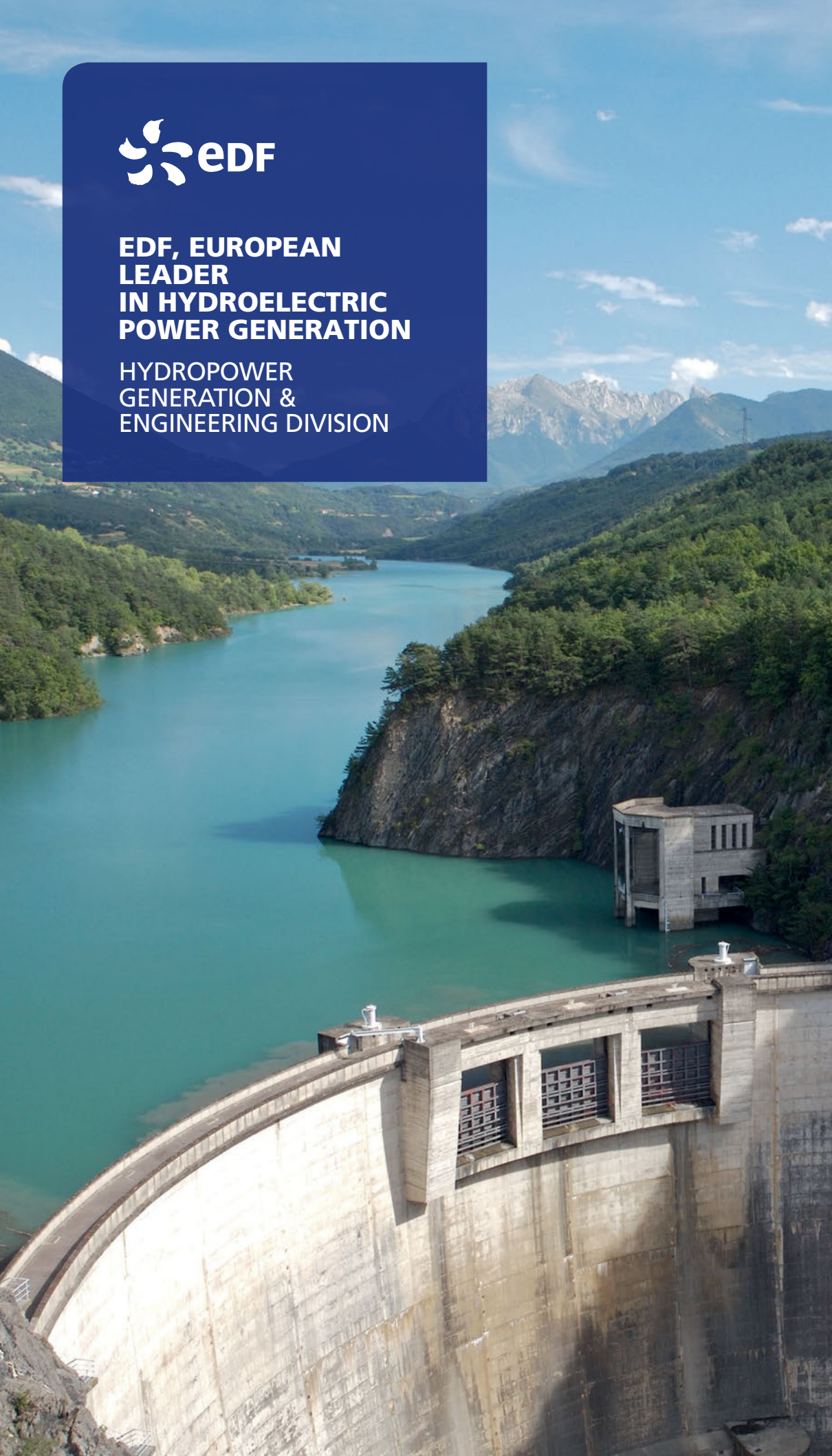
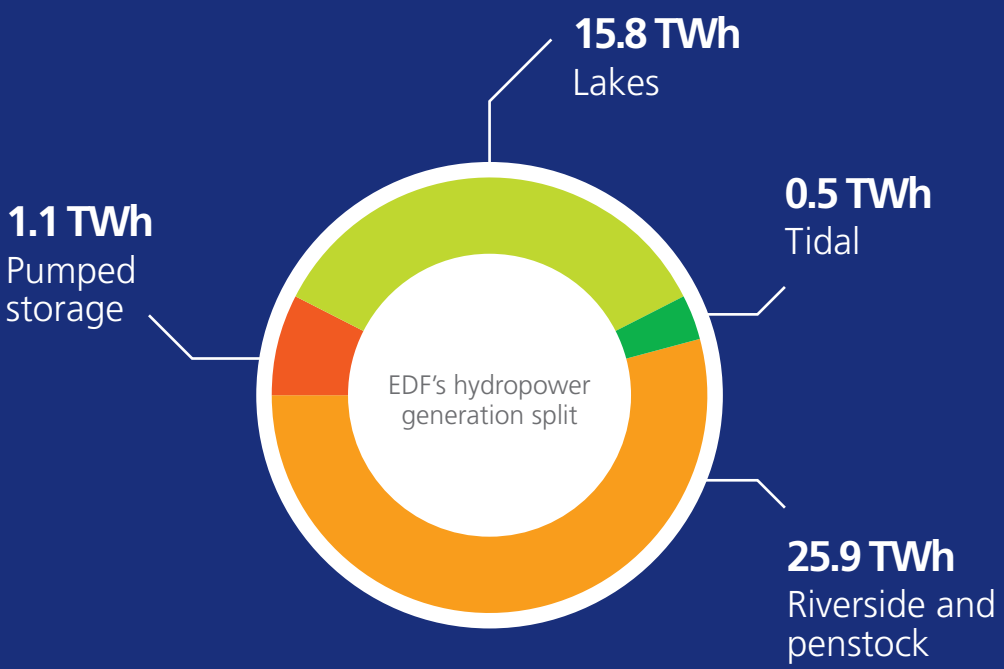


