

## **Station 1 - THE FORMER HOME OF THE “BARRAGISTE”**



**1 /** This building is the former home of the “barragiste”, the dam keeper. A small 60 m<sup>2</sup> terrace offers a remarkable view of the lake’s final meander, the dam and the power plant. It has been designed to allow visitors to learn about the extraordinary story of “white coal” (*hydroelectric power*), the role played by large hydroelectric reservoirs in the natural spaces of the Lot and Truyère river valleys, as well as water management from the area downstream to the confluence with the Garonne River.

### **We hope you enjoy your visit!**

We are very sorry. For technical reasons, this area is not accessible to people with reduced mobility today.

### **Free entrance**

### **2 / Content of the exhibition**

The story of the construction of the Castelnau-Lassouts hydroelectric complex

Facilities in the Lot-Truyère basin

The environment and biodiversity

The Natura 2000 area

The main species of interest

Fishing and fishery resources

The lake’s birds

The challenges of hydroelectricity

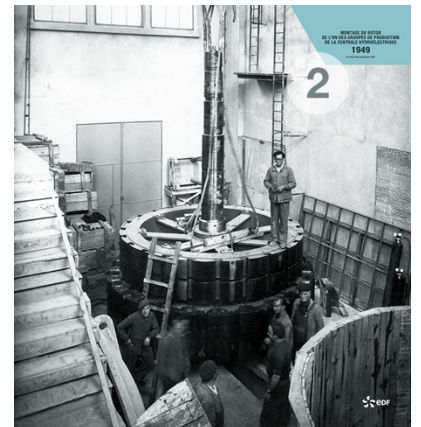
Focus on the power plant, the dam and the reservoir.

## Station 2 - LARGE FORMAT PHOTOS FROM LEFT TO RIGHT

**1 /** Construction of the Mousseaux diversion channel



**2 /** Installation of the rotor for one of the generating units in the hydroelectric plant



**3 /** Aerial view of the construction of the Castelnau-Lassouts dam



### Station 3 (front panel)

Constructed between 1941 and 1949, the Castelnau-Lassouts dam and its power plant, represent the main facility for EDF in the Lot Valley.

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## 1 / A challenging project

The work began in 1941, in the middle of the Second World War. It must be said that the project, initiated under the aegis of the Société Hydroélectrique du Massif Central (the SHEMC), dates back to 1928-1929 and that the requirements at that time in terms of strategic energy were crucial. The shortage of materials and labour was apparent: a hundred men on the ground during the winter of 1943-1944, and around sixty in December 1944. The situation improved from 1945 onwards. The construction site subsequently provided work for up to 1,200 people.

At the same time, the SHEMC was experiencing difficulties. The cost of the work, which was estimated at 100 million Francs, rose to 165 million Francs for the year 1946 alone, due to the sharp rise in prices during and after the war! The arrival of EDF, in 1946, enabled the project to be saved. The hydroelectric complex was opened on 11th December 1949 in the presence of the Minister for National Defence, Paul Ramadier, and the Minister of Industry and Commerce, Robert Lacoste

## Why here?

Steep-sided, very sparsely populated, this part of the Lot Valley was the perfect location. The proximity of Espalion, with its railway station and relative accessibility was a further advantage.

The creation of a 4 km-long access road between the site and the main A road, now a by-road, was sufficient. A lot less work than for other sites!

However, compensation for the purchase of land was hard to manage.

We still have a memory of the “40 stubborn ones” contesting every attempted agreement and settlement.

## **2 / Dam workers**

The loss in the trenches of the First World War of entire age-groups and the situation in 1940 resulted in a shortage of labour. In Castelnau-Lassouts, as on all large construction sites, many foreign workers needed to be called upon: Republican refugees from the Spanish Civil War and workers originating from the colonies formed the 319<sup>th</sup> foreign work brigade at Espalion, with anti-fascist refugees, Italians, Yugoslavians, Poles, North-Africans and others. They were joined by The Vichy Government’s Compulsory Work Service, the Youth Brigade, and then, later, German prisoners. The majority of this manpower, occasionally accompanied by families, was housed in Espalion, with it being said that the “*dam people*” had “*doubled its population*”. Here, there were only around ten or so workers huts near the dam, within the municipality of Lassouts.

In the year 1942 alone, during preliminary work, there were 27 casualties, a number of whom would remain severely disabled. In total, 10 men lost their lives on the construction site.

## **3 / Les Mousseaux put to work**

Les Mousseaux? It is quite simply a small “boralde”, which runs down from the Aubrac Plateau and joins the River Lot at a meander immediately downstream of the dam. A stretch of it was captured and feeds the reservoir at the Castelnau-Lassouts dam by means of a 1.5 km-long headrace.

A boralde is the local name for a tributary on the right bank of this part of the River Lot.

Left: photo 1

**A site crane collapses causing the death of a worker.**

Left: photo 2

**Dam spillway construction site.**

Top: photo 1

**General view of the construction site, the spillway and the dam, upstream of the latter. La Conillerie temporary town.**

Top: photo 2

**Dam diversion tunnel, which allows water to be diverted from the River Lot, enabling construction site labourers to work on a dry site.**

