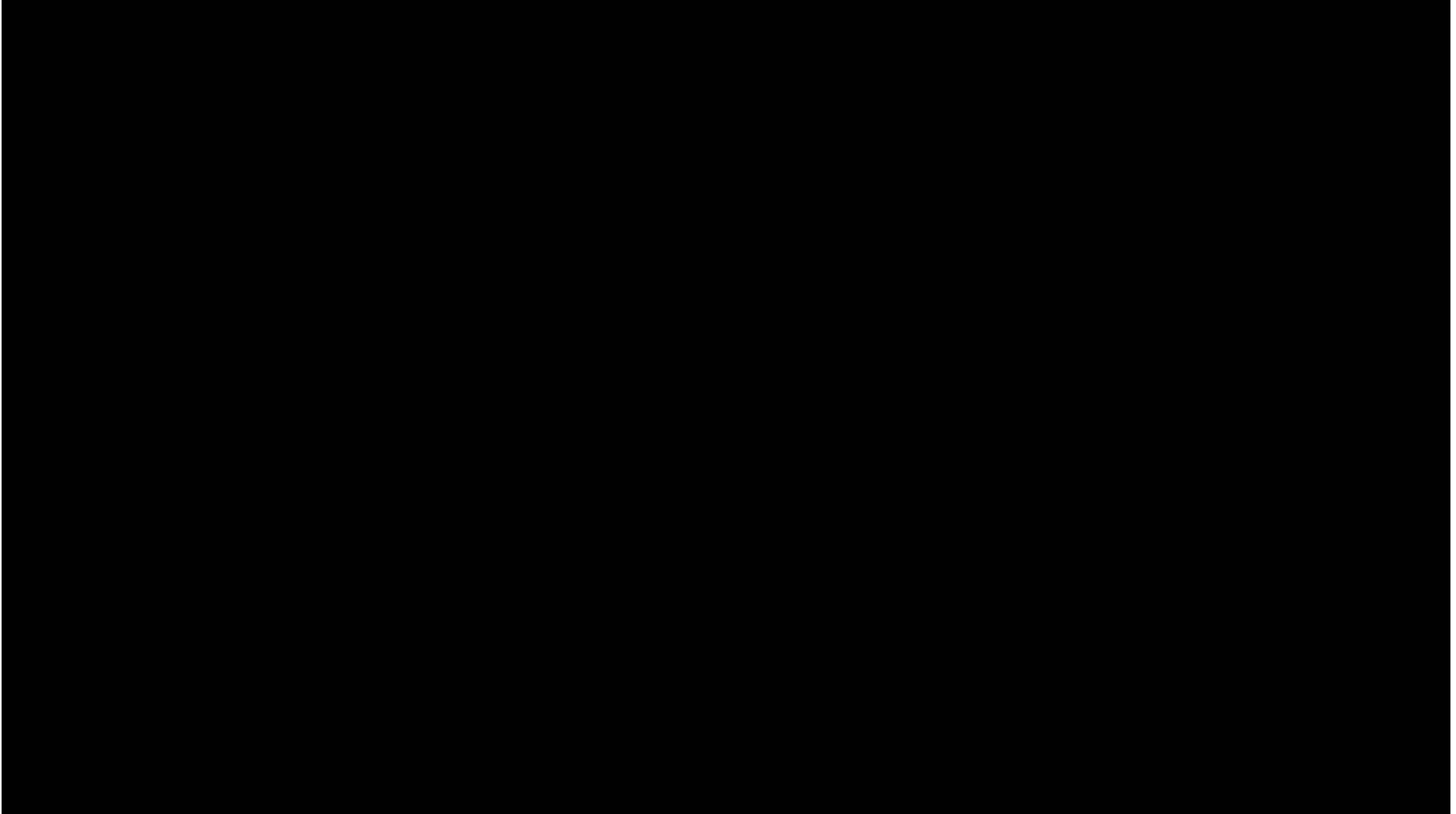
- ✓ No.1 independent power producer (IPP) in the world
- ✓ No.1 producer of non-nuclear energy in the world
- ✓ 118.1 GW of installed power-production capacity

