

# Milestones 2010

Special report

## Safety at the nuclear power plants

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Water is a precious energy source. It is used to deliver power that is immediately available and CO<sub>2</sub>-free. Thanks to reservoirs and pumped storage stations, hydropower remains the most realistic way to store electricity. More than a renewable energy, water is a sustainable energy.

Together with nuclear power, hydroelectricity, the world's foremost renewable energy, is an essential component of France's generation mix. It contributes almost 10% of total electricity output in France at EDF, the European Union's leading producer of hydropower. Generating energy from water is contributing to progress toward France's goal of producing 23% of its electricity with renewable sources by 2020. Hydroelectricity also helps balance supply and demand when electricity consumption is high, since it only takes a few minutes to bring a hydropower station on line. Already planning for the future of its hydroelectricity business, EDF has launched the "Vision 2015" project with five key objectives:

maintain existing assets (the SuperHydro program); win the hydro concessions that come up for renewal; boost the capacity of the existing plants and build new ones (for instance, EDF announced plans in 2008 to invest €225 million to add 130 MW of hydro generation capacity over five years in Alsace); develop the skills of hydraulic engineers; and overhaul the Group's production and maintenance model to extract real efficiency gains by reducing unavailability, standardizing the fleet, and using e-monitoring and computer-assisted maintenance management. EDF's commitment to responsibility is underpinned by four priorities: operating safety and security, performance, environmental protection and contributing to the

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## Editorial

Performance, accountability and commitment to communities: these are the key requirements of quality public service electricity. In these pages, those who work with EDF describe how hydro generation is rooted in the regions, and how energy services are being delivered to local authorities. Nuclear safety, EDF's core responsibility, is addressed in a special report.



EDF - Marc DIDIER

## EDF hydro: a core business

# EDF hydro: a core business (continued)

## KEY FIGURES

### EDF hydro fleet

**95%**  
of hydro potential is  
already being exploited  
in France

**46.4 TWh**  
output of EDF's hydro fleet  
in France in 2010,  
representing close to 10%  
of total generation

**87.2%**  
availability rate

**€560 million**  
invested between 2007  
and 2011 in the SuperHydro  
modernization program  
designed to make EDF's  
hydro fleet even safer  
and more efficient



EDF - Marc DIDIER

## Impoundment, storage, run-of-river and pumped storage stations...

Different types of installations are used depending on watercourses, relief, and the head of the water source.

- Impoundment: in the mountains (Alps, Pyrenees, the Massif Central and the Jura), lakes are built to store large reserves of water that are available to cover consumption peaks or help keep the system balanced. Potential output: 16.5 TWh.
- Storage hydropower systems, for instance those on the Dordogne and Garonne rivers, have medium-sized water reserves for covering temporary spikes in consumption. Potential output: 10.6 TWh.
- Run-of-river hydro plants, the largest of which are located on the Rhine, have no reservoirs, instead harnessing part of the flow of the water to produce electricity continuously. Potential output: 17.1 TWh.
- Pumped storage stations feature upstream and downstream basins, which can be natural or artificial. When consumption is low, water is pumped from the downstream basin into the upstream basin to build up reserves for use during high-consumption periods. Potential output: 6 to 7 TWh.
- The tidal power plant in la Rance uses tidal movements to generate electricity (540 GWh a year). —

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economic growth of the regions. This approach reflects EDF's view that hydroelectricity is more than an industrial activity; it is also one that modifies and shapes landscapes. At the same time, regions' requirements are changing, and this is changing the conditions in which infrastructure is operated in France and elsewhere. EDF aims to organize water management at the level of these regions, getting all users involved. Its overriding goal is to share water equitably, taking into account the need to protect biodiversity while also fostering the development of agriculture, tourism and industry. In the southwest of France, water becomes scarce every summer. EDF has signed agreements with local authorities calling for it to release up to 200 million cubic meters of water into the rivers. In cooperation with elected officials and local

players, the Group has launched two projects for creating Rural Excellence Clusters (*Pôle d'Excellence Rurale - PER*), called "PER RES'EAU", in the Dordogne valley and the Levézou valley in the Aveyron. The reservoirs EDF manages will play a role in drawing tourists to these regions. Along these lines, for over 20 years, under its agreement with "l'Entente Lot", EDF has been taking measures to support minimum flows in the Lot River and contributing to its integrated management. The quality of the water and aquatic environment has therefore been maintained, as have the supply of drinking and industrial water, farm irrigation and river navigation. In effect, EDF has taken into account a "second business line": managing and protecting natural environments, together with local players. —

## KEY FACTS...

### Protecting aquatic fauna and flora

- Maintaining a minimum flow downstream to allow the growth of aquatic life. This flow rate is set out in the Law on Water and the Protection of Aquatic Life (5 to 10% of average flow of waterway, depending on the facility).
- Construction of 146 passes for migratory fish.
- Research to better understand the behavior of these fish, one example of which is an experiment conducted with associations involving the radio-tracking of eels.

## Growth opportunities

Sharing knowledge and expertise to foster economic development.

