

Annual report

2010



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# A word from the Presidents



**I**t would be difficult to claim that the crisis and economic problems are totally behind us, but 2010's performance helped highlight the ability of the teams from Geostock Holding, its subsidiaries and interests, to ensure that, even in a potentially challenging context, our expertise remains in demand.

It is upon this solid skills base that Geostock Holding can and should construct its future. The numerous projects which we work on underline this point every day. The optimised promotion, among our clients, of the group's technical expertise, irrespective of where these skills are located, is the best guarantee of our future development.

While being attentive to the needs of our prospective clients and listening closely to our current ones, the sustainability of our growth will also be dependent on our flawless observance of the safety rules and criteria in the performance of our studies and operations.

In short, we need to become the leading company in our professions throughout the world.

**Philippe Porché**

President of Geostock Holding SA



**A**lthough the market was subject to significant shrinkage, 2010 can be considered on the whole as a good year for all entities of the Geostock Group.

In difficult market conditions, Geostock and UGS demonstrated strong resilience. Also worth stressing is the robust growth of Geostock US and Geostock Iberia. Geogreen, meanwhile, displayed a better trend than in 2009 in what is quite an immature activity segment.

Last but not least, Geomethane moved forward with the implementation of quite significant investment in Manosque in order to expand and improve its natural gas storage facilities.

These results clearly validate Geostock's strategy, which is based on first-in-class services, long-term partnerships and networks of excellence.

Furthermore, Geostock innovates in order to propose optimised technical solutions to its customers.

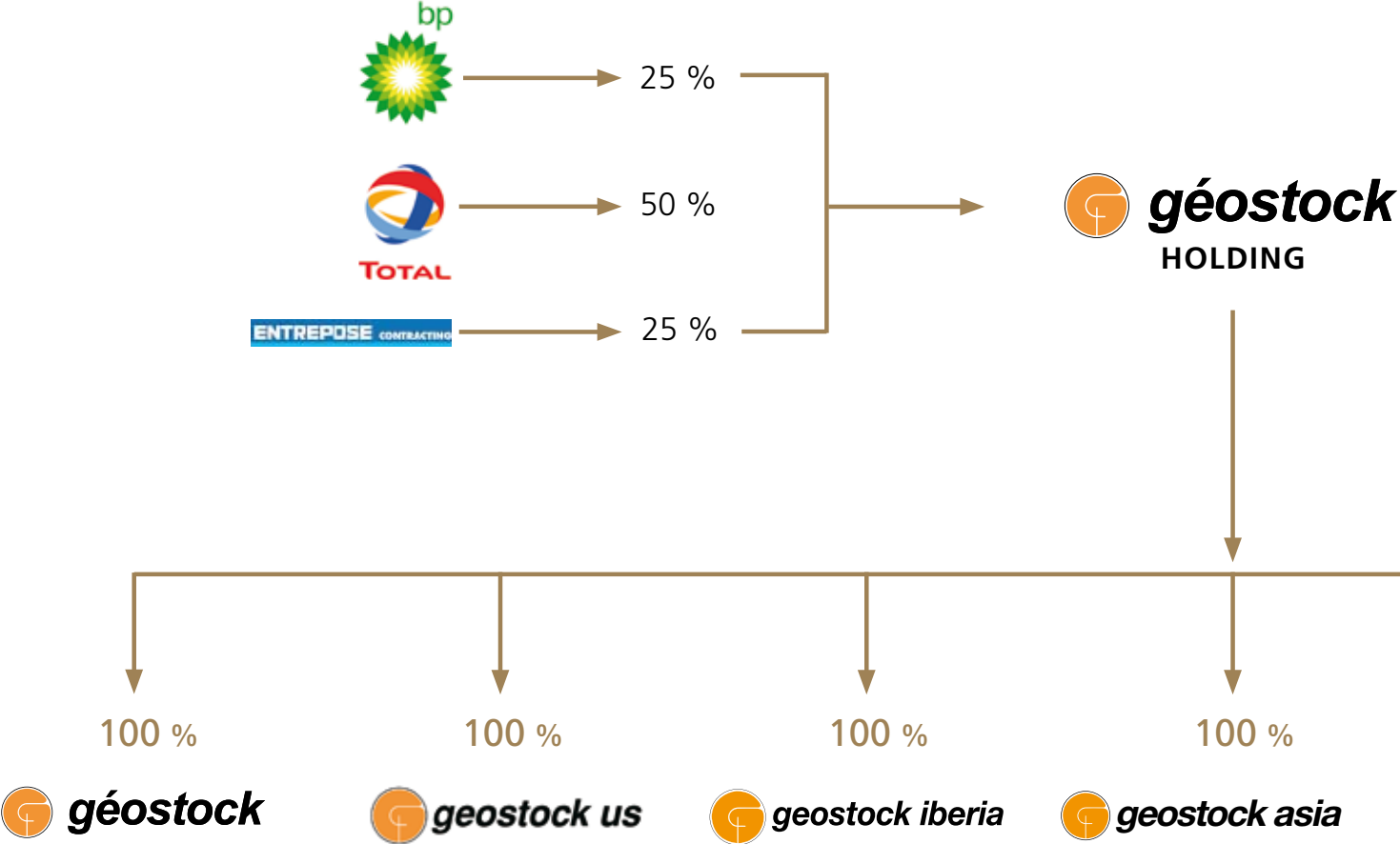
In 2010, the Group continued to successfully put in place local set-ups in order to be closer to its customers and partners, whilst benefiting from the technical support and feedback of all entities of the group, whether in consulting, engineering or storage operation.