EDF, EUROPEAN LEADER IN HYDROELECTRIC POWER GENERATION

HYDROPOWER GENERATION & ENGINEERING DIVISION

EDF HYDRO GENERATION **STATISTICS**



43.5 TWh
EDF average hydro generation capacity in mainland France

10%
Hydropower's contribution to EDF's average output in mainland France

EDF GROUP'S INSTALLED CAPACITY

20,410 MW
In France, including 400 MW in Corsica and the French Overseas Departments, excluding the Rance power plant (EDF SA)*

3 MW
In Slovakia (SSE: Stredoslovenska Energetika AS)

2,804 MW
In Switzerland (Alpiq)

25 MW
In Austria (Estag)

1 361 MW
In Italy (Edison and Fenice)*

73 MW
In Belgium (EDF Luminus)

* Companies wholly owned by EDF

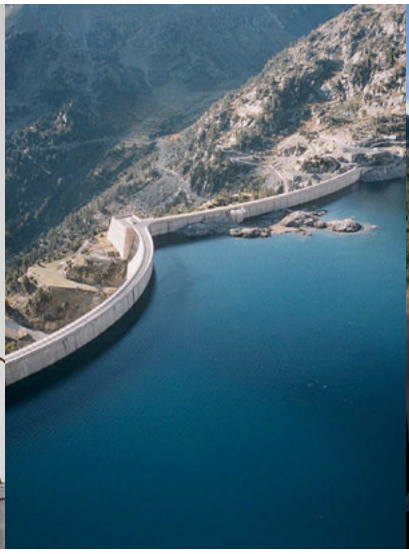
COVER: **Saint Pierre Cognet dam (Isère).** EDF / Lionel Astruc

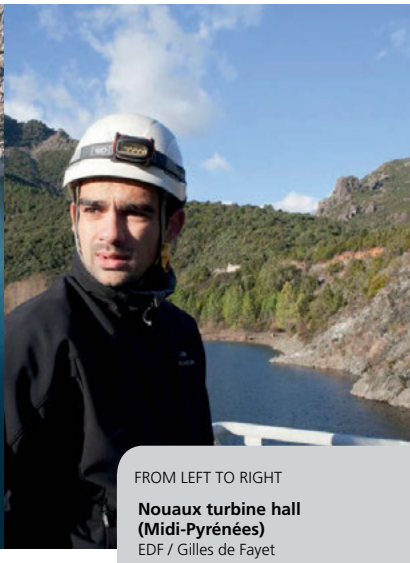
OUR COMMITMENTS

We as energy producers are committed to responsible growth and are aware of our impact on the environment. It is our duty to put all of our efforts into **preserving the planet and addressing the challenge of climate change**, while at the same time reconciling our **energy security with operational safety and affordable, competitive energy prices**.

The EDF Group, which already has an extensive fleet of low-carbon generation facilities (hydropower, nuclear power and renewable energy sources), has committed itself to **maintaining its track record as producer of the lowest carbon dioxide emissions among the foremost European energy producers**.







FROM LEFT TO RIGHT

Nouaux turbine hall (Midi-Pyrénées)
EDF / Gilles de Fayet

Aerial view of Cap de Long dam (Pyrénées)
EDF / Gilles de Fayet

Operator at Trevadine dam (Corsica)
EDF / Bruno Conty

QUALITY

ISO 9001
awarded "for generating hydropower while maintaining high safety standards".

ISO 14001
version 2004, awarded for "hydroelectric power generation and hydro plant operating services".



Tourist activity around Roselend dam (Savoie)
EDF / Antoine Aybes

THE FRENCH FLEET

INSTALLED CAPACITY

EDF SA

20.4 GW of installed capacity in France (including 400 MW in Corsica and the French Overseas Departments), accounting for:

- 80% of total available hydroelectric capacity in France.
- 20% of the EDF generating fleet.
- Annual generation capacity of 46 TWh.

France

(All energy producers)

- 25.4 GW of installed capacity

4 TYPES OF GENERATING FACILITY

Operating at base or peak load depending on demand

- High-head dams: 8.8 GW*.
- Medium-head penstocks: 3.1 GW*.
- Low-head run-of-river: 3.6 GW*.
- Pumped storage: 4.3 GW*.

Note: The Rance tidal plant has 240 MW of installed capacity.