STORENGY within GDF SUEZ group

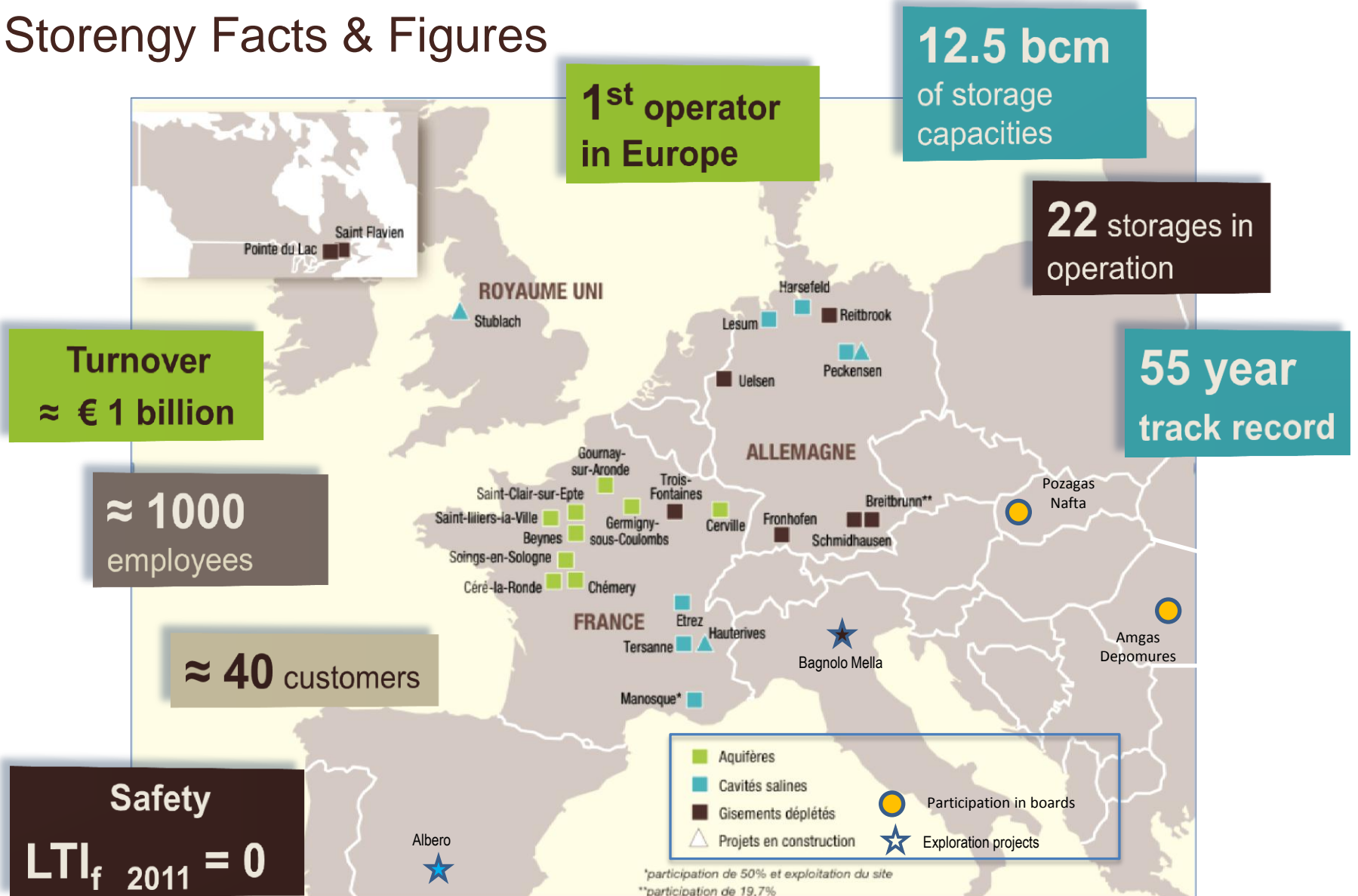


2. Storengy, European leader in natural gas storage

A brief introduction to Storengy



Storengy Facts & Figures




A value-creating business model

The strength of a marketer who is also an operator

	Marketer (= asset manager)	Operator (= industrial operator)
STORENGY	✓	✓

- Optimising site value
- Optimising their life span
- Managing technologies for quick adaptation of the supply to demand based on strong expertise
- Grouping sites for additional creation of value

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3. A unique combination of
expertise