Such success relies on the great dedication and cohesion of its teams, intra-group cross-fertilization and, of course, the solid support provided by its shareholders.

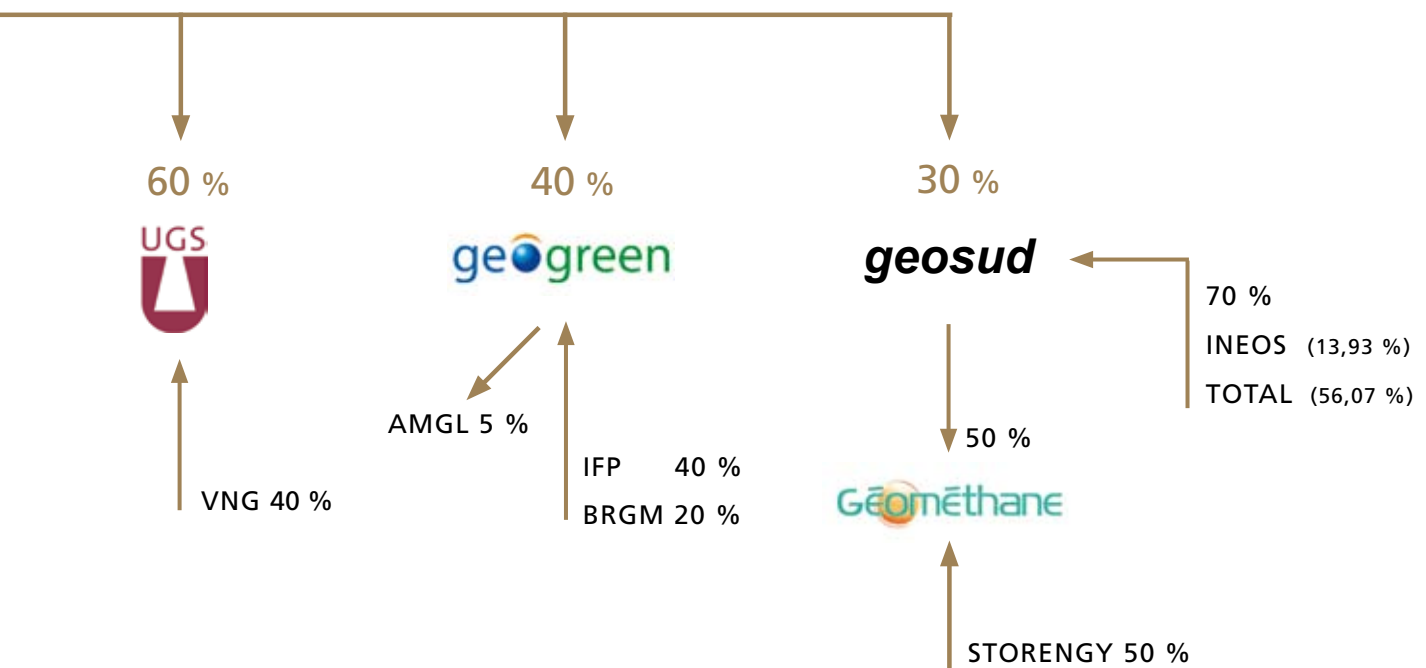
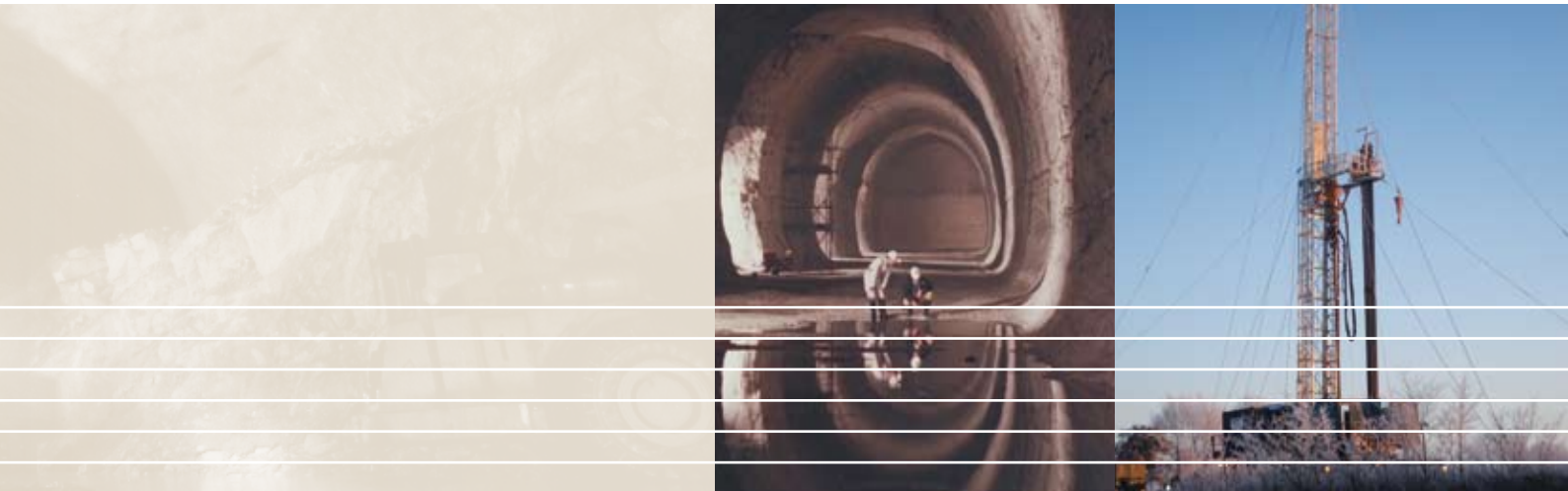
**Jean-Michel Noé**