**Installed capacity.*

FLEET OPERATIONS

A highly automated and remotely controlled generation fleet

100 power plants, accounting for 75% of installed capacity, are remotely controlled from 4 hydro control centres (HCC) and generate approximately 30 TWh a year.
One of the aims of the RenouvEAU hydro project is to develop remote surveillance of hydro structures by installing regional IT-based control centres. A pilot facility has been operating in Toulouse since the end of 2010, with another two at Limoges and Grenoble.

Fleet capability factor

- Average capability stands at around 87%.
- Response rate is above 99%.

435
hydro plants
including 14 in Corsica and the French Overseas Departments

- Built over the period spanning 1886 to 1996.
- With installed capacity ranging from 100 kW to 1,800 MW.
- 10% of them account for 50% of total output.
- 1,200 operating groups in total.

SOME IMPRESSIVE STATISTICS

180 METRES
EDF's highest dam: Tignes dam (Savoie).

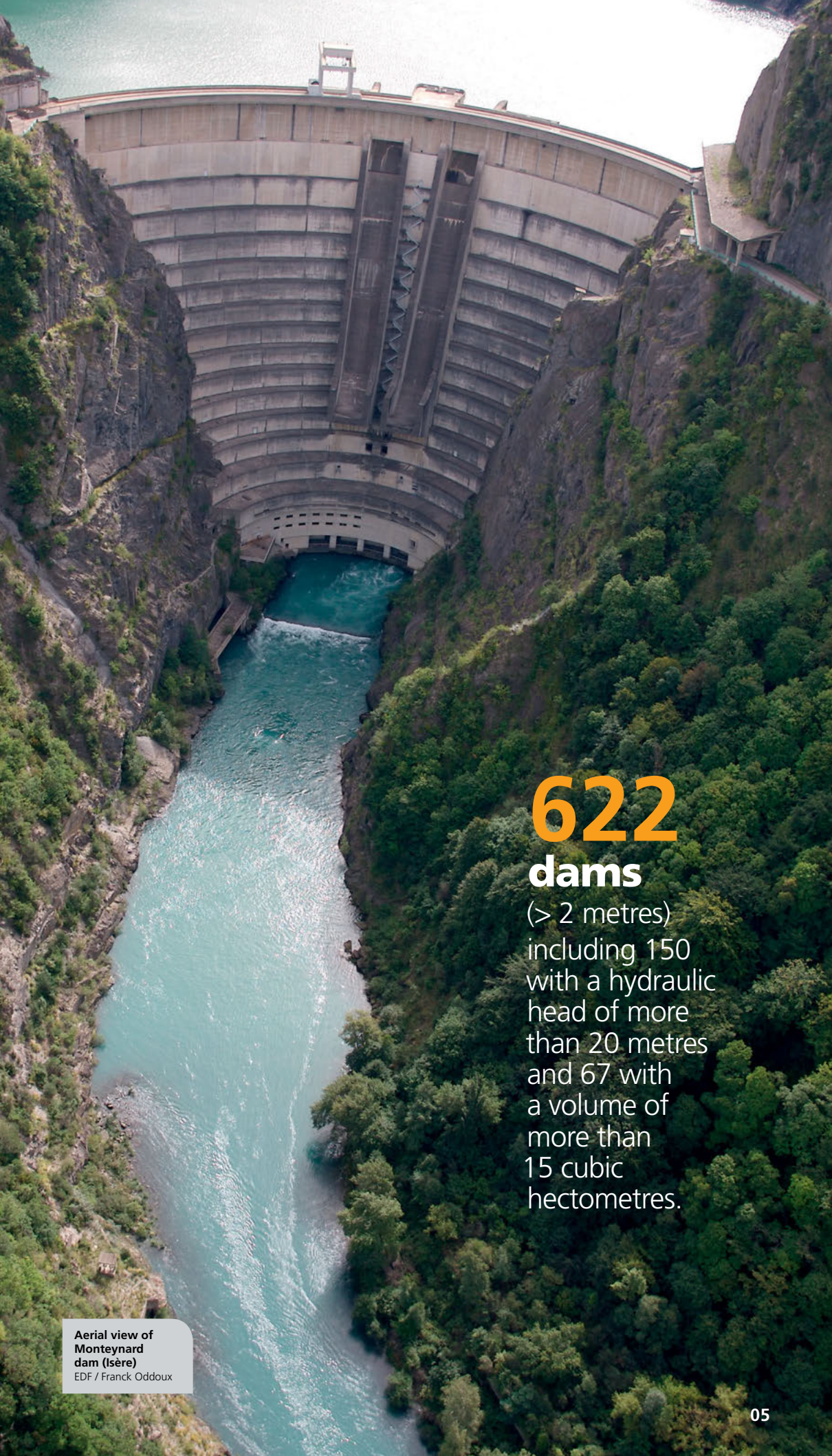
1.2 BILLION CUBIC METRES OF WATER
Europe's largest impoundment facility: Serre Ponçon dam (Hautes-Alpes).

240 MW
Installed capacity of the world's first tidal plant: La Rance (Ille-et-Vilaine).

3.5 BILLION CUBIC METRES OF WATER
Largest impoundment facility in the EDF fleet: Petit Saut dam (Guiana).

1,800 MW
EDF's most powerful hydro plant: Grand'Maison pumped-storage plant (Isère).