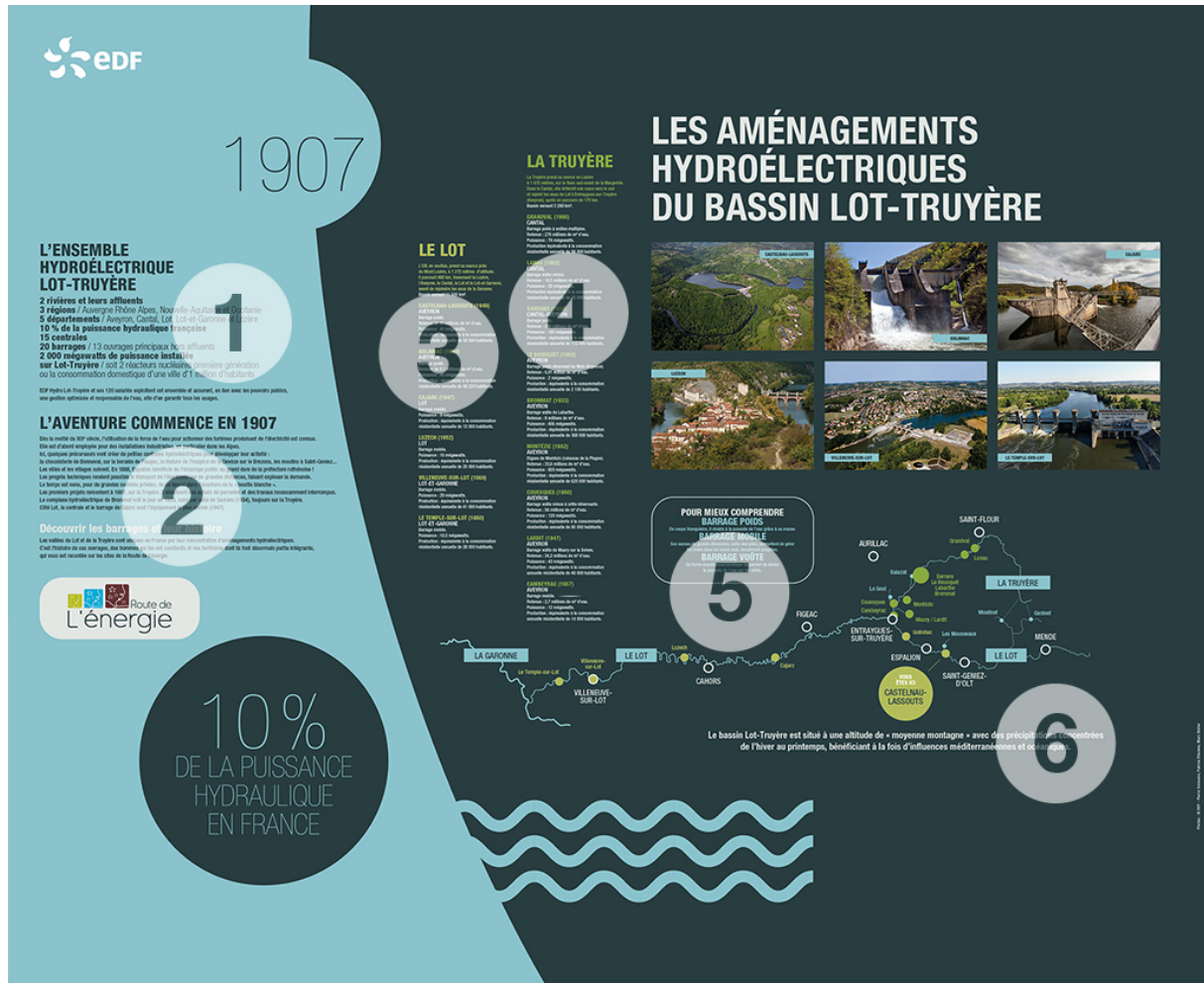
In colour

**Les Mousseaux reservoir**



## Station 3 (rear panel)

# HYDROELECTRIC FACILITIES IN THE LOT-TRUYERE BASIN



## 1 / The hydroelectric network in the Lot-Truyère basin comprises:

- 2 rivers and their tributaries
- 3 regions / Auvergne Rhône Alpes, Nouvelle-Aquitaine and Occitanie
- 5 departments / Aveyron, Cantal, Lot, Lot-et-Garonne and Lozère
- 10% of French hydroelectric power
- 15 power plants
- 20 dams / 13 main structures excluding tributaries
- 2,000 megawatts of installed power in the Lot-Truyère basin / i.e. 2 first-generation nuclear reactors or the domestic consumption of a city of 1 million people

EDF Hydro Lot-Truyère and its 120 employees run this network and guarantee, in conjunction with the public authorities, optimised and responsible water management, in order to ensure its availability for all uses.

## 2 / The adventure began in 1907

The use of the force of water to drive turbines generating electricity has been recognised since the second half of the 19th century. The technique was first deployed in industrial facilities, in particular in the Alps.

Here, a few pioneers created small hydroelectric power plants to grow their businesses: the chocolate factory in Bonneval, on the Flaujac boralde, the spinning mill at the Hospice de la Devèze on the River Brézons, the mills in Saint-Geniez and others.

Towns and villages followed. In 1888, Espalion benefited from street lighting much to the displeasure of the city of Rodez! Technical progress made it possible to transport electricity over great distances, which caused demand to soar. The time had come for large private companies to join the “white coal” (*hydroelectric power*) adventure. The first projects date back to 1907, on the River Truyère. This was followed by constantly interrupted purchases of land and work.

The Brommat hydroelectric complex was built in 1933, followed by the Sarrans plant (1934), both on the River Truyère.

As for the River Lot, the Cajarc power plant and dam are the oldest facilities (1947).

### **Learn about dams and their history**

The Lot and Truyère Valleys are unique in France with their concentration of hydroelectric facilities.

It is the story of these structures, the men that built them and the regions that they now form an integral part of, which is told on the sites along the Energy Route.

## **3 / The LOT**

The *Olt*, in Occitan, has its source close to Mont Lozère, at an altitude of 1,272 metres.

From there it begins its 480-kilometre journey flowing through Lozère, Aveyron, Cantal, Lot and Lot-et-Garonne, before joining the waters of the Garonne River.

Catchment area 11,500 km<sup>2</sup>.

### **CASTELNAU-LASSOUTS (1949)**

#### ***Aveyron***

Gravity dam.

Reservoir holding 41 million cubic metres of water.

Power: 41 megawatts.

Production: equivalent to the annual residential consumption of 34,500 people.

### **GOLINHAC (1960)**

#### ***Aveyron***

Gravity dam.

Reservoir holding 5.1 million cubic metres of water.

Power: 45 megawatts.

