

CASE STUDY ON THE MIDDLE STRETCH OF THE ROMANCHE

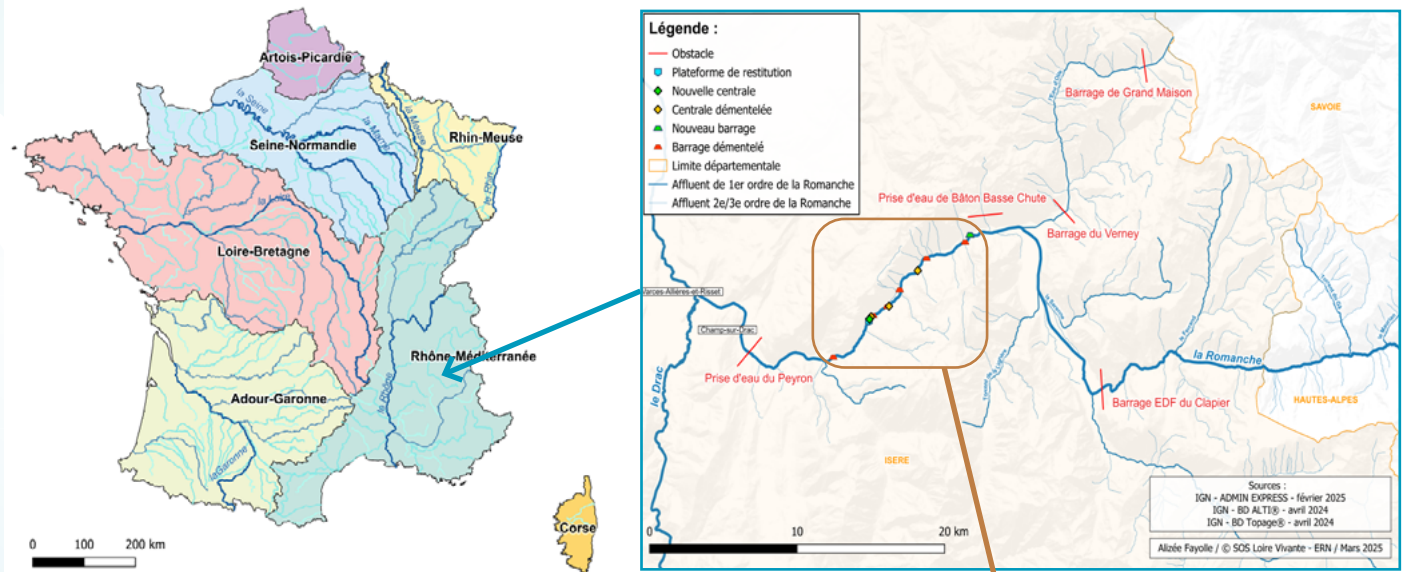
ECOLOGICAL RESTORATION OF THE VALLEY

5 DAMS REMOVED AND 40% INCREASE IN HYDROELECTRIC PRODUCTION



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LOCATION :

On the middle stretch of the Romanche
Country : France (dept. Isère, 38)
Region : Auvergne-Rhône-Alpes
Watershed (or affluent chain) : Isère, Drac, Romanche