1,420 METRES
Highest hydraulic head: Portillon (Haute-Garonne).



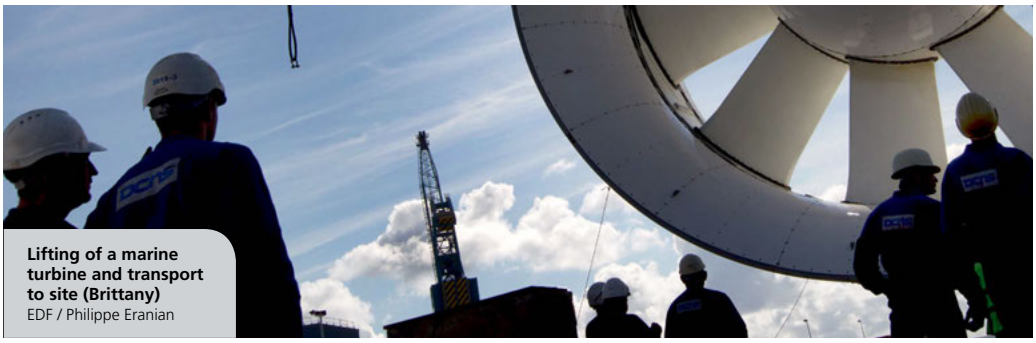
622
dams
(> 2 metres) including 150 with a hydraulic head of more than 20 metres and 67 with a volume of more than 15 cubic hectometres.

Aerial view of Monteynard dam (Isère)
EDF / Franck Oddoux



7.5
billion cubic metres
of water stored in EDF dams

Illuminated building at the Cusset hydro plant on the Jonage Canal (Rhône)
EDF / Patrice Dhumes



Lifting of a marine turbine and transport to site (Brittany)
EDF / Philippe Eranian

ATTRIBUTES OF THE EDF HYDRO FLEET

RESPONSIVE, RELIABLE AND FLEXIBLE

Aside from its run-of-river plants, the EDF hydro fleet is primarily used to supplement the electrical grid, in addition to nuclear power for example, or during peak periods, in response to fluctuating demand.

EDF maximises the potential and flexibility of its available water resources. In parallel with its nuclear facilities, run-of-river plants are used in order to meet normal day-to-day demand. These facilities do not have reservoirs and use some of the river flow to continuously generate electricity. "Modular" hydropower is particularly suited to periods of peak demand, both in summer and winter. This type of power comes in the form of dams that impound water, thus creating a store of electrical power that can be harnessed very swiftly.

The Grand'Maison facility, for instance, can supply 1,800 MW within a few minutes, tantamount to the power generated by two nuclear reactors. Hydropower's extremely low generation costs make it the most competitive form of renewable energy, providing a source of electrical power in "normal" periods as well as in periods of peak demand. Because it can be swiftly harnessed, hydropower provides a low-cost solution to sharp fluctuations in electricity demand.

WATER STORAGE CAPACITY

Supplemental energy and heat sink for fossil-fired and nuclear generation facilities.

In France, natural resources provide 180 billion cubic metres of water, 32 billion of which are enough to meet the needs of the population. EDF dams have a total storage capacity of 7.5 billion cubic metres, tantamount to 75% of France's surface water storage reserves. Every year, 700 million cubic metres of water are released from EDF dams for purposes other than electrical power generation (drinking water, increase in river flow during low-water periods, irrigation, production of artificial snow, wild water sports, etc.).

A RENEWABLE ENERGY SOURCE

An annual saving tantamount to 13 million tons of oil.

Hydropower remains the world's foremost, oldest and most competitive form of renewable energy. Close to 10% of EDF's output is generated by hydro facilities. Together with nuclear power, it enables the EDF Group to generate 95% of its electricity in France without CO_2 emissions, while also making a vital contribution to France's and more broadly to Europe's energy security. It also plays an instrumental role in helping France to meet its renewable energy targets.

THE EDF HYDRO GENERATION AND ENGINEERING DIVISION

FUNCTIONS

Maintaining a technically and economically efficient EDF hydro fleet with high safety standards.
Using water to generate competitive and CO_2-free electricity, by developing the best technological and human solutions, while also maximising the potential of this natural asset and its environment. This endeavour goes hand in hand with increasingly stringent plant and operational safety standards.

Managing EDF's water resources.
The hydro generation and engineering division (DPIH) plays a pivotal role in managing the EDF Group's water resources in order to maximise the potential of its generation facilities and maintain the Group's global competitive edge. Additionally, the storage capacity of a public asset, sometimes beset by opposing interests, compels the DPIH to play an active role in reconciling generation objectives with those of other water users.



Lake Serre-Ponçon (Durance)
EDF / Bruno Conty

PLANNING AHEAD

The DPIH is rolling out an industrial project aimed at sustaining the technical and economic performance of its hydro generation fleet.
The project will consolidate EDF's position as operator of one of the world's leading hydro fleets with high standards of reliability, flexibility, modularity and availability, blending seamlessly into its surroundings and making a major contribution to the economic life of the country's hilly regions.