Production: equivalent to the annual residential consumption of 58,220 people.

### **CAJARC (1947)**

#### ***Lot***

Weir.

Power: 9 megawatts.

Production: equivalent to the annual residential consumption of 13,000 people.

### **LUZÉCH (1952)**

#### ***Lot***

Weir.

Power: 16 megawatts.

Production: equivalent to the annual residential consumption of 25,000 people.

## **VILLENEUVE-SUR-LOT (1969)**

### ***Lot-et-Garonne***

Weir.

Power: 29 megawatts.

Production: equivalent to the annual residential consumption of 41,000 people.

## **LE TEMPLE-SUR-LOT (1950)**

### ***Lot-et-Garonne***

Weir.

Type: gate structure dam.

Power: 18.5 megawatts.

Production: equivalent to the annual residential consumption of 28,000 people.

## **4 / The TRUYÈRE**

The River Truyère has its source in the Lozère at an altitude of 1,470 metres, on the south-western slopes of the mountains of La Margeride.

In the Cantal, it changes its course to the south and joins the waters of the River Lot at Entraygues-sur-Truyère (Aveyron), after a journey of 170 km.

Catchment area 3,280 km<sup>2</sup>.

## **GRANDVAL (1959)**

### ***Cantal***

Multiple-arch gravity dam.

Reservoir: 270 million cubic metres of water.

Power: 74 megawatts.

Production equivalent to the annual residential consumption of 56,300 people.

## **LANAU (1962)**

### ***Cantal***

Thin arch dam.

Reservoir: 18.5 million cubic metres of water.

Power: 20 megawatts.

Production to the annual residential consumption of 20,000 people.

## **SARRANS (1934)**

### ***Cantal- Aveyron***

Gravity dam.

Reservoir: 296 million cubic metres of water.

Power: 183 megawatts.

Production: equivalent to the annual residential consumption of 112,000 people.

## **LE BOUSQUET (1952)**

### ***Cantal***

Mels (Argence) overflow gravity dam.

Reservoir: 0.01 million cubic metres of water.

Power: 2 megawatts.

Production: equivalent to the annual residential consumption of 2,100 people.

## **BROMMAT (1933)**

### ***Aveyron***

Labarthe arch dam.

Reservoir: 8 million cubic metres of water.

Power: 406 megawatts.

Production: equivalent to the annual residential consumption of 368,000 people.

## **MONTÉZIC (1982)**

### ***Aveyron***

Montézic dykes (the La Plagne stream).

Reservoir: 33.6 million cubic metres of water.

Power: 920 megawatts.

Production: equivalent to the annual residential consumption of 620,000 people.

## **COUESQUES (1950)**

### ***Aveyron***

Thin arch dam with spillway crest.

Reservoir: 56 million cubic metres of water.

Power: 120 megawatts.

Production: equivalent to the annual residential consumption of 90,000 people.

## **LARDIT (1947)**

### ***Aveyron***

Maury sur la Selves arch dam.

Reservoir: 34.2 million cubic metres of water.

Power: 43 megawatts.

Production: equivalent to the annual residential consumption of 46,000 people.

## **CAMBEYRAC (1957)**

### ***Aveyron***

Weir.

Reservoir: 2.7 million cubic metres of water.

Power: 12 megawatts.

Production: equivalent to the annual residential consumption of 14,000 people.

## **5 / For clarification**

*Gravity dam: with a triangular cross-section, it holds back water by its sheer size.*

*Weir: its large gates, between piers, enable floods in downstream, heavily populated areas, to be managed.*

*Arch dam: its characteristic arched form enables it to deflect the force of water to its sides.*

**6 /** The Lot-Truyère basin lies at a “low mountain” altitude with a concentration of precipitation in the winter and spring, benefiting from both Mediterranean and Oceanic influences.

The map shows the entire Lot-Truyère basin as far as the confluence with the Garonne River. In the photo, the 6 facilities on the Lot.



## Station 4 (front panel) - IN A REGION OF BIODIVERSITY

### 1 / In a region of biodiversity

The Upper Lot Valley is a protected area due to the quality of its natural habitats and the value of the species living there. Although the creation of the Castelnau-Lassouts dam reservoir changed the natural course of things, it now forms an integral part of these landscapes and is contributing to the development of biodiversity.

### 2 / Natura 2000 zone

This area extends from Saint-Laurent d'Olt to Espalion in the upstream section of the Lot, encompassing the Lake of Castelnau-Lassouts-Lous. It also covers the Central Lot Valley, upstream of the confluence with the Dourdou, as well as the Truyère and Goul gorges. This classification was awarded thanks to the presence of two particularly rare species, the European otter and the sculpin, as well as the diversity of aquatic, forested and open space habitats that are found along the River Lot. This Natura 2000 zone is enhanced by a classification as a Natural Zone of ecological interest, fauna and flora, ZNIEFF, which also covers the Lot flood plain and adjoining spaces. It extends over an area of 2,560 hectares, from Saint-Laurent d'Olt to Bouillac, downstream of Decazeville.

### 3 / Natura 2000, what is it ?

The purpose of Natura 2000 is to protect the biological diversity of European Union countries and to ensure the conservation of natural habitats conducive to wild flora and fauna.

The network's sites are designated in accordance with two directives:

- the "Birds" directive on the conservation of wild birds,
- the "Habitats" directive on the conservation of natural habitats, wild fauna and flora.

The aim of Natura 2000 is to reconcile human activity with biodiversity as part of a sustainable development approach.