President and CEO of Geostock SAS - President of UGS Supervisory Board  
Chairman and CEO of Geostock US, Inc - Chairman of Geostock Iberia SA  
President of Geogreen SA - President of Geosud SA - President of Geomethane GIE

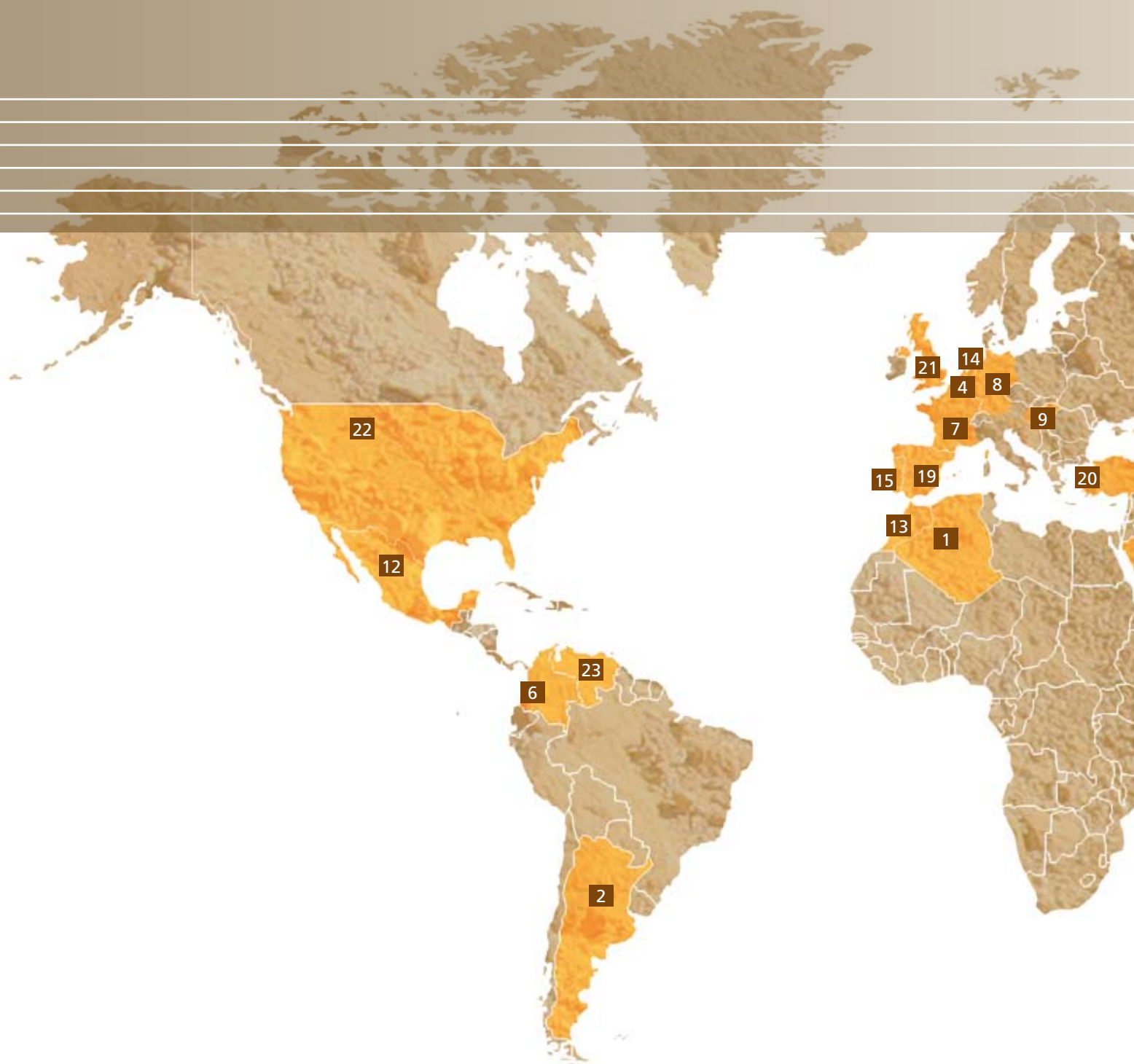
# Organization chart\*

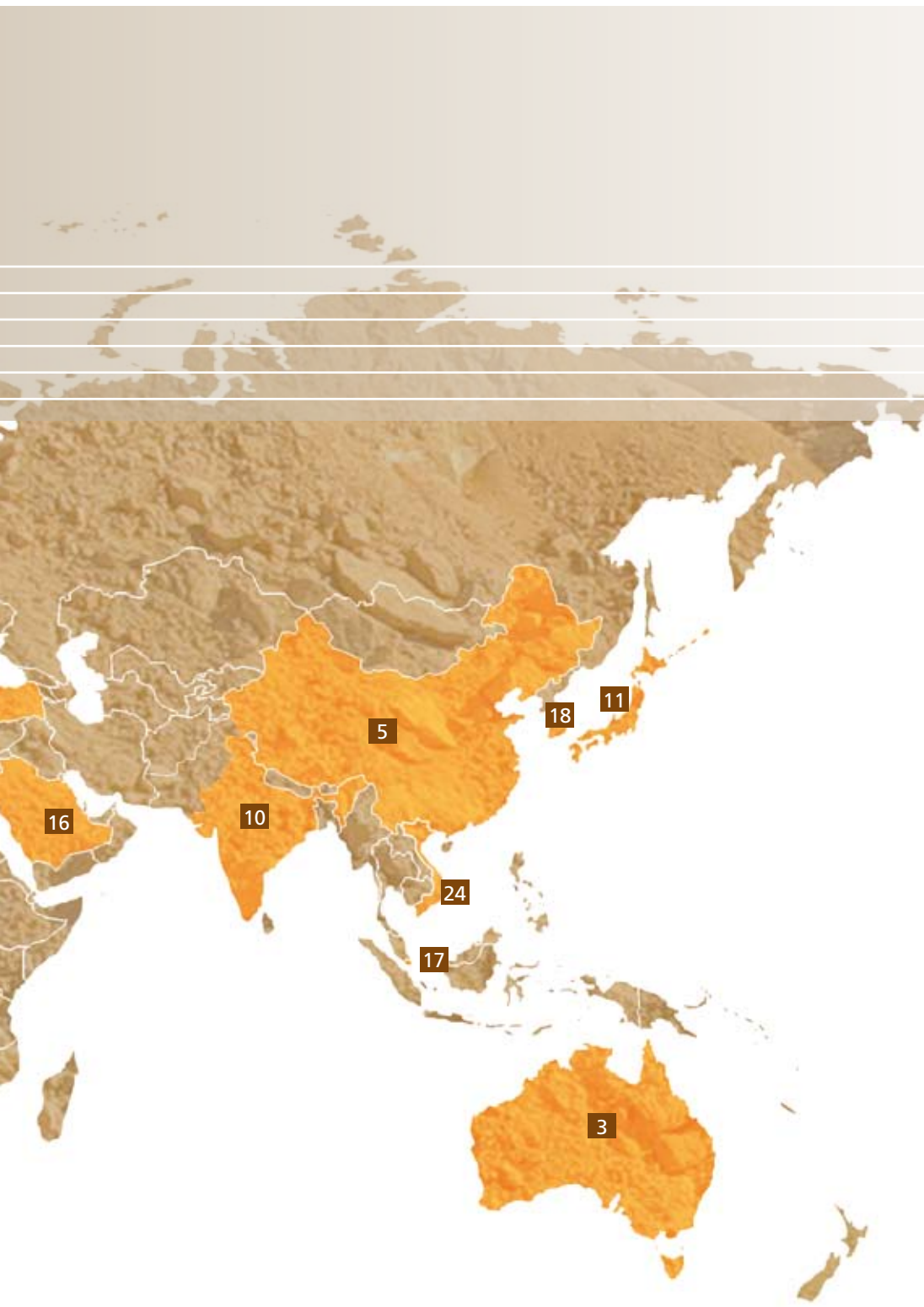


\* updated 2011



# Worldwide interventions





- 1 Algeria
- 2 Argentina
- 3 Australia
- 4 Belgium
- 5 China
- 6 Colombia
- 7 France
- 8 Germany
- 9 Hungary
- 10 India
- 11 Japan
- 12 Mexico
- 13 Morocco
- 14 Netherlands
- 15 Portugal
- 16 Saudi Arabia
- 17 Singapore
- 18 South Korea
- 19 Spain
- 20 Turkey
- 21 United Kingdom
- 22 United States of America
- 23 Venezuela
- 24 Vietnam

**A presence in 24 countries in the world in 2010**

# The key player in Underground Gas Storage



**Geostock is an international engineering group and the key player in the underground storage of liquid, liquefied and gaseous hydrocarbons. Founded in 1965, the company has acquired unique know-how in its field. Whatever the products stored or the techniques used, Geostock's expert knowledge enables it to provide quality services and solutions at the vanguard of technology.**

Geostock relies on its network of companies to provide a global offer right along the underground storage chain: this involves consultancy & engineering, construction, management & operation, but also a targeted offer tailored to the needs of the customer, who receives support right from the start of the project.

## **These services include:**

### **Economic studies**

- market survey and evaluation, planning studies, economic feasibility assessment, due diligence.

### **Design**

- project planning, site selection, feasibility studies, exploration, reservoir engineering, permitting, conceptual design, modelling.

### **Construction**

- engineering, detail design, tendering, procurement, construction management, commissioning and start-up, training of operators, operating and maintenance procedures and documentation.

### **Operation**

- storage facility management & operation, technical assistance to operation, organisation and safety audits.

### **Drilling, workover and solution mining**

- drilling, solution mining, well completion, well logging, workovers, brine disposal, operation of leaching plants.



### **Maintenance and revamping**

- maintenance, revamping, upgrading to new regulations and standards, performance enhancement, risk analysis.

### **Decommissioning closure and abandonment**

The combined skills and expertise of its companies enable the Geostock Group to offer its services all around the world on all types of underground storage facilities for a full range of products.