### Victor Berenguel

President of the SMADESEP, a public-private entity for planning and development in Serre-Ponçon

Here in the mountains, we are used to the land, we're not used to the sea. But Serre-Ponçon is the largest reservoir in Europe. We then began to have more and more tourists come here during the summer; companies, including EDF, built leisure residences around the lake for their employees, and business requested authorizations to set up shop. The neighboring

municipalities responded on a case-by-case basis. But we needed to get organized and have a single interlocutor interact with EDF and leisure organizations. In 1997, we created the SMADESEP, whose union committee brings together 12 general advisors and 10 representatives of neighboring municipalities. We are responsible for planning amenities and equipment and for compliance with the regulations of the prefecture, including installing markers. The main thing we expected from EDF was a bona fide land management delegation that would be here for the long term. ●●●

●●●

As long as authorizations were only granted for one year, it was impossible to demand quality investments. The agreement we signed with EDF in 2008 was a step in the right direction: we were granted full rights to manage neighboring lands until the concession expires 35 years from now. Since then, we have been granting authorizations for ten-year periods, with highly demanding specifications. And it's working! The number of contracts was shrinking, but the trend has reversed today, and elected officials can choose the best service providers. The offering is broad, and "port capacity" is increasing. Winter is still our high season, but Serre-Ponçon is attracting more tourists in the summer. EDF also agreed to provide us with databases on the dam. We can thus track changes in water levels hourly and inform

**"We track changes in water levels hourly and inform users."**

users. During the summer, EDF guarantees a minimum water level, meaning we can in turn guarantee that leisure activities are available non-stop. Our main concern today is to achieve a better balance between the downstream towns, which are expanding and drawing more and more electricity and water for cities and farms, and upstream towns, i.e. the shoreline residents who must also benefit from the urban and economic growth made possible by the development of the Durance in general, and Serre-Ponçon in particular. —

### Patrick Lavarde

General Manager of the National Office for Water and Aquatic Environments

**W**e have signed agreements with players in the water industry, R&D institutes, water agencies, chambers of agriculture, and of course EDF, Europe's leading hydropower producer. EDF must find ways to comply with two directives: one saying that renewable sources should contribute 20% of electricity generated, and another saying that water bodies must be in good condition by 2015. I see two main points in our agreement with EDF.



The Roselend dam during the 2011 ten-year inspection.

EDF - Philippe ERANIAN

### KEY FACTS...

**Onema is a national public institution created in 2007** to provide the technical assistance needed by those working in the field to apply the EU directives. It oversees water-related R&D at national level, produces and posts to the internet data about the state and usage of water in France, and creates methods and tools in order to implement and evaluate policies on water.

Onema also ensures that regulations are applied and fulfills the role of safeguarding water systems. In solidarity with overseas territories, it finances infrastructure projects for water basins, especially in terms of sanitation. It also provides financing for the national program to reduce phytosanitary products by 50% in ten years.

The first relates to information sharing. EDF will have access to our national databases, while we will be able to consult the documentation on water

**"Measuring the impact of flow variations on the biological balance: a promising example of cooperation with EDF."**

temperatures that EDF has compiled over 40 years for the rivers near its plants. These records of water temperature trends over long periods, crucial to aquatic life, constitute invaluable information. The second is our R&D agreement. EDF's Chatou facility is one of the leading laboratories on hydropower in Europe. We are engaging in very promising cooperation around important issues such as the

impact of flow variations on the biological balance. This research should help us establish river regime modulations reserved for the needs of aquatic fauna, depending on the season. Another key theme is the ecological continuity of waterways, a provision included in the "green" and "blue" frameworks of the French national conference on the environment. This relates to the displacement of sediments, as well as the circulation of protected migratory species like eels. Where the latter are concerned, EDF, Onema and other players are working together in a €4 million program to gather knowledge about species behaviors and come up with technical solutions to reduce the impact of turbines and design systems to guide the eels toward specific passes. —