### 4 / The environment closest to EDF's hydroelectric facilities

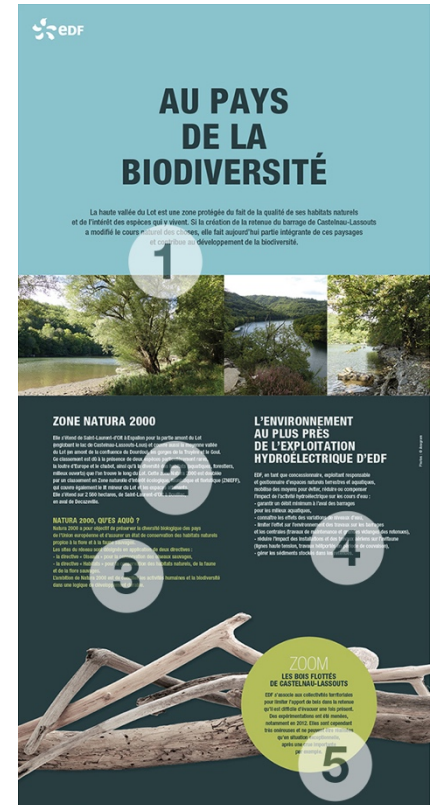
As the concession holder, responsible operator and trustee of natural terrestrial and aquatic environments, EDF is devoting resources to preventing, reducing or offsetting the impact of hydroelectric operations on watercourses.

This means:

- guaranteeing a minimum flow downstream of dams for aquatic environments,
- understanding the effects of variations in water levels,
- limiting the effect on the environment of work on dams and power plants (maintenance work and extensive drainage of reservoirs),
- reducing the impact of facilities and aerial work on avifauna (*birds*) (high-voltage lines, heliborne work during the nesting season),
- managing sediment held in reservoirs.

### 5 / Focus on driftwood at Castelnau-Lassouts

EDF is working with local authorities to limit the amount of wood in the reservoir, which is hard to remove once present. Trials have been conducted, in particular in 2012: however, they are very expensive and can only be carried out in exceptional circumstances, after a major flood, for example.



## Station 4 (rear panel) - SPECIES OF PARTICULAR INTEREST

### 1 / Species of particular interest

European otter  
 Lesser horseshoe bat  
 Greater mouse-eared bat  
 Eurasian eagle-owl  
 Touch-me-not balsam (*Impatiens noli-tangere*)  
 Snapdragon (*Antirrhinum majus*)  
 Peregrine falcon  
 Sculpin  
 European eel

\* From left to right and from top to bottom

*The presence of the latter is confirmed. However, the distance of the Lot Valley from the Atlantic coast and the number of impassible obstacles downstream suggests a discharge of elvers (eel fry), rather than the result of a species migration.*

All these species appear on the IUCN Red List, the International Union for the Conservation of Nature, with various levels of concern.

### 2 / Fish as bioindicators

The plentiful beaked dice, the sculpin and the South-west European nose are present in fast-flowing, cool and oxygen-rich water, upstream and downstream of the reservoir. They indicate the good ecological continuum of the river despite the presence of hydroelectric structures.



## Station 5 (front panel) - FISHING AND FISH

### 1 / Fishing and fish

The Lake of Castelnau-Lassouts-Lous has achieved an international reputation with carp fishermen (anglers), with catches with an average size of 12 kg and a record of 32 kg. There is also a very high density of carnivorous type zander and perch, which also attracts numerous fishermen, as well as white fish, bream, roach, etc., and even a significant population of catfish.

Pike are relatively rare.

### 2 / Zander (Percidae family) - Carnivorous

Up to more than 1 metre long and weighing 15 kg.

This species originates from Eastern Europe and has established itself in our lakes.

Highly sought-after by fisherman for its “kick” and outstanding flavour!

### 3 / European perch (Percidae family) - Carnivorous

On average 25 cm long, occasionally up to 40 cm long.

Native to northern and central France, this species was introduced into the Upper Lot Valley.

### 4 / Common carp (Cyprinidae family) - Omnivorous

Characterised by its massive size, its large lateral scales and its toothless mouth, which may protrude forwards, edged with 4 barbels. Carp mainly feed at night, on the bottom.

Carp originate from Asia, but have been extensively bred since ancient times in pools and ponds, and form an integral part of our fishery resources.

### 5 / Mirror carp (Cyprinidae family) - Omnivorous

The mirror carp differs from the common carp in its very small number of scales. This may be due to the selective breeding carried out by Medieval monks to obtain fish that were easy to scale.

They represent around 10% of the larger species present in the reservoir.

### 6 / Catfish (Siluridae family) - Omnivorous

The largest are more than 2 metres long and weigh up to 150 kg.

The specimens at Castelnau-Lassouts-Lous are much smaller in size!

Introduced from Eastern Europe.



## **7 / A paradise for carp fishermen**

Before the arrival of the catfish, the carp was the largest fish that could be caught in our waters. Improvements in angling equipment, the quest for the record catch and competition have increased this type of fishing, where there are two different schools of thought, English and French.

Well-known fishermen and specialist journalists, Jo Nivers alias Armand Delrieu, Henri Limouzin and Rod Hutchinson, have helped to make Castelnau-Lassouts-Lous a cult destination since the 1970s. During the spawning period, entire shoals of massive carp come to the head of the lake in order to reproduce in shallow water.

EDF manages the water level in the reservoir to ensure that the eggs, which cling to aquatic plants, are able to hatch in the right conditions.

## **8 / Note on fishing**

Fishing on the Lake of Castelnau-Lassouts-Lous and on all surrounding watercourses is strictly regulated. A fishing licence is essential, compliance with catch sizes and closed periods: specific closures for certain species, as fishing is open all year round for category 2.

For more information or to learn more about fishing:

<http://www.pecheaveyron.fr/>



### Station 5 (rear panel) - BIRDS

# 1 / Birds

The Castelnau-Lassouts-Lous body of water is of great interest for avifauna (*birds*). The area is home to birds that prefer steep-sided valleys, woods/forests alternating with open spaces, as well as species found on and around lakes, ponds and slow-flowing watercourses. The lake attracts numerous, occasionally unexpected, migratory species to our region!

Source LPO (*French League for the Protection of Birds*) – Atlas Communal 2019

## 2 / Swallows

The most well-known migratory bird has four species around the lake: the sand martin, photo 1, the crag martin, photo 2, the house martin, photo 2, and barn swallow, photo 2. They appreciate this wide open space, which is rich in insects. They can also be seen drinking by skimming over the water. Another advantage of the site is the dam's enormous "man-made cliff" on which certain species gather before migrating south.