Our activity: building the underground fondation of the energy markets (1/4)

Nature re-used

Type of Facility : Storage in Depleted Fields

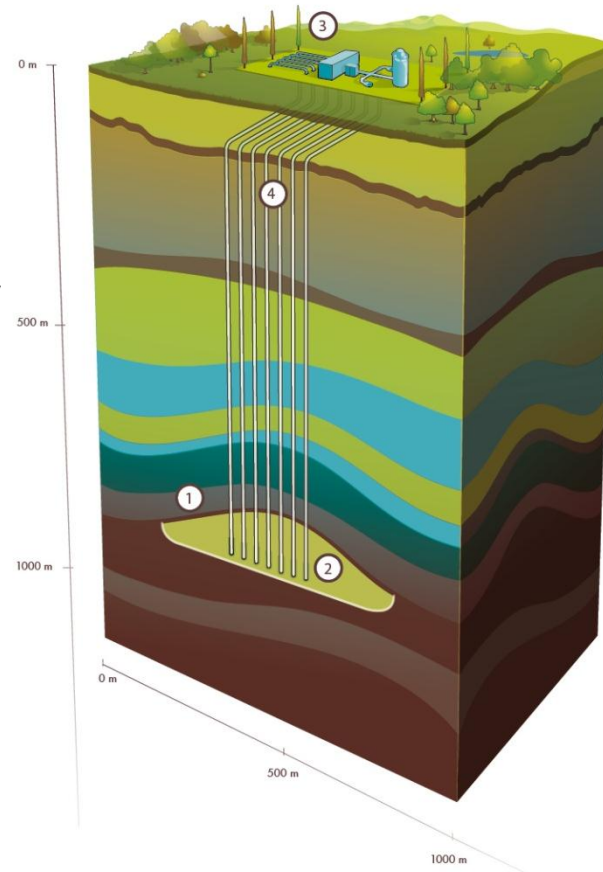
- large working gas capacity
- deliverability depending on rock porosity and permeability

1) caprock

2) reservoir (depleted field)

3) gas plant

4) storage well



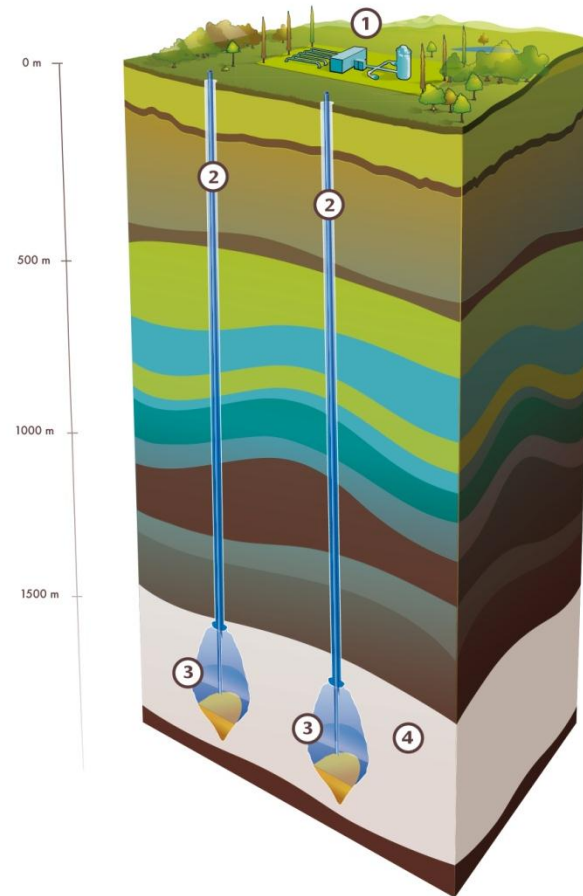
Our activity: building the underground fondation of the energy markets (2/4)