### Vincent Descœur

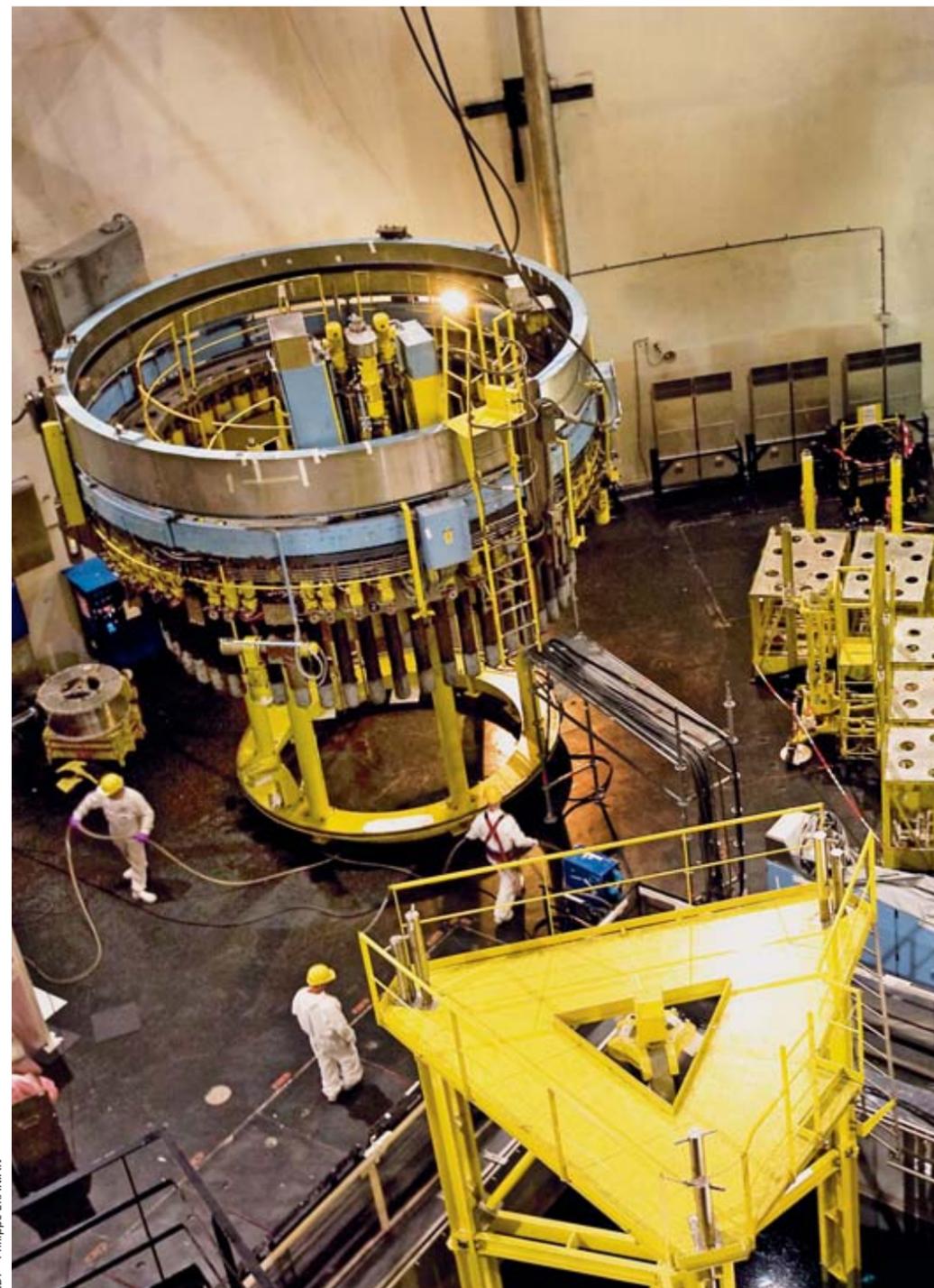
President of the National Association of local officials in mountain regions (ANEM)

**T**here is a natural link between hydroelectricity and the mountains. Referred to as the "water tower of France", the mountains and hydroelectricity play an active role in electricity generation, raising the question of solidarity between upstream and downstream. The fact that there is a relationship between elected officials and concession-holders is not surprising: we did not wait until it came time to renew the concessions to state our priorities and concern about producers fitting into the regional fabric. —

# Safety at the nuclear power plants

Nuclear safety encompasses all of the technical, human and organizational measures applied to protect, under all circumstances, people and the environment from a potential release of radioactive products. EDF is vigilant about each of these measures at every step of its power plants' lifespan, from design and operation to maintenance and decommissioning.

The accident at the Fukushima nuclear power plant in Japan has raised questions throughout the world about the risks associated with civilian nuclear power and what is being done to prevent them. This report provides information about the safety measures in place at EDF's power plants in France.



EDF - Philippe ERANIAN

## KEY FACTS...

### French Nuclear Safety Authority (*Autorité de Sûreté Nucléaire* - ASN)

Set up by a law passed in 2006, the ASN is an independent administrative authority tasked, on behalf of the State, with:

- regulating nuclear safety and radiation protection as well as civilian nuclear activities;
- protecting workers, patients, the public and the environment from the risks associated with nuclear activities;
- informing the public in an entirely transparent manner.

The ASN is governed by a commission of five commissioners, including a chairman, who can only be relieved of their duties in exceptional circumstances, and are required to perform them with impartiality. Commissioners are appointed for six years, three by the President of the Republic and one by the president of each parliamentary assembly.

## Factoring safety into design

### Identifying and preventing risks

During the design stage, a safety report is drawn up for every nuclear power plant, listing all potential natural risks (earthquakes, floods, storms) and those that could arise during operations (loss of power supply, loss of cooling functions, etc.). Each risk is evaluated and factored into the choice of design (buildings, dikes, etc.) or materials (safety doors, for instance). Risks and design systems are reevaluated every decade during the ten-year inspections conducted by the French Nuclear Safety Authority, and after all major events in France or elsewhere so feedback can be integrated.