### 3 / Yellow-legged gull

Yes, this inhabitant of the Mediterranean shores and the Atlantic coast can be seen here too!

It is even possible for it to nest here. The black-headed gull, with which it should not be confused, is also present.

#### 4 / Great crested grebe

The great crested grebe is the largest of the grebe family. It likes deep bodies of water where it can dive to a depth of up to 20 metres! It is partially migratory and sometimes nests on the Lake of Castelnau-Lassouts-Lous. It is seen more often during the migration or overwintering periods.



## 5 / **Common snipe**

This winter resident prefers grassy wetland areas around the edge of the lake where it feeds on small invertebrates by probing the muddy ground with its beak.

## 6 / **Osprey**

This bird of prey seeks out large rivers and bodies of water where it feeds solely on fish. It may remain here for a number of days during its two migrations, in April and September.

## 7 / **Grey heron**

A more or less erratic resident of our region, it regularly visits still, fish-filled waters. It may also be seen in fields where it feeds on small terrestrial prey: rodents, insects, etc.

## 8 / **Anatidae**

Anatidae, family of ducks, geese and swans, are present on the site in the winter, during their migration between the temperate zone and Central Europe or Scandinavia where they nest. The mallard, gadwall, wigeon and shoveler from the duck family are still quite rare on the lake. The tufted duck and shelduck are occasional visitors.

## 9 / **Great cormorant**

This northern bird is mainly present in winter. Once an endangered species, it has become far more prevalent, to the great displeasure of fishermen, who see it as a competitor.

## Station 6 (front panel) - WATER POWER

### 1 / Water power

Hydroelectricity, i.e. electricity generated using the force of water, is now the leading renewable energy in France at 95%, well ahead of wind, biomass, geothermal and solar energy.

### 2 / Simple and reliable operation

Its operation makes use of the natural water cycle. Dams hold back natural water inflow from rain, melting snow, etc., by creating lakes where this water is stored.

The driving force of the water is used to turn turbines and generate electricity.

EDF also operates run-of-river power plants, as well as pumped-storage hydropower plants, PSPHs, which allow a dam's production capacity to be increased.

The Montézic PSPH, in the Truyère basin, is France's 2<sup>nd</sup> largest producer of hydroelectricity!

### 3 / Responsive power

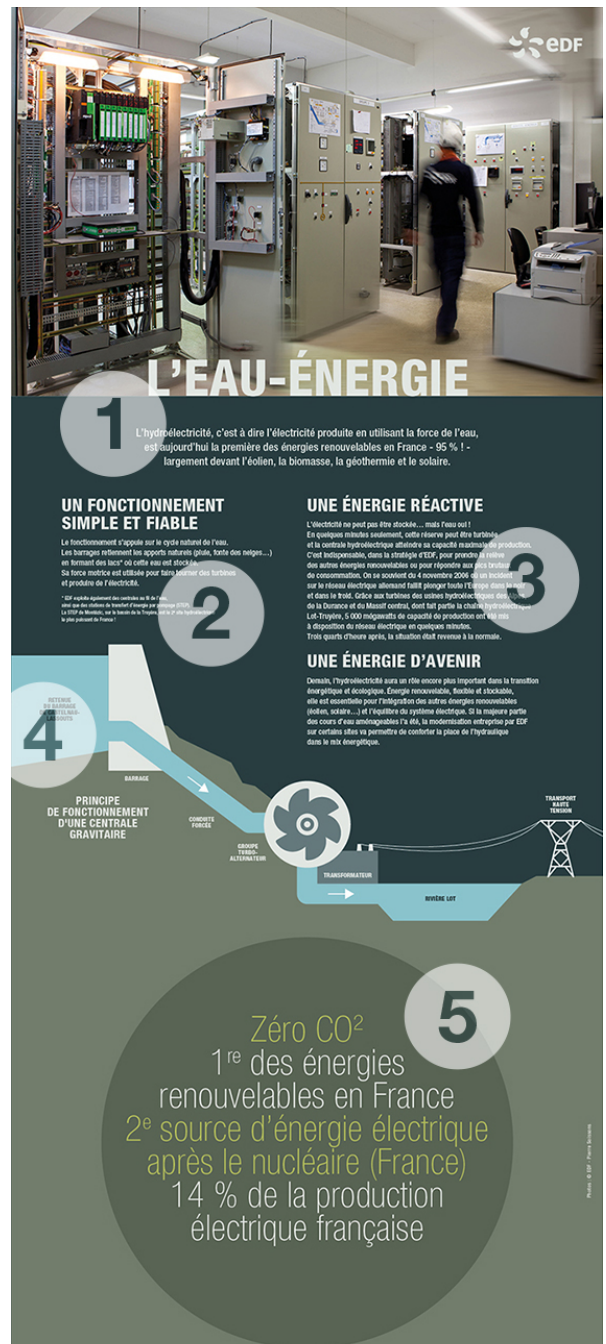
Electricity cannot be stored... but water can!

This stock of water can be released into the turbines and the hydroelectric plant can reach its maximum generation capacity in the space of just a few minutes.

It is vital, within EDF's strategy, to take over from other renewable energies or to respond to sudden spikes in consumption. Remember 4th November 2006 when an incident affecting the German power grid almost plunged the whole of Europe into darkness and cold. Thanks to the turbines at hydroelectric plants in the Alps, on the River Durance and in the Massif Central, of which the Lot-Truyère hydroelectric chain forms part, 5,000 megawatts of generation capacity were made available to the grid within minutes. Three quarters of an hour later, the situation had returned to normal.

### The energy of the future

In the future, hydroelectricity will play an even more important role in the energy and ecological transition. As a renewable, flexible and storable energy, it is vital for the integration of other renewable energies, such as wind or solar power, and the balance of the power system. Although the majority of watercourses that can be developed have been, the modernisation of certain sites by EDF will reinforce the role of hydroelectricity in the energy mix.