### **Aquifers and Depleted fields**

- Natural gas
- Compressed air
- CO<sub>2</sub>

### **Leached salt caverns**

- Natural gas
- Liquid hydrocarbons
- Liquefied hydrocarbons
- Compressed air

### **Mined caverns (unlined) and Disused mines**

- Liquid hydrocarbons
- Liquefied hydrocarbons

### **Mined caverns (lined)**

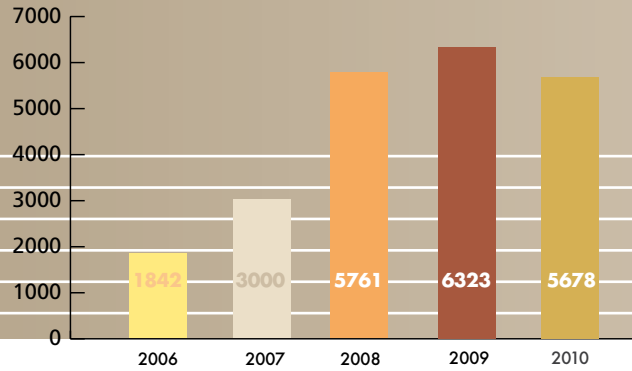
- LNG

Geostock and UGS are ISO 9001 quality-certified for their storage engineering, operational activities and underground technologies services.

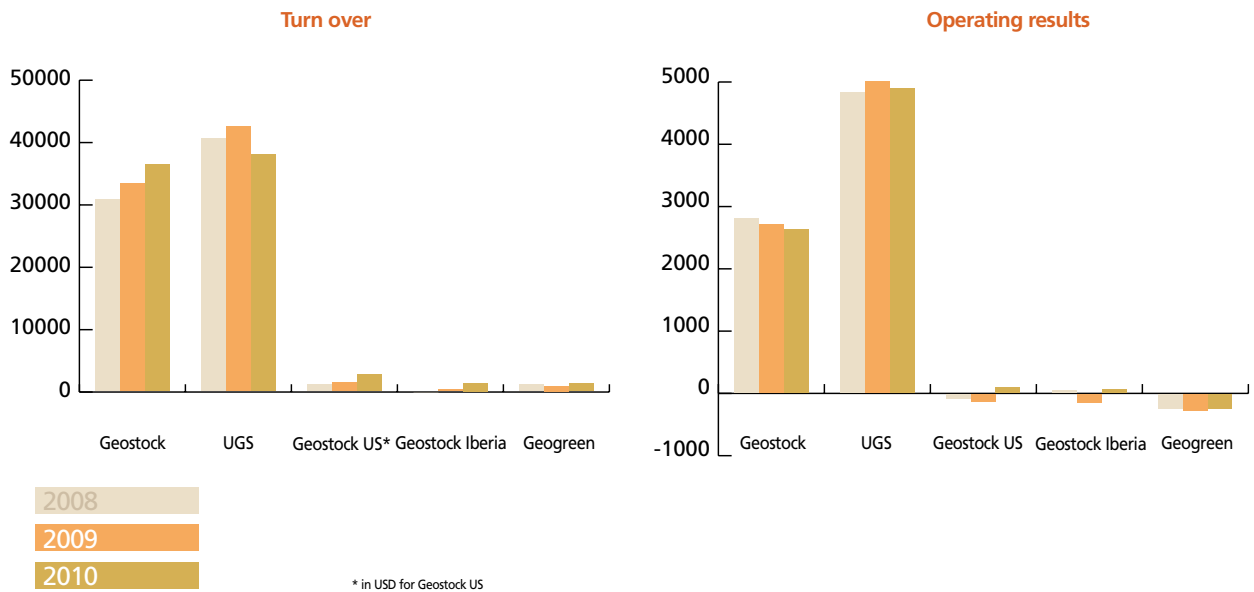


# Key figures

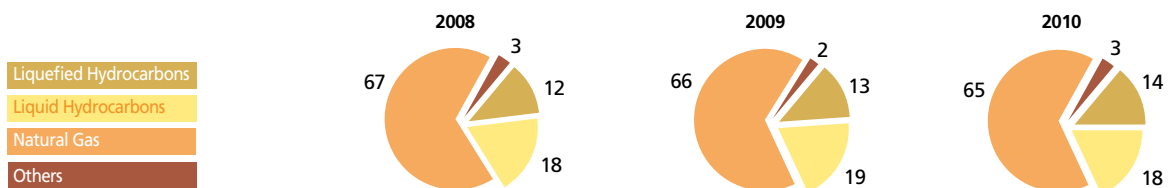
Group consolidated net income (in thousand euros)



Group companies sales and results (in thousand euros)

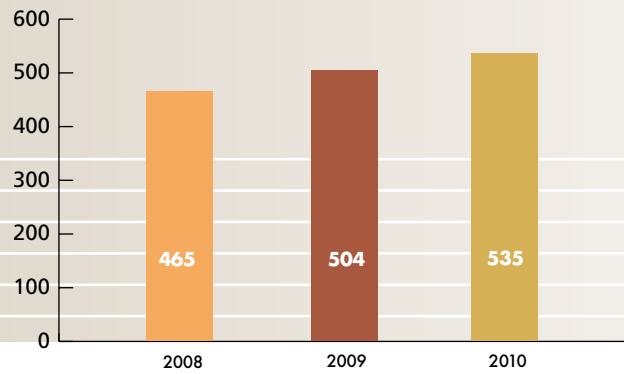


Sales by line of products (in % of gross income)