### Redundant systems

EDF systematically takes into account all possible technical failures and protects itself from these with redundant protective barriers.

- Three airtight barriers to prevent radioactive products from being dispersed into the environment

- 1<sup>st</sup> barrier: the hermetic metal cladding (pencil) surrounding the fuel (uranium fuel pellets).

- 2<sup>nd</sup> barrier: the closed and hermetic primary circuit containing the water used to evacuate heat emanating from the reactor core and for fuel cooling.

- 3<sup>rd</sup> barrier: the containment that surrounds and insulates the reactor. It comprises one concrete wall the inside of which is lined with steel (900 MW reactors) and/or two concrete walls with a space between them (other reactors).

- All plants have two if not three safety systems, so that if one system ceases to function a backup system replaces it.

- There are three, and in some cases four, sets of measurement devices.

- Other equipment is used for some safety functions. For instance, an electric pump is used to circulate water inside circuits, and a backup pump powered by a steam turbine is available in case the electric motor fails.

- Redundant systems and equipment are installed in physically separate locations to avoid more than one system or piece of equipment serving the same purpose becoming unavailable at the same time. —

## KEY FACTS...

### Five power sources

Power supply is crucial to safety. The plants have five separate electric power sources: two connected to the power grid and three backup sources linked to diesel or gas turbine generators.

Annual maintenance budget of €2 billion to guarantee the highest level of safety.



## Operating safety: discipline, surveillance and feedback

In-depth defense requires a focus on three specific areas: prevention, surveillance and actions taken to limit the consequences of a failure.

The operators who run the generation unit from the control room have strict rules to follow. If an event occurs, automatic systems kick in to bring the reactor back to its normal state of operation; operators get information in real time, allowing them to take necessary actions.

### Training to guarantee operating discipline

Plant operators are trained to comply to the letter with operating rules and procedures.

New employees start with a 14-week course at the Generation and Engineering Training Unit (*Unité de formation production ingénierie - Ufpi*), where they acquire the basic skills required to work in a nuclear zone. They are only accredited to work in one after their behavior in the field has been observed. The next step is a "professionalization" course, ranging from two months for valve workers to two years for control room operators. This course includes initial training, followed by skills maintenance and advanced training work. Progress is evaluated at each step through certification. All plants are equipped with simulators that model the control room, allowing new and more senior employees to practice responses to all situations. The Ufpi has a main simulator that can reproduce more than 1,000 failures as well as a miniature plant and mini-simulators on which employees can be trained to respond to specific phenomena. The goal is for everyone to be familiar with a wide range of phenomena that can affect the circuits, fuel, temperature, etc.

### Maintenance to guarantee reliability

Every two to three years, partial inspections are organized during fuel reloading and maintenance work.

The reactors and equipment, especially parts that cannot be accessed during operations, are shut down and carefully inspected. More than 10,000 checks are scheduled. Everything is verified, from the piping to the alternators, including the 3,000 tubes of the steam generators. EDF works in cooperation with the French nuclear safety authority, which oversees the quality of its work as well as security and radiation protection. Once the work is completed, EDF sends a report to the safety authority, which analyzes it to determine whether or not the reactor can be put back on line.

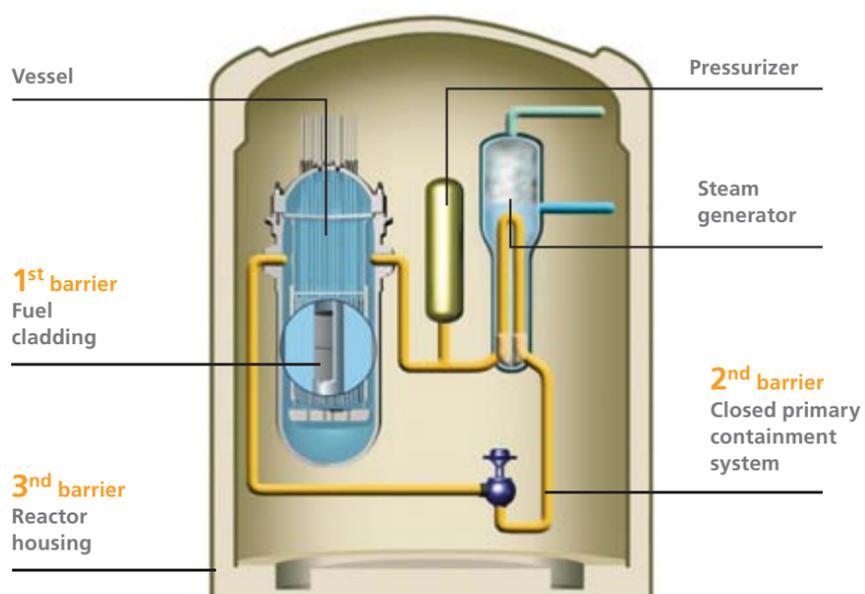
### Feedback to move forward

Feedback gathered by EDF and other nuclear operators worldwide serves to enhance safety (design and operation) thanks to analysis of malfunctions. This feedback is then factored into the periodic reviews of EDF plants. Specific safety reviews are also organized whenever important events occur in France or elsewhere.