#### **4 / Bottom: Operating principle of a gravity power plant**

**From left to right:**

Castelnau-Lassouts dam reservoir

Dam

Penstock

Turbine generator unit

Transformer

River Lot

High-voltage distribution

#### **5 / Zero CO<sup>2</sup>**

Leading source of renewable energy in France

2<sup>nd</sup> largest source of electrical energy after nuclear power (France)

14% of French electricity production



## Station 6 (rear panel) - SHARED WATER...

**1 / The water contained in the Lot and Truyère reservoir is not just used to produce electricity!**

Together with the public authorities and all local stakeholders, edf is contributing to the management of water that is shared to meet all needs.

**2 / Game :** line up the pictogram with its corresponding subject by turning this disc.

**3 / Water resource management**

Since 1946, EDF has gained a recognised level of hydrometeorological expertise. Its forecasting and anticipation skills are widely used for the optimised management of water resources throughout the year, whether there is not enough... or too much!

**4 / Supplying water to towns & cities and industrial facilities**

Along the entire River Lot, some conurbations extract drinking water for their populations and certain industries use water from the River Lot in their operations. These uses are secured by reserves from the Truyère and Lot.

**5 / Generation of carbon-free energy**

Hydroelectricity does not emit any greenhouse gases. and its flexibility allows new and intermittent renewable energy sources to be incorporated. As a result, it represents a key asset in combating climate change.

**6 / Preservation of natural environments**

Measures are taken to prevent, reduce or offset the effects of hydroelectric facilities on biodiversity and ecosystems, by sharing knowledge of natural environments and how they work with specialists and by developing its in-house expertise.

**7 / Development of tourism activities**

Reservoirs were designed for electricity generation but, since they were first created, they have witnessed the development of water sports and activities: swimming, motor boating or sailing, fishing. Tourism around lakes enhances the region's attractiveness with outdoor, as well as cultural or industrial heritage, activities such as the Energy Route.

**8 / Low-water replenishment during periods of drought**

Essential for agricultural irrigation, as well as aquatic life.

Every year, the Lot basin joint association defines the necessary requirements for the summer and applies for the reserves managed by EDF.



## Station 7 (tablet) – THE HYDROELECTRIC POWER PLANT



**LA CENTRALE HYDROÉLECTRIQUE**

C'est elle, ce grand bâtiment carré, que vous voyez à vos pieds, en contrebas du barrage. Elle fonctionne selon le vieux principe du moulin. L'eau est acheminée par une conduite forcée vers une turbine qu'elle actionne. Plus la hauteur d'eau de cette chute et son débit sont importants et plus ils génèrent de force. La turbine actionne à son tour un alternateur qui produit le courant électrique. Un transformateur élève ensuite la tension pour faciliter le transport de l'électricité sur le réseau (lignes haute ou très haute tension). Cette haute tension est abaissée avant que l'électricité n'entre dans le circuit domestique.

**1**

**2**

ANNÉE DE MISE EN SERVICE INDUSTRIELLE : **1949**

**3**

GROUPES DE PRODUCTION À AXE VERTICAL (TURBINES FRANCIS)

HAUTEUR DE CHUTE MAXIMALE : **51,60** MÈTRES

DÉBIT MAXIMAL TURBINABLE : **97** M<sup>3</sup>/S (97 000 LITRES)

PUISSANCE MAXIMALE : **42** MÉGAWATTS

PRODUCTION : L'ÉQUIVALENT DE LA CONSOMMATION ANNUELLE DE **34 500** HABITANTS

### 1 / The hydroelectric power plant

That's it, that large square building that you can see at your feet, down below the dam. It operates using the age-old principle of a mill. The water is conveyed via a penstock to a turbine, which it drives. The greater the height of the water head and the faster its flow, the more force it generates. The turbine, in turn, drives a generator, which produces an electric current. A transformer then raises the voltage to make it possible to transport electricity over the grid, via high or very-high voltage lines. This high voltage is reduced before the electricity enters the domestic system.

### 2 / Info

Year of industrial commissioning: 1949

3 vertical axis generating units (Francis turbines)

Maximum head height: 51.60 metres

Maximum turbinable flow: 97 m<sup>3</sup> / second (97,000 litres)

Maximum power: 42 megawatts

Production: equivalent to the annual consumption of 34,500 people

## Station 8 (tablet) - THE DAM



**LE BARRAGE**

Les travaux commencent en 1941. Le cours du Lot est détourné pour permettre aux ouvriers de mettre à nu le rocher qui supportera les fondations. Une galerie de 250 mètres de long pour 6 mètres de diamètre est creusée en rive droite, avant d'être revêtue de béton. Il en sera extrait 80 000 m<sup>3</sup> de roche et de terre ! Ces travaux préparatoires dureront 4 ans.

**LA SÉCURITÉ AVANT TOUT**

Sous l'effet de leur propre poids, de la pression de l'eau, ou des variations de température, les barrages « bougent ».

Une surveillance permanente permet de détecter, dès son apparition, tout « écart de comportement » par rapport à la conception initiale.

- installation de repères et de sondes lors de la construction du barrage
- surveillance permanente, par les agents, de l'ensemble des ouvrages hydrauliques (barrage, vannes, conduites forcées...)
- prévention et gestion des crues, afin d'équilibrer le débit d'eau entrant dans la retenue et celui qui en est rejeté (les équipes EDF sont alors mobilisées 24 heures / 24).
- examen technique des grands ouvrages tous les 10 ans (inspection par robot subaquatique, abaissement partiel ou vidange totale).