Supplying safe and value-added energy.
EDF is determined to retain its position as one of the leading European hydro energy producers by boosting the capability and flexibility of its hydro fleet. Two of its main objectives are to further enhance the safety of its facilities and operating methods, as well as investing its capital in increased generation performance.

Managing its assets in the face of competition.
Bearing in mind that EDF does not own its generation facilities and that hydro concession award rules have changed, it is no longer enough for the company to maintain its reputation as an operator with high professional standards as it now has to be chosen from among its competitors.
EDF is determined to show that the expertise developed by its teams remains the best choice on the market.

Investing in development and innovation.
France's undertaking, as part of the climate plan, to have its renewable energy sources supply 23% of final energy consumption, combined with the end of Europe's excess capacity, has opened the door to new perspectives. EDF intends to promote investment in new operating groups able to demonstrate profitability.

Skills management.
As is the case in many other industries, EDF's hydro business will be faced with a significant number of retirements, thus making it essential to have a successful recruitment scheme.
EDF will therefore ensure that all measures are in place for recruiting, training and coaching tomorrow's hydropower professionals.

Over the period spanning
2011 to 2015

1 billion €

will be spent on
optimizing and upgrading
power generation assets



Gambsheim hydropower facility (Bas-Rhin)
EDF / Thierry Dichtenmuller



SuPerHydro programme: Refurbishing the Pragnères penstock facility (Hautes-Pyrénées)
EDF / CIH

RENOWNED EXPERTISE AND A GLOBAL BENCHMARK

With more than 60 years of experience in the design, construction and operation of one of Europe's largest hydro fleets, EDF has built up a high level of expertise and technical skill across the entire production chain.

THE HYDRO ENGINEERING ORGANISATION

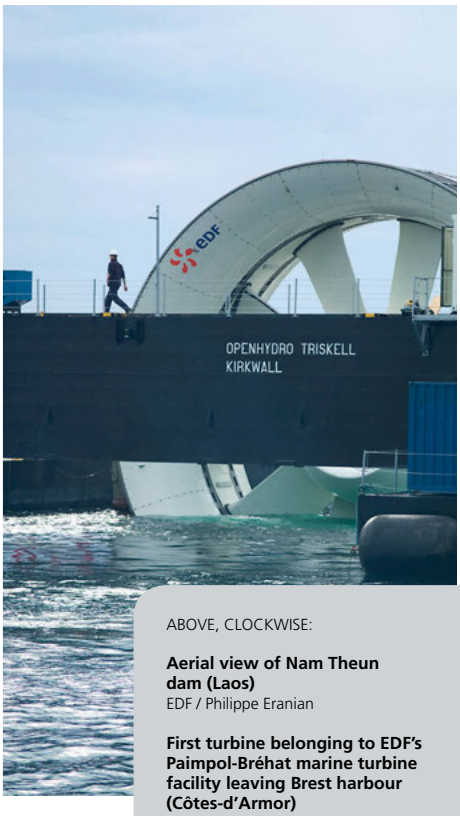
The technicians responsible for the day-to-day safe and efficient operation of EDF's hydroelectric plants can rely on the expert knowledge of two engineering entities attached to the hydro generation and engineering division.

These provide:

- Project management and assistance thanks to their expert knowledge in the areas of plant operation and maintenance.
- Monitoring and improvement of equipment performance.
- Monitoring of dams and civil engineering structures (remote monitoring) using rare and unique monitoring equipment.
- Forecasting and monitoring of hydro-meteorological events (1,100 monitoring stations), liaising with Météo France. EDF's engineering organisation uses a single database containing more than 60 years of operating experience from the world's largest generation fleet. It also draws on the experience gleaned from services provided to EDF subsidiaries and other French or international energy producers.







ABOVE, CLOCKWISE:

Aerial view of Nam Theun dam (Laos)
EDF / Philippe Eranian

First turbine belonging to EDF's Paimpol-Bréhat marine turbine facility leaving Brest harbour (Côtes-d'Armor)
EDF / Christelle Sasso

Tunnel-boring machine on the construction site of the new hydro facility at Romanche-Gavet (Isère)
EDF

DEVELOPMENT ENGINEERING

Keen to develop and consolidate its industrial expertise while continuing to operate a competitive and environmentally friendly fleet, EDF is examining every conceivable opportunity to develop the use of hydropower, the world's foremost renewable energy.
The group's expertise spans the entire length of the process:

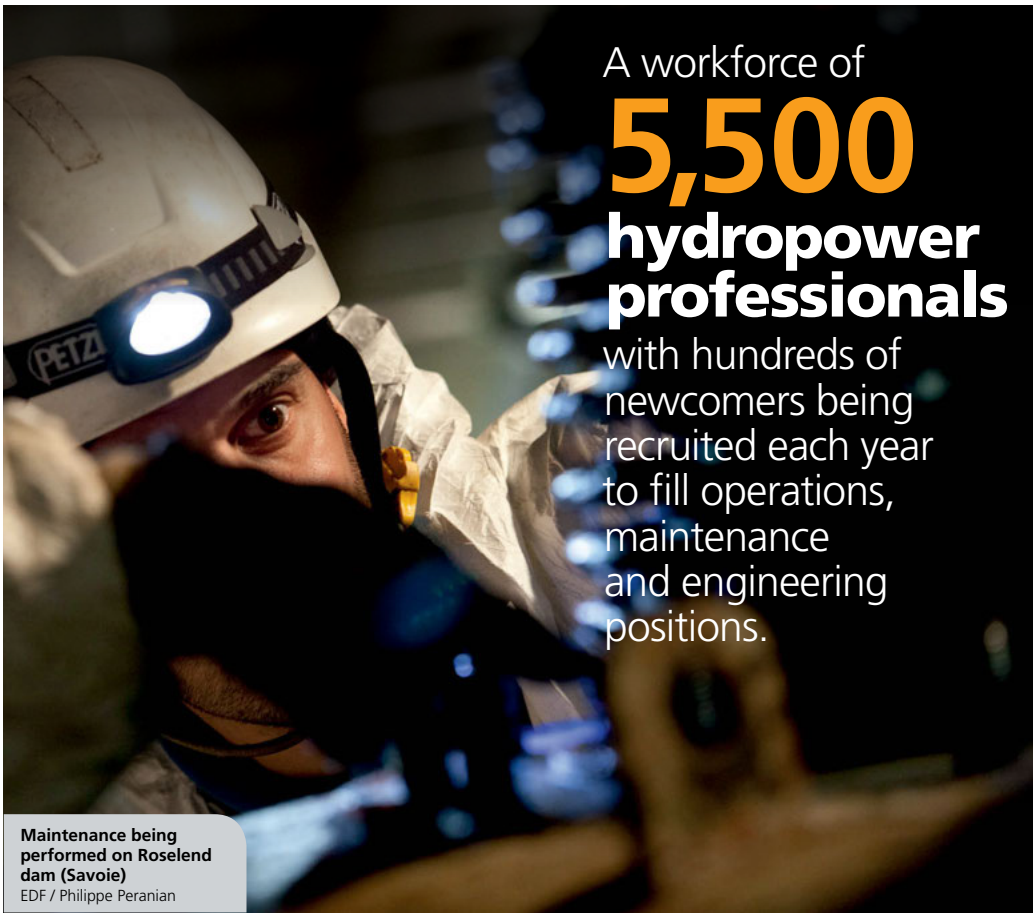
- Design and construction of new projects, ranging from technical, economic and feasibility studies through to commissioning,
- Refurbishment, reconstruction and modernisation of existing facilities.

While it chiefly involves itself with hydro facilities on behalf of the EDF Group, this expertise is also made available to external customers both in France and abroad. Every year, around fifty design, construction and refurbishment contracts are signed in more than 30 countries.

ENVIRONMENTAL KNOW-HOW

With 622 dams in operation, EDF currently manages 75% of France's surface water storage reserves.
As water is a scarce resource, EDF manages it responsibly by preserving the environment and by ensuring that other users have access to it.

In order to do this, the company has developed a renowned set of skills in France and abroad, focused on reducing and controlling environmental consequences (fish passes, water quality, mitigation of thermal impact, diagnosis of environmental impact, etc.).
EDF also relies on its environmental hydrology lab (LNHE), which employs around one hundred experts in the fields of hydrology, sedimentology, river pollution and aquatic biology, etc. These experts work closely together with the scientific community on R&D programmes. They are held up as role models in the international arena.



Maintenance being performed on Roselend dam (Savoie)
EDF / Philippe Peranian

SPECIALIST JOBS WITH THE DIVISION

Within the hydro generation and engineering division, the role of the 5,500-strong workforce is to design, construct, operate and maintain the hydroelectric structures used to meet energy demand without producing CO_2 emissions while maintaining high levels of efficiency and safety, with a constant regard for the regional and local environment.

DESIGN AND CONSTRUCTION
Entails the rollout of hydropower projects from beginning to end, ranging from project design and management through to construction and commissioning.

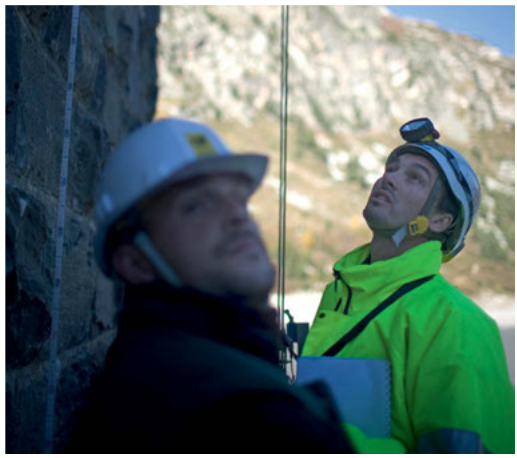
OPERATION AND MAINTENANCE
Entails the efficient and sustainable generation of electricity to meet demand by adapting to local needs and the needs of other users.

OPTIMISATION
Entails the constant upgrading of generation facilities in order to maintain operational performance as well as plant and public safety.