For instance, after the Three Mile Island accident in 1979, EDF added more lines of defense at its plants: safety engineers were trained to carry out independent surveillance, simulators were installed in each plant to train operators, and security and operations systems redundancy were strengthened.

After the storm of 1999 partially flooded the Blayais plant and led to its shutdown, with the loss of electricity networks and the partial loss of the pumping station, EDF added three preventive measures against extreme flooding risks: it increased the height of dikes and strengthened them, improved the watertightness underground in the surrounding area, and deployed a weather warning system. [See page 06](#)

### Reactor building: three safety barriers between nuclear fuel and the environment



### Factoring in risk: flooding

#### Design stage

Nuclear power plants located near the sea or rivers were designed on platforms the height of which was calculated to ensure that they could never be flooded.

#### Constant improvement

The 15% increase in the Enhanced Safety Height (*Cote Majorée de Sécurité - CMS*) ordered by the French nuclear safety authority in 1984 resulted in an even greater safety margin. EDF recalculated the CMS for the sites already built and added additional waterproofing systems.

Drawing lessons from the 1999 storm, when waves from the estuary of the Gironde River went over the protection dike at the Blayais power plant, EDF reviewed its safety systems and carried out work at several sites.

### Factoring in risk: earthquakes

#### Design stage

Plants are designed to resist earthquakes twice as intense as the most powerful one recorded in the previous 1,000 years at the site. Significant margins are then added to this calculation basis.

#### Regular inspections

EDF regularly inspects its sites and integrates the latest technical advances and feedback from France and other countries, particularly during the ten-year inspections conducted under the supervision of the French nuclear safety authority.

#### Significant investments

Since 1977, EDF has invested €500 million to adapt its facilities to earthquake risks.

KEY FIGURES

ASN inspections

**100%**  
of the 900 MW reactors passed their second ten-year inspection and three have passed a third ten-year inspection.  
**14** (out of 20) 1,300 MW reactors have passed their second ten-year inspection  
**2** (out of 4) 1,450 MW reactors have passed their first ten-year inspection

International inspections

**1**  
OSART per year at an EDF plant (Saint-Alban in 2010)  
**3** Peer Reviews per year on the EDF fleet



**2,300,000 hours of training provided in 2010, of which 353,500 on simulators.**

EDF - Philippe EBANIAN

Operating safety (continued)

Inspections

The 19 nuclear power plants are regularly inspected by independent and internal experts, both national and international.

Inspections by the French nuclear safety authority

- Every year, French nuclear safety authority ASN conducts some 450 regulatory site inspections, of which about 50 are unscheduled.
- In addition, during the ten-year inspections, risks and design systems are reevaluated factoring in feedback received, technological progress, and regulatory changes. Safety targets are set by the ASN. EDF proposes ways to meet them, and implements solutions after approval by the ASN. Once ten-year inspections are completed, the ASN decides whether or not reactors can be kept in service for another ten years. Key components, such as the reactor vessel, primary circuit and interior of the reactor building, are subjected to in-depth testing.

International inspections

Nuclear operators across the world regularly conduct inspections and reviews to share their experience.

- OSARTs<sup>1</sup> conducted by the IAEA<sup>2</sup>, at the request of the ASN, are designed to generate recommendations and spread best practices.
- Peer reviews conducted by the WANO<sup>3</sup> are organized at EDF's request. They focus on evaluating safety performances in relation to international best practices.

Internal inspections by EDF experts

- Power plants: internal control services ensure that safety and quality rules are complied with during operations and maintenance.
- Nuclear Generation Division: the nuclear inspection service conducts about 60 general inspections including comprehensive safety inspections that take three weeks and mobilize about 30 inspectors.
- EDF Group: the Inspector General for Nuclear Safety and Radiation Protection, who reports directly to the

Chairman and CEO, publishes a report once a year. These reports can be found on the EDF website at edf.com.

Classification of events on the INES scale

In use since 1991, the international nuclear event scale, INES<sup>4</sup>, can be applied to any event occurring in facilities or during the transportation of radioactive materials. Events are ranked on a scale of 0 to 7 depending on their level of significance, using three criteria: on-site impact, off-site impact, and degradation of defense in depth. In 2010, EDF reported 600 safety deviations rated at level 0 on the INES. In most cases, these deviations were the result of non-compliance with procedures and did not entail any safety impact. For instance, a pump that is not used during normal operations must

be tested regularly. If the test is delayed by a few hours, EDF reports the event to the ASN.

EDF also reported 68 significant safety events rated at level 1. Like those rated at level 0, these had no impact on safety: rather, they were attributable to shortcomings with regard to the "safety culture", resulting in an error, even a non-serious one, being repeated. The repeated use at several sites of two different types of lubricant, when only one is authorized, was classified as a level-1 incident. In 2010, EDF did not report any level-2 safety significant events.

EDF also reports events relating to the environment, radiation protection and transportation to the ASN. It reported one level-2 radiation protection event in 2010, after a staff member picked up a contaminated object.