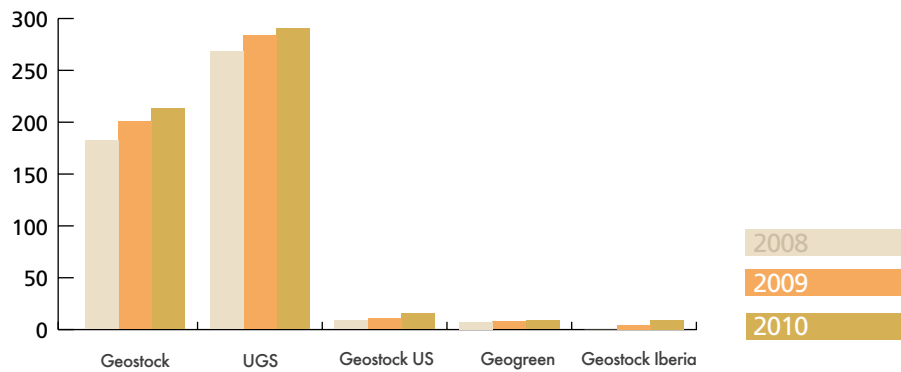


# Human resources

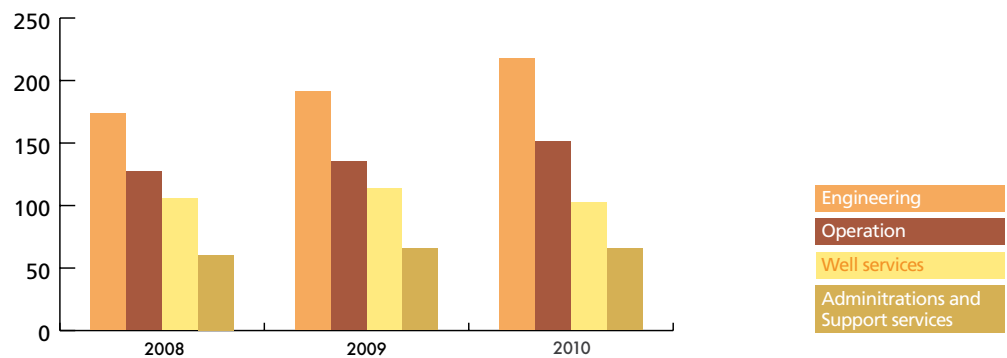
Consolidated group headcount at end of year



Headcount per company at end of year



Headcount per activity at end of year



# Activities review



## **GEOSTOCK**

**Within an economic climate that has been depressed since 2009, Geostock has maintained a high level of activity and pursued its recruitment efforts in order to contend with the increasing number of projects and to prepare the company for the future.**

Its activity is divided between two complementary services:

- underground storage engineering and construction,
- underground storage site operation.

### **Engineering & Construction**

■ In the United Kingdom, Geostock is in charge of the engineering and the construction supervision of eight salt-leached gas storage caverns at the Holford site for E.ON UK. All of the caverns are currently being leached as expected and in compliance with the schedule and budget, and the debrining of the caverns should start early in 2011.

Geostock also completed the engineering and construction supervision for Storengy of the drilling of ten wells at the Stublach site with a view to creating ten salt caverns.

■ In France, Geostock participated in the engineering, construction and commissioning of the topside facilities of a Storengy new gas storage site at Trois Fontaines, in support of Entrepose Contracting.

Geostock has also carried out the engineering and is supervising the works for the closure of the Geovexin LPG mined cavern.

■ In Portugal, Geostock is providing support to Redes Energéticas Nacionais (REN) for the expansion of its natural gas storage facility in salt-leached caverns at Carriço.

■ In Belgium, Geostock is continuing with the monitoring and development for Fluxys of the existing aquifer gas underground storage facility at Loenhout.

■ In Morocco, Geostock has carried out the design of a third salt cavern at Sidi Larbi (near Mohammedia) for Somas, as well as the engineering for the associated surface facilities. Works will start in 2011.



- In China, Geostock completed the design of a crude oil storage facility in an underground rock cavern.

Geostock is also supervising the construction for Dragon Gas of a LPG underground storage facility in mined caverns at Qingdao.

- In Singapore, Geostock is managing the construction of several mined caverns to store 1.5 Mm<sup>3</sup> of liquid hydrocarbons for Jurong Town Corporation (JTC), after having designed the caverns.

- In India, Geostock has designed a 1.5 Mm<sup>3</sup> strategic crude oil storage facility in underground rock caverns at Mangalore, and is now supervising its construction.

- In Vietnam, Geostock has completed a detailed feasibility study for Petrovietnam Oil Stockpile Company Limited (PVOS), relating to a major crude oil storage facility in underground rock caverns in the South of Vietnam. Geostock is also working on other potential locations for the underground storage of liquid hydrocarbons.

- In Japan, Geostock is assisting Japan Oil, Gas and Metals National Corporation (Jogmec) with the construction and start-up

preparation of LPG strategic storage facilities in Namikata and Kurashiki planned in 2012 and 2013.

At the Geosel site managed and operated by Geostock in Manosque (France), Geostock has started the leaching operations on two new caverns to be created for Sagess (the French agency for the management of strategic petroleum reserves).

In the same area, Geostock has completed the design of two new gas storage caverns to be created for Geomethane and is preparing the construction works.

### Operation

Geostock continued its operating services on sites at Manosque, Lavera and Sennecey-le-Grand (France) with a high level of activity.