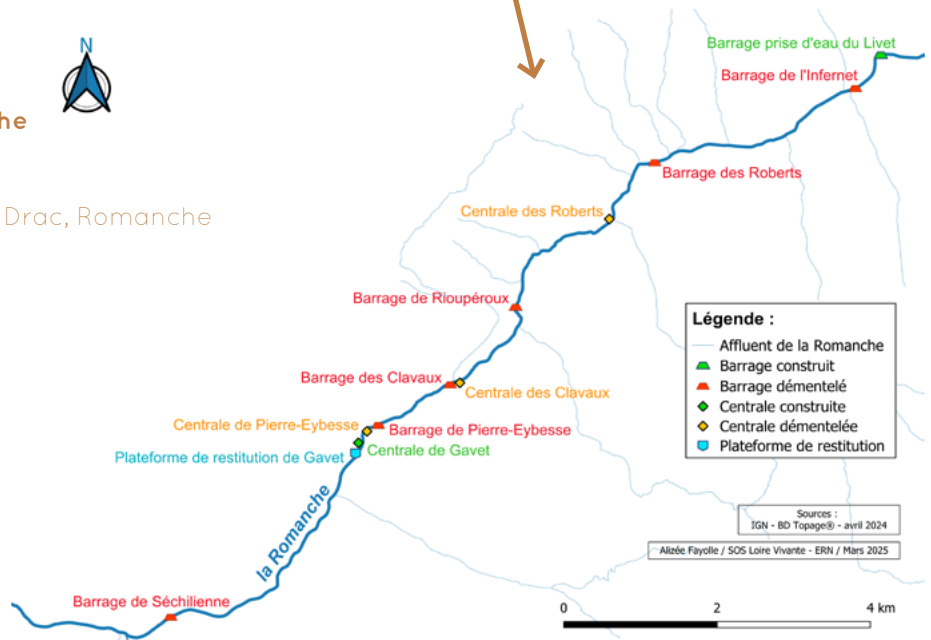
KEY NUMBERS

- Séchillienne dam

Commissioned in : 1917
Decommissioned : 1946
Dismantlement : 2018

- Romanche-Gavet project

New installed capacity : 92 MW
Annual production : 560 million kWh (which is 40% more than the 6 old power plants)
Length of the underground gallery : 9.3 km
Height of the fall : 163 m
5 dams deconstructed : Pierre-Eybesse, the Clavaux, Rioupéroux, the Roberts and Infernet
3 power plants removed : Pierre-Eybesse, the Clavaux and the Roberts
A power plant classed as a historical monument : Vernes
2 power plants where the scenario has not yet been finalised : Rioupéroux and Livet
1 water intake and 1 reconfigured power plant : Livet water intake and Gavet power plant
Stretch restored : 37 km (between the downstream obstacle (Peyron water intake) and the upstream obstacle (Clapier dam))



An industrial past linked with hydroelectricity

The Romanche is a 78-kilometer Alpine river located in the Isère department. It originates from the Plate des Agneaux glacier in the commune of Villar-d'Arène, at the heart of the Écrins mountains. From the late 19th century onward, several industrial structures were built along the valley. For example, since 1917 the Séchilienne dam supplied the Noyer Chut factory, which produced combat gas. Further upstream, six power plants constructed between 1896 and 1914 in the Gavet-Livet sector provided electricity to the metal and paper industries of the Grenoble region. These facilities were quickly abandoned when their energy potential proved insufficient (as in the case of Séchilienne), or they were taken over by EDF under a 60-year hydroelectric concession. This valley, once shaped by intense industrial activity, now bears the marks of deindustrialization. Some areas have even come to be described as "abandoned".



↑ The Romanche, marked by anthropisation and the end of the industrial era

Restoring the valley

Between 2018 and 2024, several projects were carried out to improve safety, restore the valley's natural character, and re-establish landscape connectivity over approximately 10 kilometres :

The dismantling of the Séchilienne dam :

As part of efforts to reduce landslide risks linked to the Séchilienne slope, in 2009 the state acquired all the infrastructure associated with the operation of the Noyer Chut hydroelectric plant, including the intake canal and the Séchilienne dam. Between 2010 and 2013, the first phase of work was carried out: the hydroelectric plant was demolished, the intake canal was filled in, and the dam gates were removed. The dam itself was then fully dismantled between 2016 and 2018.



↑ Comparison of aerial view of the Séchilienne dam

Modernization of a 6-structure chain, the Romanche-Gavet project :

In 2001, EDF sought to renew the concession for the chain of power plants between Gavet and Livet. Two options were considered: modernising the six existing facilities or completely reconfiguring the system. After analysis, the reconfiguration option was selected. On December 31, 2010, the state granted EDF a 60-year concession to operate the new Gavet run-of-river

power plant. Construction began in 2010, and the plant was commissioned on October 9, 2020. The Romanche-Gavet project is part of the "Commitment Convention for the Development of Hydroelectricity in Coherence with the Restoration of Aquatic Environments," signed by EDF in June 2010 as part of the Grenelle de l'Environnement. This agreement aims to promote environmentally responsible hydropower by integrating measures to reduce ecological impacts and enhance biodiversity.