1. Operational Safety Review Team.
2. International Atomic Energy Agency.
3. World Association of Nuclear Operators.
4. International Nuclear Event Scale.

➔ TO FIND OUT MORE:  
<http://rapport-dd.edf.com>

KEY FIGURES

Internal EDF inspections

**15**  
inspections a year on each reactor by EDF internal control services.  
**1** general safety inspection per plant every three to four years by the EDF nuclear inspection service.  
**60** annual inspections of the fleet by the EDF nuclear inspection service.  
**1** annual report published by the Inspector General for Nuclear Safety and Radiation Protection.

International Nuclear Event Scale (INES)

7	Major accident
6	Serious accident
5	Accident with wider consequences
4	Accident with local consequences
3	Serious incident
2	Incident
1	Anomaly
0	Deviation. No safety significance.

AFTER FUKUSHIMA...

After Fukushima, EDF, in its role as operator-designer-constructor, has developed short-, medium- and long-term plans of action in its continual effort to improve the safety and performance of plants. On April 21, 2010, Henri Proglio presented EDF's three initial proposals to the French nuclear safety authority:

- evaluation of the resources that can be mobilized in the event of an accident,
- creation of an EDF rapid response taskforce operational within 24-48 hours on-site, consisting of a workforce, dedicated transportation, and supplementary electricity and water supply,

- in-depth reassessment of the design of the reactors and storage pools to ensure sufficient margins of safety in case of seismic activity, flooding, electricity outages and failure of cooling systems. These measures will be implemented by end-2011. The evaluations and safety reviews will be carried out under the supervision of the French Nuclear Safety Authority (ASN). The French Prime Minister, in keeping with the EU decision to conduct stress tests at all nuclear plants in Europe, has requested that they be part of the safety inspections conducted by the ASN at all nuclear plants in France.

## Management of nuclear accidents

EDF and public authorities have created two closely coordinated plans to respond to emergency situations. These plans are tested regularly.

### Internal emergency plan (*plan d'urgence interne* - PUI)

This plan, which EDF is responsible for implementing, calls for the immediate mobilization of the technical and human resources required to assure that the facility is made safe and that consequences for people and property, on-site and in the environment, are minimized. About 100 people are on duty at all times at each plant in case mobilization is required.

If the PUI is activated, EDF sets up a local command post to coordinate efforts on-site. EDF, the ASN and Radiation Protection and Nuclear Safety Institute (*Institut de radioprotection et de sûreté nucléaire* - IRSN) mobilize incident experts across France.

As long as the PUI remains in effect, EDF keeps the government, the media and the public informed.

### Special intervention plan (*plan particulier d'intervention* - PPI)

The prefect is responsible for implementing this plan and taking any measures required to protect people and the environment in cases where there is a recognized risk of leakage. These include mobilizing teams responsible for measuring and detecting radioactivity, informing the public, ordering the public to take iodine tablets, mobilizing hospitals and specialized centers, and organizing the setup of shelters or evacuations. The ASN and IRSN evaluate the situation at the national level and provide technical assistance. If the situation so requires, the government and minister of the interior may mobilize the Interministerial Crisis Management Operations Center (*Centre opérationnel de gestion interministérielle de crise* - COGIC).

### Regular drills

The PUI and PPI are tested on a regular basis. These drills ensure that the EDF teams are prepared for incidents. Several times a year, EDF also tests its local and nationwide organizational structures and ensures that they are coordinated with those of the government, the ASN and the IRSN. An average of 10 PUI drills are organized at every nuclear power plant. Larger-scale drills, overseen by public authorities, are organized every three years at each nuclear power plant. Additional, local drills focus on specific themes such as fire prevention, the environment, transportation, search and rescue, etc. ■



EDF - Philippe ERANIAN

# Local authorities rising to the energy challenge

Local authorities are being given more and more responsibility: now tasked with devising energy policies, climate plans and renovating low-income housing, they are playing a leading role in building a new, more environmentally-sound energy future. Even urban development projects now factor in energy in all of its facets - consumption, networks and generation - by developing low-energy and even energy-producing residences, coming up with new modes of transportation and fostering new business zones.

In these pages, elected officials and regional representatives discuss their expectations and how they are cooperating in the field with EDF's teams.



EDF - Philippe ERANIAN

## "Building a city requires teamwork"

Five questions for Jean-Marc Offner, General Manager of l'a-urba, the Bordeaux Métropole Aquitaine town planning agency

### What is l'a-urba?

**J.-M.O.:** "L'a-urba is a forum for studying and generating new ideas about issues relating to urban development, transportation, the environment and regional development. We work with major public bodies like the city and urban community of Bordeaux, the department, the region, the university and the Bordeaux-Mérignac airport."

### How did you first get in contact with EDF?

**J.-M.O.:** "For the agency's fortieth anniversary, we organized an exhibit in Bordeaux, from December 2010 to May 2011, and there were a number of events addressing the issues of transportation, energy, water and housing. This was when EDF came onto the scene. The main idea behind these events was to show that

those in the energy, water and transportation industries play just as much a role in "building cities" as locally-elected officials and architects, and that the right people must be on board for these projects."