In addition, Geostock has provided technical operational support at about fifteen sites, mostly outside of France, focusing on the monitoring of underground storage facilities (reservoir, seismic monitoring, hydrogeology, corrosion aspects, etc.).



## **GEOSTOCK US**

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**With the relatively low gas price, operators and developers were less interested in green field projects and more on evaluation of existing and future projects. The Geostock US engineering services carried out several due diligence studies, both in porous media and salt cavern storage. We were also able to expand our gas operations support services on existing facilities.**

Geostock US continued to provide technical support and assistance on four main gas storage projects (in Alabama, Louisiana, Mississippi and Texas). The drilling operations group was staffed up in response to the increased workload. Project management services for the drilling of two caverns wells was completed and a further two wells are to follow in the new year. Integrated services (which includes subcontracted drilling services) were provided for the drilling of a monitoring well.

Geostock US continued to provide project management services, leaching engineering and reservoir engineering services to clients in China, the Netherlands and Spain, all in cooperation with Geostock.

The drilling of three wells also began in Nebraska with the aim of evaluating the gas-tightness of a LPG storage facility. The work was interrupted by the onset of the winter, but its resumption is planned in 2011.

## **GEOSTOCK IBERIA**

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**Geostock Iberia SA services grew significantly in 2010.**

### **Engineering Services**

Geostock Iberia is working on several projects in Spain, with support from Geostock experts in France when required.



On the East coast of Spain, Geostock Iberia is providing technical assistance to Escal UGS on the Castor project, which consists of converting a depleted offshore oil field into an underground storage facility. Geostock Iberia is mainly in charge of the geological and reservoir modelling but is also providing technical support for the drilling operations.

In the Madrid area, Geostock Iberia is involved in the Yela Project for Enagas, an underground aquifer gas storage facility. Geostock Iberia is primarily in charge of the reservoir modelling, as well as providing technical expertise regarding the drilling operations and surface facilities.

In 2010, Geostock Group companies were involved in around ten different projects in Spain for seven different clients, involving natural gas storage in aquifers, depleted fields, and salt caverns.

Geostock Iberia is also providing technical support to Invexta, a fully-owned subsidiary

of ACS, for the implementation of a crude oil strategic storage facility in salt caverns at Pinoso, South Valencia.

### **Operation Services**

The development of operation and maintenance services or technical assistance to operation and maintenance is a strategic objective for Geostock Iberia, whether for underground storage facilities that are under construction or planned, or for existing ones.

In this respect, Geostock Iberia, with the support of Geostock in France, is in charge of reservoir monitoring at the Serrablo underground gas storage facility, operated by Enagas.

In the near future, Geostock Iberia will be involved in the operation of the Castor project for Escal and is also working on other opportunities.



## UGS

### (Untergrundspeicher-und Geotechnologie-Systeme GmbH)

**The UGS range of services mainly encompasses engineering, drilling, workover and well services, leaching, gas filling, gas plant operation and procurement of equipment for underground gas storage facilities.**

In 2010, UGS's activity remained at a high level despite a general decrease noticed on the German Underground Storage market.

The bulk of the activity was a continuation of projects from 2009, but UGS also succeeded in securing some new projects such as the 3rd stage extension of the Ellenberg gas facility for Storengy Deutschland and the extension of the Epe gas facility for Trianel.

The "facility operation" division created in 2007 and responsible for both the short and long-term operation of leaching and gas plants developed two new projects: the start of the

leaching operation at the Jemgum facility for Wingas and the acquisition of a new gas operation contract at Etzel (four gas caverns for the EDF & EnBW Crystal project).

Services in the field of welded casings and completion installation performed well, including on international markets: Etrez and Hauterives in France for Storengy, Zuidwending in the Netherlands for Gasunie and Holford in the UK, where Geostock is acting as Subsurface Engineer for E.ON UK, and where UGS will be installing welded completions in eight salt caverns in 2011 and 2012.

No new well was drilled in 2010. However, the workover activity was at an exceptionally high level and encompassed 47 operations altogether. The drilling of several wells, in particular for SGW at Epe, is anticipated in 2011.

Audits for the renewal of DIN ISO 9001 and SCC certifications were passed successfully.



## Highlights of the UGS 2010 activity include:

### Engineering / Construction

- Bernburg (VNG) salt caverns: re-completion and first gas filling of several caverns.
- Bad Lauchstädt (VNG) salt caverns: planned development of four to six new caverns; leaching of two new caverns, revamping of existing caverns.
- Rüdersdorf (EWE) salt caverns: management of leaching and brine disposal.
- Ellenberg (GdF-Suez ESD) salt caverns: leaching of two caverns. New contract for the extension of the gas facility.
- Kraak (E.ON Hanse) salt caverns: leaching and first gas filling of the last cavern, extension of surface facility, installation of an additional compressor.
- Epe salt caverns:
  - Trianel: preparation of a new extension stage of the surface facility.

- Nuon: successful completion of a turnkey contract for testing, completion and first gas filling of three caverns.
- Construction of a dehydration unit for E.ON.
- Berlin (Gasag) pore medium storage: engineering studies for workover, drilling of a new well and storage extension.
- Buchholz (VNG): reservoir modelling, preparation of a long-term maintenance programme for the subsurface installation.
- Empelde (Gasunion): completion of the extension of the leaching facility.

### Exploration, Feasibility studies

- Engineering for site investigation of two potential CO<sub>2</sub> storage sites for Vattenfall progressed slowly due to public opposition.