↑ Restitution platform and power station in Gavet



↑ Comparison of aerial views of the Livet water intake

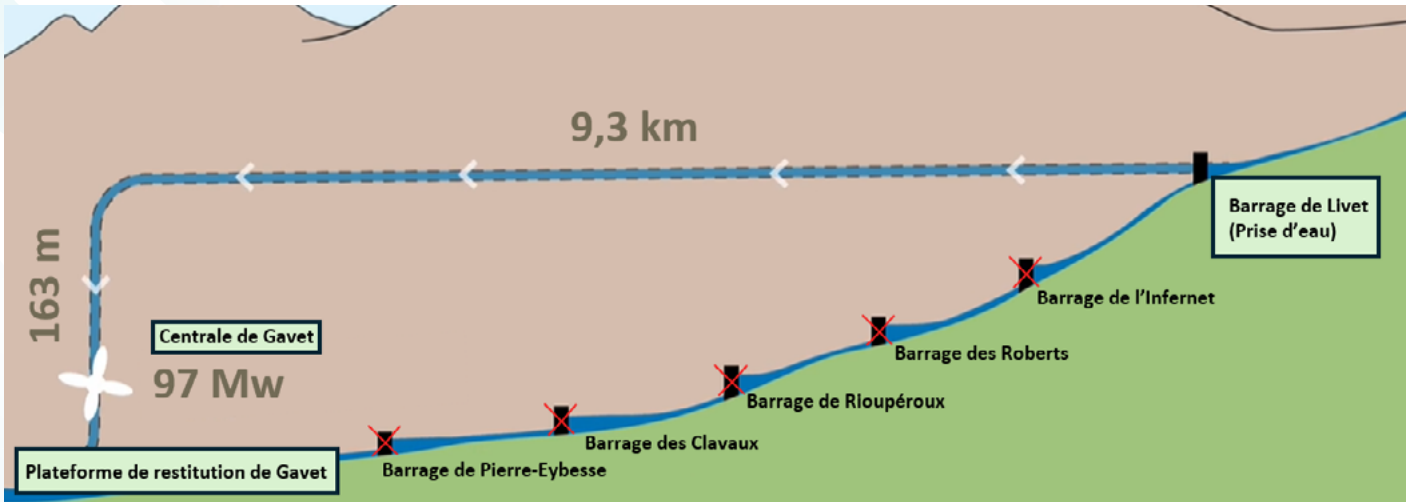
Romanche-Gavet - A technical challenge

The Romanche-Gavet project is one of the largest hydroelectric developments ever undertaken by EDF in France and the most significant of its kind in Europe. It represents a major investment of 400 million euros and involves extensive engineering works designed to deliver both ecological and energy benefits.

The new Livet intake dam is equipped with a 60-meter fish ladder composed of 24 pools. It diverts water from the Romanche and directs it into a 9.3-kilometer underground gallery excavated within the Belledonne mountains.

The dam diverts a maximum flow of 41 m³/s, while an ecological flow equivalent to one-tenth of the river's average discharge is maintained in the bypassed section to preserve aquatic habitats and ensure fish survival.

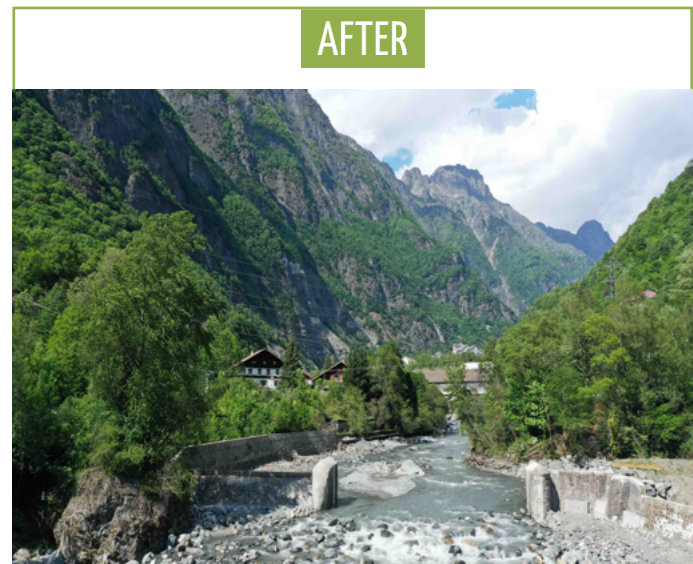
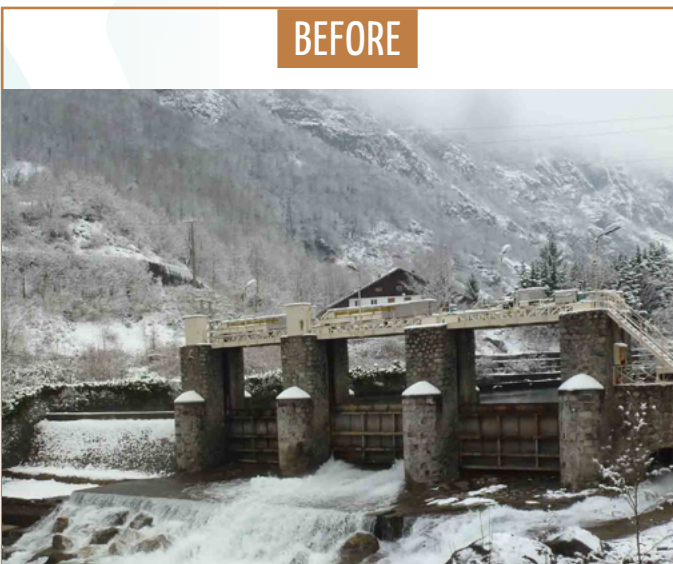
The gallery carries the water to an underground power station in Gavet, where it drops 163 meters to drive two turbines. The facility generates 560 million kWh per year—40% more than the six former power plants—and provides electricity to nearly 230,000 residents.