**1**

**2**

ANNÉE DE MISE EN EAU : **1948**

LONGUEUR EN MÈTRES : **182**

40 000 TONNES DE CIMENT, **215 000** M<sup>3</sup> DE BÉTON, **175 000** M<sup>3</sup> DE MAÇONNERIE (BARRAGE + ÉVACUATEURS DE CRUE)

HAUTEUR EN MÈTRES : **52,2**

**BARRAGE POIDS**

IL S'OPPOSE À LA FORCE DE L'EAU PAR SON SEUL POIDS, AVEC UNE BASE DE MAÇONNERIE PROCHE DE LA HAUTEUR DE L'OUVRAGE (ÉPAISSEUR : 40 MÈTRES À LA BASE, 5 MÈTRES AU SOMMET)

### 1 / The dam

Work began in 1941. The course of the River Lot was diverted to allow workers to expose the rock, which would bear the foundations. A 250 metre long tunnel with a 6 metre diameter was excavated on the right bank, before being lined with concrete. 80,000 m<sup>3</sup> of rock and earth were excavated! This preliminary work took 4 years.

### Safety first

Dams “move” under the effect of their own weight, water pressure or variations in temperature. Permanent monitoring allows us to detect any “abnormal behaviour” in relation to the initial design as soon as it happens:

- installation of markers and sensors when building the dam,
- permanent monitoring of all hydroelectric structures (dam, gates, penstocks, etc.) by officials,
- flood prevention and management, in order to stabilise the flow of water entering the reservoir and that which is discharged. In this case, EDF's teams are deployed 24 hours a day.
- technical inspection of large structures every 10 years. This may be an inspection using an underwater robot, by partial lowering of the water level or by complete drainage.

### 2 / Info

Year of filling: 1948

Length in metres: 182

40,000 metric tons of cement, 215,000 m<sup>3</sup> of concrete, 175,000 m<sup>3</sup> of stone for the dam and spillways

Height in metres: 52.2

Gravity type dam

It holds back the force of water using its own weight, with a stone base that is approximately the same height as the structure. Thickness: 40 metres at the base and 5 metres at the top.



## Station 9 (tablet) - THE RESERVOIR



### 1 / The reservoir

The lake created by the Castelnau-Lassouts-Lous dam has a strange serpentine form, whose enormous meanders stretch from Saint-Eulalie d'Olt to the dam. The reservoir is barely 350 metres across at its widest point due to the valley's very deep profile. Around twenty small tributaries of the River Lot, some intermittent, flow into it. The Roudil stream, the Merdanson on the right bank and the Neyrou on the left bank are the largest. The average flow of the River Lot at Castelnau-Lassouts is approximate 25 m<sup>3</sup> per second.

### 2 / Info

Length in kilometres: 15

Maximum depth in metres: 45

Area: 218 hectares, the equivalent of 310 football pitches

41 million cubic metres of water, i.e. 16,000 olympic swimming pools



## Station 10 (tablet) - THE FORMER SPILLWAY OR “FLOOD-CONTROL WEIR”



### L'ANCIEN ÉVACUATEUR DE CRUE OU « DÉVERSOIR »

Situé à 800 mètres à l'amont du barrage, il constitue la particularité de la retenue à tel point que le public imagine souvent « deux barrages ». Comme son nom l'indique, l'évacuateur de crue permet de déverser l'eau excédentaire avant qu'elle n'atteigne la hauteur de crête du barrage. Son édification a nécessité d'enlever un pan entier de montagne qui s'élevait entre les lits du Lot et des Mousseaux et de le remplacer par une digue à deux passes en béton. Chaque passe est équipée d'une vanne-segment de 15 mètres de large et de 9 mètres de haut.

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### UN RÔLE TRÈS IMPORTANT

La bonne utilisation de l'eau à des fins énergétiques permet d'éviter des déversements d'eau sans que celle-ci ne soit turbinée. Grâce à sa retenue, le barrage de Castelnau-Lassouts possède une capacité de stockage « ordinaire ». En cas de fortes crues, la priorité est donnée à la protection des ouvrages bétons. Les évacuateurs de crue sont mis en action afin de rendre le barrage « transparent ».

### 1 / The former spillway or “flood-control weir”

Situated 800 metres upstream of the dam, it is a special feature of the reservoir, such that the public often thinks there are “two dams”. As its name suggests, the spillway allows excess water to be discharged before it reaches the same height as the top of the dam. Its construction needed a whole section of the mountain to be removed, between the beds of the River Lot and Les Mousseaux, and for it to be replaced with a concrete dyke with two pipes. Each pipe is equipped with a 15 metre wide and 9 metre high radial gate.

### 2 / A very important role

Good use of water for energy generation purposes enables discharges of water to be avoided without it being turbinéd. Thanks to its reservoir, the Castelnau-Lassouts dam has an “ordinary” storage capacity. In the event of heavy flooding, priority is given to the protection of concrete structures. The spillways are put into operation in order to render the dam “transparent”.

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### Excluding the landscaped terrace, left bank of the dam

#### The new spillway

Situated between the dam and the dyke for the former spillway, the new spillway was built in 1992. It has an 11.8 metre wide and 9 metre high radial gate. During floods, this new spillway is used first.

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## Station 11 (front panel) - THE CASTELNAU-LASSOUTS REGION

### 1 / The Castelnau-Lassouts region

The dam takes its name from the municipalities of Castelnau-de-Mandailles and Lassouts, which it connects, on either bank of the River Lot. Very few regions have such marked contrasts and such a wide range of landscapes. On the right bank, overlooking the valley from a height of more than 400 metres, the Aubrac Plateau begins around the hamlet of Lestrade which is also crossed by the famous Way of St. James. On the left bank, near Lassouts, the steep ascent opens onto a range of small limestone plateaus, which extend from the area around Rodez at Séverac-le-Château to Laissac and the Upper Aveyron Valley. Upstream, three villages with a rich heritage have been proudly standing on the banks of the River Lot since the Middle Ages: Sainte-Eulalie d'Olt, at the very tip of the reservoir, Saint-Geniez d'Olt et d'Aubrac and Saint-Laurent d'Olt. Downstream, there is the same procession of beautiful villages with Saint-Côme d'Olt, Espalion and Estaing. Vines are grown on the limestone or slate hillsides alternating with red soil. A number of outstanding Romanesque churches, Sainte-Eulalie d'Olt, Le Cambon, Perse, Saint-Pierre-de-Bessuéjols, a number of volcanic outcrops, World Heritage Sites ... the scenery is green and stunning!