Nature valorised

Type of Facility : Storage in Salt Caverns

- high deliverability
- modular development

- 1) gas plant
- 2) storage well
- 3) salt cavern
- 4) salt dome formation



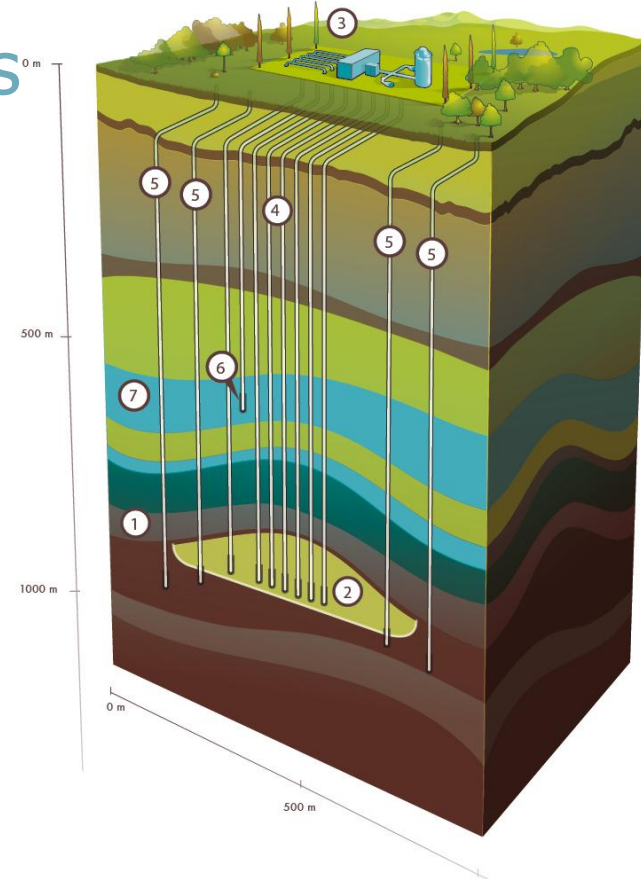
Our activity: building the underground fondation of the energy markets (3/4)

Nature adapted

Type of Facility : Storage in Natural Aquifers

- large working gas capacity
- deliverability depending on rock porosity and permeability

- 1) caprock
- 2) reservoir
- 3) gas plant
- 4) storage well
- 5) observation well
- 6) upper aquifer observation well
- 7) upper aquifer

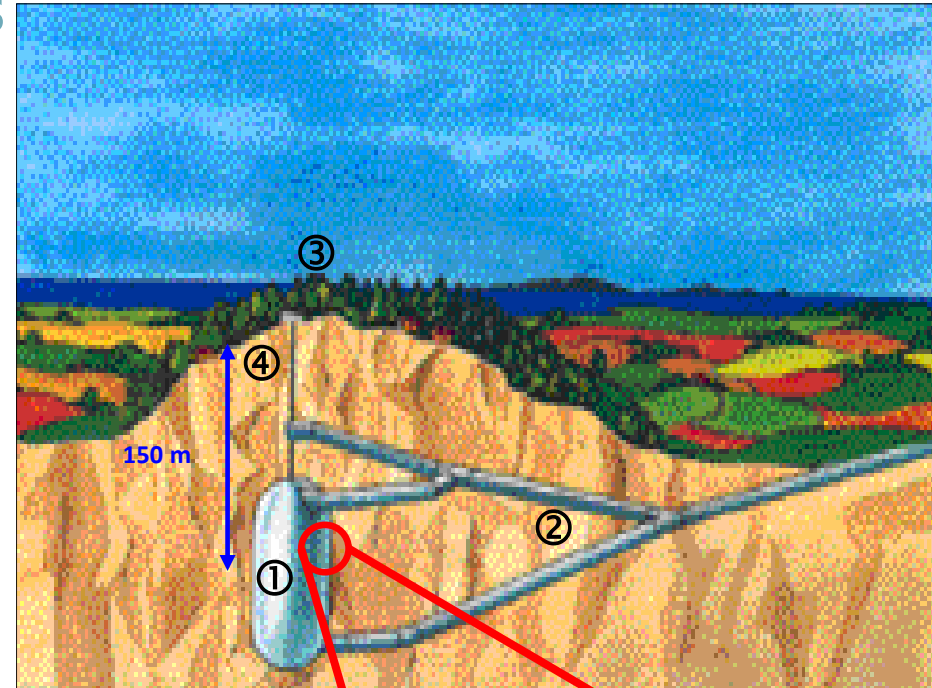


Our activity: building the underground fondation of the energy markets (4/4)