### Well Services

- 47 workovers and caverns completion operations (Nüttermoor, Rüdersdorf, Jemgum, Epe, Kraak, Bad Lauchstädt, Bernburg, Buchholz, Ellenberg, Bierwang, Breitbrunn, and at the DOW Ohrensen salt cavern field).
- Large welded casings and welded completion activity in particular at Bad Lauchstädt and Bernburg (VNG), Kraak (E.ON Hanse), Krummhörn, Etzel (IVG), Etrez and Hauterives (France) for Storengy, Zuidwending Netherlands for Gasunie.

### Operation

- Leaching and brine disposal at Kraak (E.ON Hanse) and Rüdersdorf (EWE). Preparation and start-up of the long-term Jemgum leaching operation (Wingas).
- Gas first filling (short term operation) at: Epe (Nuon), Ellenberg (GdF ESD), Kraak (E.ON Hanse).

- Gas operation: operation management of pore medium storages - Allmenhausen (ETE) and Buchholz (VNG) - and of salt caverns - Epe (Trianel). Etzel (EDF/EnBW) under preparation and mobilization.
- CO<sub>2</sub> injection at Ketzin.

## GEOGREEN

**Geogreen offers its services in the field of expertise, consulting, and engineering for the development of transport and geologic storage of carbon dioxide. The company provides its clients with technical and economic estimates for the whole CCS chain development. Its activity was tailored to the market through diversification into consulting during its first year of activity (2007-2008). At the end of its third year, the company recorded a strong increase in turnover from its international portfolio.**

### Some contracts awarded in 2009 have continued in 2010:

- Feasibility of a BioCCS project in central Paris Basin for BRGM.



- Assistance to ArcelorMittal's ULCOS-BF CCS project in the Lorraine area, involving subsurface engineering (3D geological modelling) and administrative engineering (license file application, impact notice).
- Expertise for EDF relating to the France Nord storage project.
- Storage site characterisation, modelling, and injection simulation for Veolia Environnement (central Paris basin).
- For Saudi entity Kapsarc, study of CCS project deployment in the Kingdom (consortium lead by Geogreen).
- For the European Commission, study of capture and transport clustering in Le Havre area (consortium led by IFPEN).

In synergy with sister companies from the IFPEN group, new contracts have been secured in the EOR-CO<sub>2</sub> field (assisted hydrocarbon recovery through carbon dioxide injection in depleted reservoirs) with the Venezuelan National Oil Company PDVSA.

A feasibility study for the transport and storage of CO<sub>2</sub> for a future power plant in the town of Os-Marsillon (Aquitaine area) was carried out for the French subsidiary of the German E.ON group.

Geogreen also won a call for tenders issued by the International Energy Agency (IEAGHG) aimed at proposing a critical review of CCS deployment in 2020 and 2050.

Finally, Geogreen won a direct negotiation with United Nations (UNIDO) for the identification of early opportunities for CCS projects to be launched in developing countries worldwide.

In coming years, Geogreen will continue to increase its portfolio of international projects, especially in North and South America.

Over the medium term, Geogreen will be making some strategic alliances in order to position itself on the Operating and Maintenance segments of the CCS market.

# Research & Development



**The Geostock Group's Research and Development program is in the continuity with the previous year objectives: the improvement of existing services and development of new techniques and activities.**

**1** The technology of capture, transport, and geologic storage of CO<sub>2</sub> is progressing toward the demonstration phase. Important efforts were maintained by our companies in this field:

- Geogreen R&D activities were related to injection risk analysis methodology, capture and transport clustering, dynamic economic analysis, performance evaluation of CCS project, and - in cooperation with Geostock - to specific technical issues related to subsurface aspects (reservoir simulation, geomechanics, and geochemistry).
- UGS participated in the operation and monitoring of CO<sub>2</sub> injection at Ketzin (CO<sub>2</sub> Sink Project).

**2** After first full-size tests, the UGS friction welding prototype has been improved and final full-scale testing is planned

for next year. This will be the last step before commercialisation of the friction welding technology for gas storage wells.

**3** The R&D activities linked to technical improvement in the field of Geostock's core business include:

- Simulation of multiphase flow in relation to the concept of the hydrodynamic sealing of mined caverns, and thermo-mechanical modelling.
- Salt cavern leaching and operation follow-up modelling.
- Design optimisation of mined cavern for liquid hydrocarbons.

**4** Development of new techniques in connection with:

- Feasibility of DME storage in mined caverns with special focus on water/product interactions and treatment.
- Feasibility study of a full-scale LNG mined cavern storage project.
- Adiabatic Compressed Air Energy Storage (participation in a 3-year joint research program).

# Health, Safety & Environment



**The Health of people, Safety of property and Environmental protection are an absolute priority in all activities of the Geostock Group companies: engineering, construction and operation.**

For all group entities, this policy is based on:

- ongoing awareness-raising among key players,
- regular audits,
- numerous staff training actions,
- detailed analysis of incidents and near misses in order to learn from experience.

This feedback is also useful when designing new facilities, in order to constantly improve the level of health, safety and environmental protection.

A shared HSE report is currently used by all entities of the Geostock group. It is issued monthly by each subsidiary and operated facility, while a complementary report is issued quarterly. It summarises the key indicators and

presents the major HSE events of all Geostock group entities within the previous three months.

The contingency plans available in response to any hazardous situation occurring on premises operated by Geostock have been updated, including the Crisis Centre at Geostock headquarters.

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