ABOVE, CLOCKWISE:

Maintenance technician at the Monistrol hydro plant (Haute-Loire)
EDF / Patrice Dhumes

Operations technician at the Sautet hydro plant (Isère)
EDF / Lionel Astruc

Inspection at the foot of the drained Aussois dam (Savoie)
EDF / Laurent Vautrin

Works inspector at the Rizzanese construction site (Corsica)
EDF / Philippe Marsini

IN ORDER TO DO THIS:

The DPIH performs ongoing and predictive scientific surveys in order to evaluate the impact of its facilities on their surroundings.

- Adaptation of facilities to environmental changes and mitigation of their impact on the aquatic environment (biodiversity).

The DPIH is constantly focused on hydro safety.

- From the design and construction phases through to operation and decommissioning.
- Management of flow variations and public safety by running awareness campaigns in the areas surrounding its facilities.
- Weather forecasts to ensure that facilities are properly run in high-water periods.

The DPIH constantly liaises with local players in order to promote the fair distribution of water resources among the different users and to maximise the potential of this shared asset.

- Production of drinking water.
- Farming and fishing.
- Recreational activities (wild water sports, etc.).
- Preservation of biodiversity (fish passes, eel migration, etc.).

The DPIH draws on a formidable pool of scientific, technical and research skills.
On the Rhine River, EDF manages navigation by means of 8 locks, operated by lock-keeper shift crews working around the clock, seven days a week.

GEOGRAPHIC LOCATION OF EDF HYDROPOWER PLANTS IN FRANCE

LAKE-SUPPLIED HYDRO PLANTS

- 50 to 100 MW
- 100 to 250 MW
- + 250 MW

RUN-OF-RIVER HYDRO PLANTS WITH POND

- 50 to 100 MW
- 100 to 250 MW
- + 250 MW

RUN-OF-RIVER HYDRO PLANTS WITHOUT POND

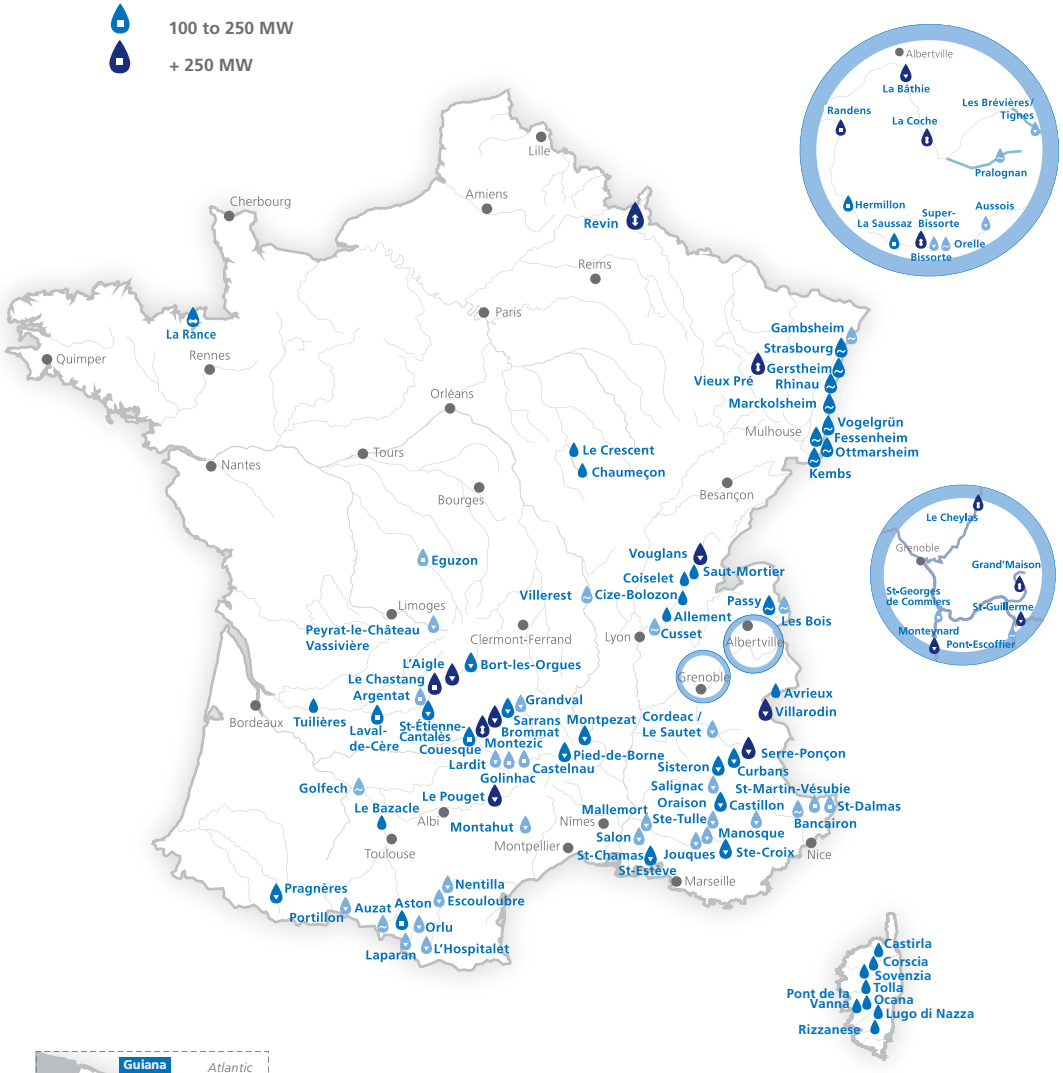
- 50 to 100 MW
- 100 to 250 MW
- + 250 MW