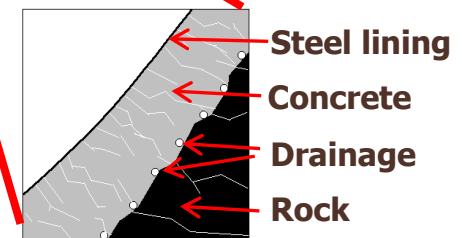
Type of Facility : Storage in Lined Rock Caverns

Nature valorised

- high deliverability
- An alternative geological solution
- Innovation = unique assembly of matured technologies (excavation, construction of steel tank, and pouring of self-compacting concrete)
- Track record : a pilot plant in Sweden commercially operated since 2004
 - Geometrical volume: 1.5 Mcf
 - Max pressure: 200 barg
 - Working volume: 0.3 Bcf
 - Withdrawal rate: 10 days / Injection rate: 20 days



- 1) Lined rock cavern 3) gas station
2) Access tunnels 4) Vertical concreted shaft with pipes

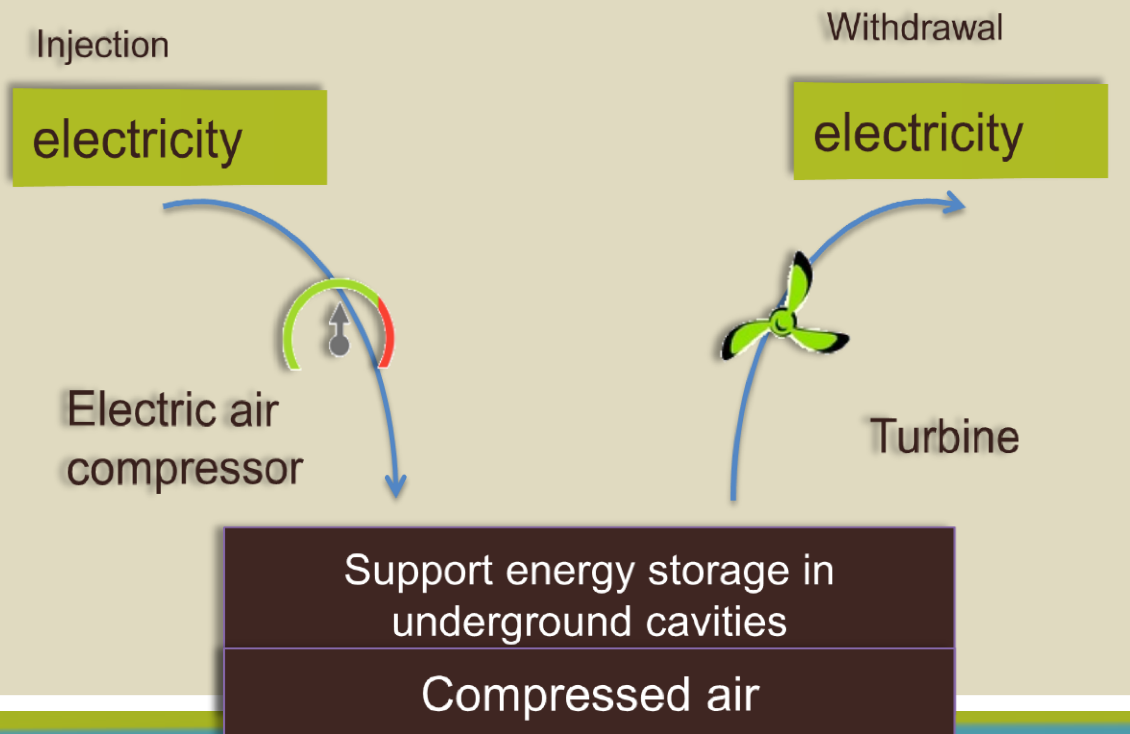


Storengy is also a player in the new CAES* market

* CAES : Compressed Air Energy Storage

An electricity storage

A mature technology (2nd generation) and developing (3rd generation) ...



Mix CAES + Renewable (Wind, Solar, ...) in baseload supply:

- Smoothing of the power generation
- Competitive production marginal cost

A large range of professions in the service of the business model...