### In what way are these economic actors affected by urban development?

**J.-M.O.:** "They are involved because their projects are transformative, and because energy is an increasingly local service. Energy issues are being transferred to the regions due to the new forms of generation being developed, linked in large part to decentralized renewable energies. Elected officials are also focusing more and more on environmental and energy issues as they seek to stay in step both with public expectations and regulations that are increasingly demanding. ●●●

**Serving communities by working with elected officials on climate and energy policies.**

### Serge Grouard

Member of Parliament from the Loiret, Mayor of Orléans

"Our first goal is to put the concepts behind the French national conference on the environment into action, starting with measures that are fundamental, concrete and efficient. Of our 215 municipal buildings, we identified the ones that consumed the most energy and devised thermal and energy renovation plans for them. Low-income housing units are being revamped in several neighborhoods, in the aim of reducing their energy bill by 50%. For new housing, our programs are not far from the "BBC" (low-consumption building) standard [...]. Carbon-free vehicles are hitting the market, and local authorities should play a key role in encouraging economic players to help keep up this new momentum. The City of Orléans will have its network of public charging stations up and running early in 2011. People can say



Gianni VillarAndria

what they will about global warming, but sustainable development is a real source of competitiveness and progress for our country. France is in an extraordinary position thanks to its world-renowned engineering capacity in all sectors, including transportation, water and energy. Local authorities can leverage the expertise and innovation potential of a large firm like EDF when deciding on the most relevant approach to sustainable local development." ■

## Five questions for Jean-Marc Offner (continued)

This is why we need EDF to be involved early on in projects."

## How far along is your cooperation with EDF?

**J.-M.O.:** "We are just getting started. The idea is to get EDF on board very early on, as the greater Bordeaux area defines its strategy, to help assess energy needs and offer innovative solutions. This will be all the more important as the region moves closer to its target of having a population of 1 million by 2030 (730,000 today). We want to make sure EDF plays a central role in 'building' the greater Bordeaux area."

## What do you expect from EDF?

**J.-M.O.:** "We expect EDF to go beyond its role as a generator and distributor of energy, and tackle new urban energy issues, taking urban and regional considerations into account, while bringing the right players together to form networks of state-of-the-art expertise that are credible and can play a key role in reinventing urban centers. EDF can also share with us its expertise in the organizational and urban effects of specific techniques, and deliver new ideas for urban services such as electric bicycles, smart street furniture or combinations of services." —

## Serving communities by working with elected officials on climate and energy policies. (continued)

## Dominique Baert

Member of Parliament and Mayor of Wattrelos

"We expect EDF to provide logistics and/or financial support when we engage in certain sustainable development projects, and maybe even to develop alternative solutions, for instance building a photovoltaic plant on a former industrial site. For older residential buildings, home to the most vulnerable families, we are supporting work to provide more comfort (better heating, less humidity and a healthier environment) and save on their energy bills since heating expenses are considerably reduced." —



Didier GOUPY

## Marc Baietto

President of the Grenoble-Alpes Métropole ("La Métro") Agglomeration Community

"We look to EDF for its experience and expertise. It is already working with us on a number of sustainability projects, including the promotion of renewable energies with micro hydro plants, the deployment of a fleet of electric vehicles, and the creation of an efficient lighting campaign. Our goal is to consolidate this partnership for the long term so that we can work together to promote the values of service to communities." —

## Jean-Marc Ayrault

Member of Parliament and Mayor of Nantes, President of Nantes Métropole

"Urban areas are responsible for an estimated 75% of CO<sub>2</sub> emissions. The City of Nantes decided to include a Climate Plan with its other public policies (water, energy, etc.). Approved in 2007, the plan aims to give fresh impetus to and ensure consistency between these various policies, making sure they all promote lower CO<sub>2</sub> emissions. Today, the plan is in a new phase, and the EDF Group has been asked to contribute its experience, ideas, expertise and low-carbon solutions. During this phase, we are putting the emphasis on interaction at local level, both with individuals and economic actors." —