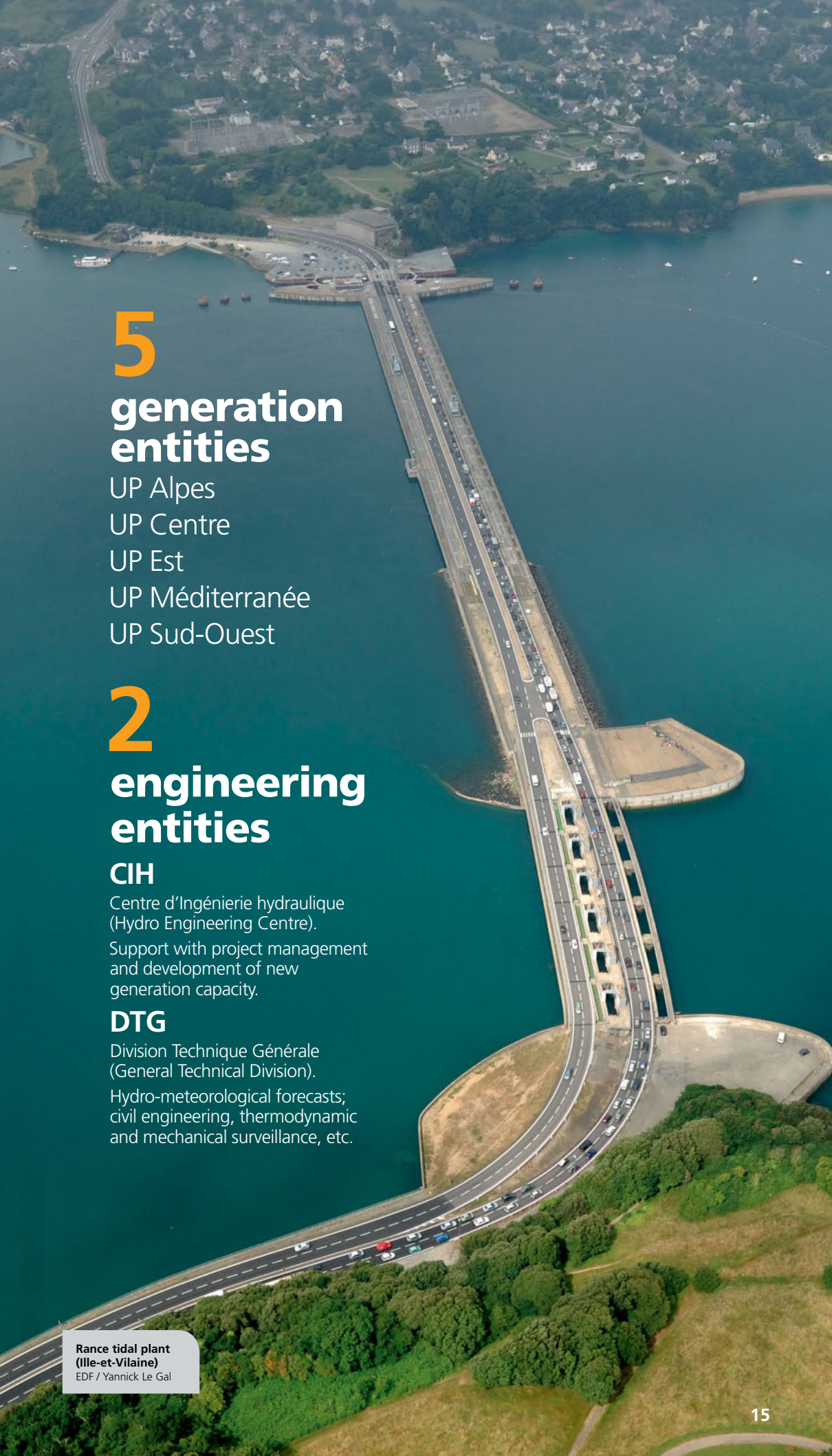
TIDAL PLANTS

- 100 to 250 MW

PUMPED-STORAGE HYDRO PLANTS

- +250 MW
- Sites in Corsica, French Overseas Departments and Territories, and sites with a capacity of ≤ 50 MW





5 generation entities

UP Alpes
UP Centre
UP Est
UP Méditerranée
UP Sud-Ouest

2 engineering entities

CIH

Centre d'Ingénierie hydraulique (Hydro Engineering Centre).

Support with project management and development of new generation capacity.

DTG

Division Technique Générale (General Technical Division).

Hydro-meteorological forecasts; civil engineering, thermodynamic and mechanical surveillance, etc.

Rance tidal plant (Ille-et-Vilaine)
EDF / Yannick Le Gal

EDF Generation The EDF group carries ISO 14001 certification **October 2013**

EDF
Generation
Communication Department
Cap Ampère - 1, place Pleyel
93282 Saint-Denis cedex

EDF - Head office
22-30, avenue de Wagram
75008 Paris

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