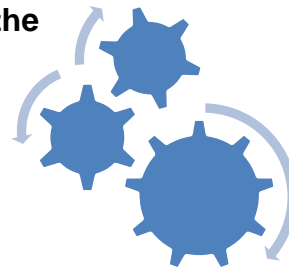
Operation & Maintenance



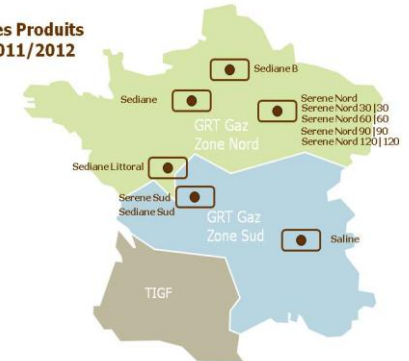
Wells / Interface with the underground



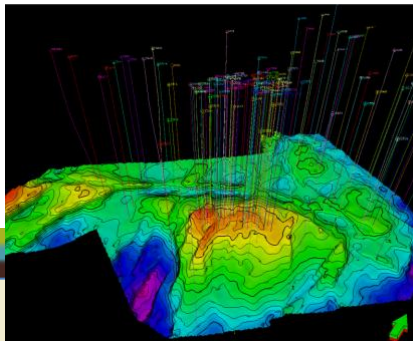
**Design /
Production management /
Performance**



**Les Produits
2011/2012**



Sales & Marketing



Geosciences

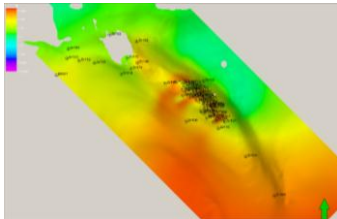
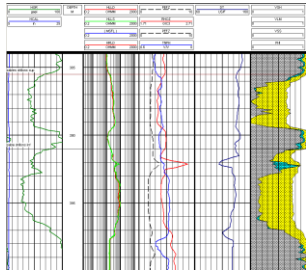


**Industrial & Environmental
Safety**

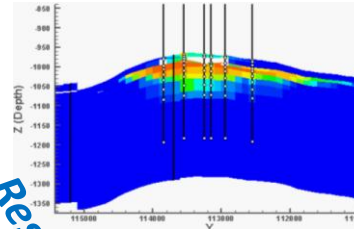
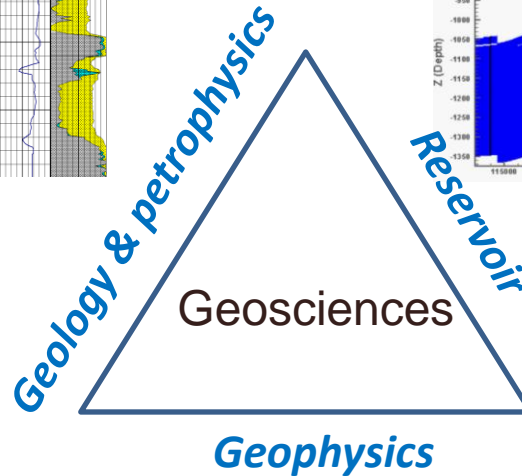
...with a competitive advantage:

Our recognised in-house expertise
in geosciences

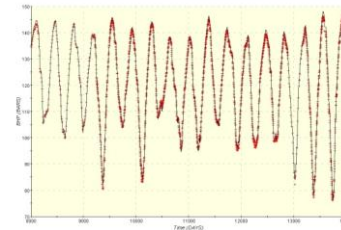
Logs



Maps of properties



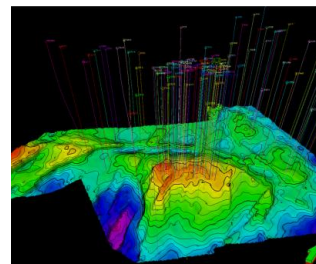
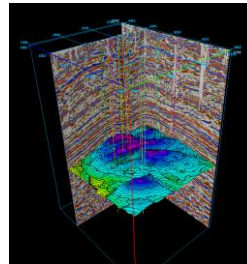
Gas saturation



Pressure forecast

*Both in-house and commercial softwares
are used*

→ Best technical solution driven



*Reservoir structure
and attributes*

- Performance, availability, operational strategy
- Environmental impact, long-term concessions
- Projects, Development

4. Our vision, our ambitions

Our vision

- Natural gas and its capacity to be stored are key elements of the future of energy in the world
- Underground storage is the energy flexibility instrument of the future
- Storengy is at the crossroads of the energy sector, as a bridge between the gas and electricity markets