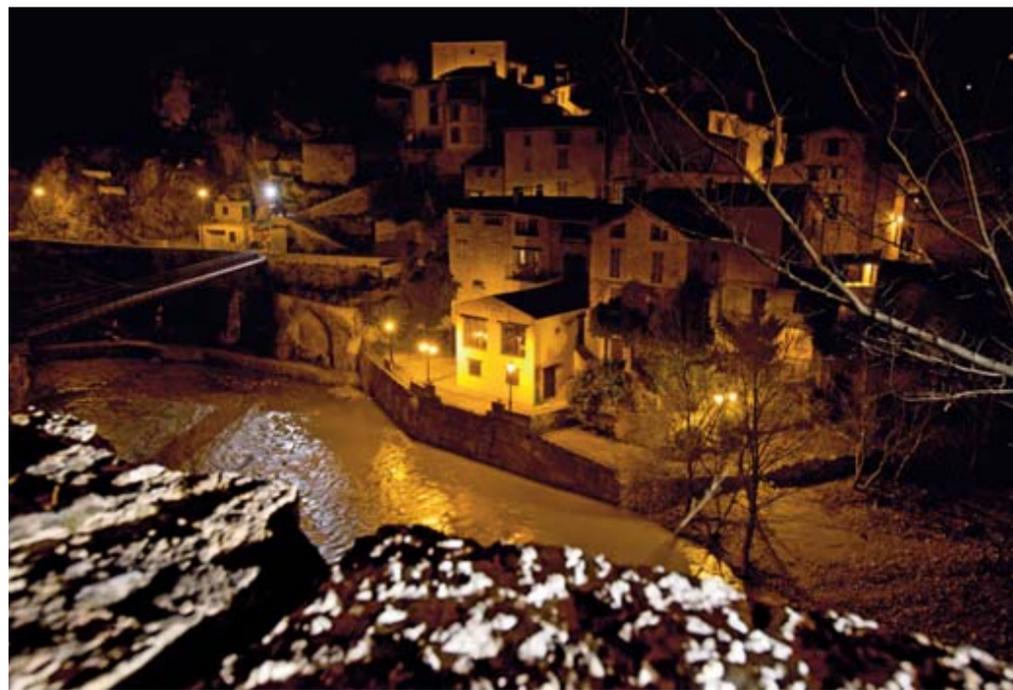
## Alain Duclercq

Mayor of Mesnil-en-Thelle, Vice-President of the Pays de Thelle Association of Local Authorities

"Like most mayors of small municipalities, I have a professional activity: I am a doctor, and have no specific technical or legal skills in the field of energy. This means I need to work with experienced and trustworthy professionals. I know that I can count on my EDF sales advisor: when I leave a message on his cell phone, he always gets back to me very quickly and does whatever needs to be done. He is also an invaluable source of ideas. Small municipalities are very keen to contribute to the country's efforts to save energy, reduce greenhouse gas emissions and develop renewable energies. I am grateful that I can go to my EDF sales advisor for advice on all of these issues." —



Daniel VERNET



EDF - Philippe ERANJIAN

EDF has initiated, along with local authorities, a program to cut back on energy consumption in public lighting systems in the rural areas of the Esteron valley near Nice. Some 1,300 lamps have been replaced and their intensity can now be adjusted remotely in response to surrounding light levels. The result: energy savings of 53%. Shown here: the village of Gilette.

## Partnerships to reduce public spending on energy

## Jean-François Negret

Mayor of Meschers-sur-Gironde

"The public lighting system in Meschers was old, and accounted for 53% of our annual electricity bill. We wanted an overall review of the system and advice from experts on the quality of our lighting and security. In a word, EDF's recommendations on how to cut our energy spending were anxiously awaited. And we followed them, replacing old lamps with more efficient, closed ones equipped with high-pressure sodium lights. EDF also found that we could save energy and reduce our greenhouse gas emissions by managing the amount of time lights were kept on as well as the level of lighting. Here again, we took on its suggestion, installing systems that manage, adjust and regulate lighting so that power supply varies depending on our needs (...) while maintaining the level of comfort and security the public expects. Our public lighting system now consumes almost 15% less energy than before, and our energy bill has dropped by €3,500; at the same time, we have been helping move toward the targets laid out during the French national conference on the environment." —

## Hélène Venturino

City Councilwoman responsible for renewable energies and lighting in the City of Marseille

"Lighting makes up about 40% of regional authorities' electricity consumption. EDF's plan to light rue Thubaneau with LEDs\* was part of the Efficient Energy program agreed on by the city and EDF. The objective of this experiment was to reduce energy consumption by half and quadruple the lifespan of the lamps. About a dozen lamps were replaced by ones equipped with LEDs. We tracked the experiment throughout 2010.

Thanks to EDF's photometric measurements and analysis of electricity consumption levels, we will be able to see whether LED-based public lighting is indeed the solution we have been looking for." —

## Yves Detraigne

Senator from the Marne, President of the Plaine de Bourgogne Association of Local Authorities

"Regional authorities have until 2015 to ensure that all public amenities meet accessibility standards. We plan to take advantage of this mandatory construction work to renovate buildings and improve their energy performance. In 2010, we signed a memorandum of understanding with EDF on energy efficiency. EDF is committed to the idea of quality public service. It fully understands the issues facing regional authorities. For locally-elected officials, EDF is an obvious partner for promoting sustainable development, and all agree that it meets their expectations in terms of assistance and advice." —

## Sébastien Billard

Director General of SIEMOR (semi-public company comprising Oissel and its region, managing more than 700 rental properties in Upper Normandy)

"A review of the efforts undertaken within the framework of EDF's *Montant de charges* solution was very positive. Working with EDF has been financially beneficial, not only via the energy saving certificate scheme but also through its energy renovation expertise, recommending minimum performance levels and validating the quality of the renovation process. Our tenants are very pleased, and their heating bills should decline by 15%." —

\* Light-emitting diode