↑ Diagram of the underground layout of the power plant and the Livet water intake

Upon exiting the Gavet plant, EDF also installed four energy dissipators, a unique technology in France. Each device weighs 30 tonnes and is positioned outside the power station to safely manage variations in the river's flow. Located downstream of the plant, near the spillway gallery, these structures prevent sudden changes in discharge. In the event of a turbine shutdown, they dissipate excess energy before the water returns to the river. They consist of reinforced basins equipped with perforated drums that break the force of the water and reduce its speed, ensuring the safety of

both local residents and the surrounding environment. The five structures located between Livet and Gavet are no longer in use and were dismantled between 2021 and 2023. The Clavaux dam was leveled, and a bottom weir was built to stabilize the riverbed, reduce erosion risks, and allow migratory fish to pass. Removing these old, aging dams restores landscape connectivity along roughly 10 kilometers of the river, improves water quality, and supports the natural transport of sediments. Aquatic habitats and the river's natural functioning are now being re-established along this section.



↑ The Clavaux dams before and after decommissioning

Reviving the Valley

The project not only restores landscape connectivity and habitats, estimated at one hectare across the former reservoirs, but also aims to restore the natural environment across the entire valley. Several industrial wastelands, including former hydroelectric plants, have been dismantled to free up four hectares of space and improve the local environment, giving residents a landscape that feels more natural. Three of these old power stations have already been removed, Pierre Eybesse, Clavaux and Roberts, while the Vernes plant, which is listed as a historical monument, has been preserved. The future of the Rioupéroux and Livet plants has not yet been decided. Other initiatives, such as the redevelopment of certain neighborhoods including the hamlet of Rioupéroux, are also being studied. The National Forestry Office has restored the riverbanks using plant species sourced locally and certified under the "Local Vegetation" label. These species help stabilize the soil and

support biodiversity. More than 8350 shrubs and 500 kg of seeds adapted to the local climate and soils have been planted. The renatured valley now creates opportunities for new projects that highlight its natural and historical heritage. A 9 km hiking trail has been created through the gorges of the middle stretch of the Romanche, showcasing the valley's hydroelectric history and linking the hamlets along the river. To help visitors better understand this industrial past and the transformation of the valley, the Romanche Museum in Rioupéroux presents the history of these changes.



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↑ Vernes power plant, a conserved monument

Modernisation of the hydroelectric plant - a viable solution

The project also sparked some opposition and criticism, especially from those who questioned the removal of the dams and power plants. They argued that modernising the existing infrastructure could have preserved the energy benefits. EDF responded by explaining that the cost of modernising the old facilities would have been similar to the cost of building the new development, while providing fewer advantages in terms of safety, energy efficiency and environmental performance. Although several obstacles to landscape connectivity remain in the basin, particularly downstream at the Peyron intake and upstream at the EDF Clavier dam, the middle Romanche project stands out as a genuinely innovative example. It shows that it is possible to increase energy production while restoring landscape connectivity in a valley that has been deeply shaped by

human activity. Obsolete structures have been removed and new solutions that respect the environment have been put in place. This project marks the beginning of the valley's ecological renewal. The collaboration between EDF, local authorities and environmental organisations, supported by the Rhône Mediterranean Corsica Water Agency and the French Biodiversity Office, ensures that environmental concerns are taken into account from the very beginning. This partnership demonstrates that energy development and biodiversity conservation can be brought together. Future scientific studies will monitor progress and assess the effects of these actions on wildlife and plant life. Their findings will help refine management strategies for the Romanche and ensure its long term preservation.



← Rehabilitation of the Romanche valley

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Document produced with the support of :



Pour en savoir plus :

- Agence de l'eau RMC, CLE Drac-Romanche
- EDF, Commissioning of the new Gavet power plant
- ONF, Isère, renaturation of the biggest hydroelectric work in France