### 2 / Castelnau-de-Mandailles

Despite its name, this “new castle” is actually very old and controlled the route from Espalion to Javols, in the Lozère, from the 16th century onwards. Castelnau and Mandailles gradually superseded the former parish of Cambon by attracting a large population.

The municipality, combining Castelnau with Mandailles, reached its demographic peak at the end of the 19th century with almost 2,000 inhabitants. Today, it has a population of less than 600.

Rural depopulation hit the Upper Lot Valley hard!

#### Not to be missed:

- the church in Castelnau-de-Mandailles,
- the village oven in Lestrade, a hamlet located on the Way of St. James,
- Mandailles, a “French and European Listed Site” and its long main street descending towards the lake,
- the Romanesque church in Cambon. Refurbished in the 16th century and unusual in having two bell towers. Usually open in the summer, when you can see its wall paintings and ornate capitals, as well as furniture dating from the 15th to the 17th centuries.

#### Famous residents

**Antoine Salvanh**, the architect, who created the bell tower of Rodez cathedral, the church in Saint-Côme d'Olt and the Gothic church in Prades d'Aubrac,

**Simone Anglade**. Mayor from 1977 to 1995, departmental councillor. She died in 2019 and was the great female political figure of North Aveyron, an area she loved passionately. With a long, lean figure, always standing tall with her short hair and an agile tongue. She touched everyone with her personality and deep commitment. The renaissance of the Way of St. James in Aveyron and its classification as a UNESCO World Heritage Site in 1998 are largely and specifically due to her efforts.



### 3 / Lassouts

The Priory of Saint-Jacques, dating from the 17th century, is the founding church of Lassouts, the name of which comes from the Occitan “Las sots”, homes for pigs: pigsties. The complex was fortified and mention has been found of a former tower belonging to the Rodez chapter built within the compound.

It was used as a granary. The highest known population was reached in 1861 with 1,173 inhabitants. 291 people were listed in the 2016 census.

#### **Not to be missed:**

- the 15th century church of Saint-Jacques Agreement and its beautiful Romanesque tympanum,
- the Thubiès lava flow at Roquelaure,
- the Château of Roquelaure. Private, not open to visitors,
- the chapel in Roquelaure, which houses a 16th century tomb,
- panoramic view over the Lot Valley and the foothills of the Aubrac Plateau.

#### **Famous resident**

##### **Clément Cabanettes (1851-1910)**

Founder of the Aveyron “colony” in Pigüé, Argentina. The Aveyron campaign reached its demographic peak in the middle of the 19th century. The increase in the population, the fragmentation of holdings due to inheritance laws and the phylloxera crisis would cause a mass exodus. Men and women left the region in huge numbers for Paris and large regional capitals. Many of them would become the famous “coal men” (*bougnats*), who went on to open cafés and bars. Some followed Clément Cabanettes across the Atlantic to found the town of Pigüé in Argentina.

### 4 / “In” and green!

Visitors can enjoy a unique floating 100% eco-house, as well as electrically powered boats, on the Lake of Castelnau-Lassouts-Lous.

Tour of the Lake / 32 km by mountain bike, on foot or by horse

Fairly flat terrain, easy route, 90% track, 10% tarmac.

Motor vehicles allowed.

For all information on outdoor activities, accommodation and restaurants, please visit the following:

- Tourist Office [des Causses à l'Aubrac](#)
- Tourist Office [Terres d'Aveyron](#)



## Station 11 (rear panel) – SURROUNDINGS

### 1 / Sainte-Eulalie d'Olt

Upstream of the lake, the medieval village of Sainte-Eulalie d'Olt is quite rightly classified as one of the Most Beautiful Villages in France. It grew up around the original “castrum” (*castle*).

Its typical streets, 11th century church, 15th century château, Renaissance houses, mill and unusual traditions, have been handed down to us.

It is definitely worth a visit!

### 2 / Aubrac natural regional park

#### A regional project

The Castelnau-Lassouts-Lous dam is located within the Aubrac Natural Regional Park, NRP. It reflects the desire of local men and women to build on the successes of the past (including cheese and Laguiole knives, the Aubrac breed, etc.) and to create new ones, in order to support the region's sustainable development.

#### Its aims

To increase its attractiveness by maintaining the population and improving their quality of life. To preserve and develop local heritage and resources, to experiment and innovate to establish a united Aubrac, with no administrative or sectoral divisions.

#### Key figures

Protected area: 64 municipalities  
 Area: 2,200 km<sup>2</sup> / 30,000 people  
 2 regions: Auvergne-Rhône-Alpes, Occitanie  
 3 departments: Aveyron, Cantal, Lozère  
 6 municipality groupings  
 26% of the land occupied by protected spaces  
 4 UNESCO World Heritage Sites  
 2,250 km of watercourses  
 2/3rds of the area is grassland and 1/3rd is forested  
 2,500 km of walking/hiking routes



### Excluding the landscaped terrace, former spillways LONG LIKE MANDAILLES

Can you see that small village on the hillside? That's Mandailles. With a superb panoramic view over the lake, it was built on a long rocky ridge, on either side of a single and typically “lo calat” street, hence the expression “long...”.

Mandailles has been a French and European listed site since 2019.



## **EXCLUDING THE LANDSCAPED TERRACE, RIGHT BANK OF THE RESERVOIR**

### **Traces of the construction site**

Do you see that ledge on the hillside opposite you?

That's where some of the material needed to smooth the gradient for building the dam were quarried.

To find out more about the Castelnau-Lassouts dam, go to the right bank where a free exhibition has been set up.

Photo: Castelnau-Lassouts dam

Upstream quarry

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