Invest in
INNOVATION
SPECIAL STORAGE

Discover Claudia, one of the largest storage units in Europe, by Amarenco

Amarenco shapes the future with the Claudia project

Alexandre IRISSOU
CEO BL Storage

Amarenco's Storage Business Line aims to develop large-scale stationary battery projects **to provide frequency/voltage support and energy capacity to the electricity transmission grid**, as well as unified structuring services for intermittent solar energy generated by our photovoltaic plants.

Our strategy is in line with Europe's 'Net Zero' objective, which calls for massive deployment of renewable energies to achieve zero greenhouse gas emissions by 2050.

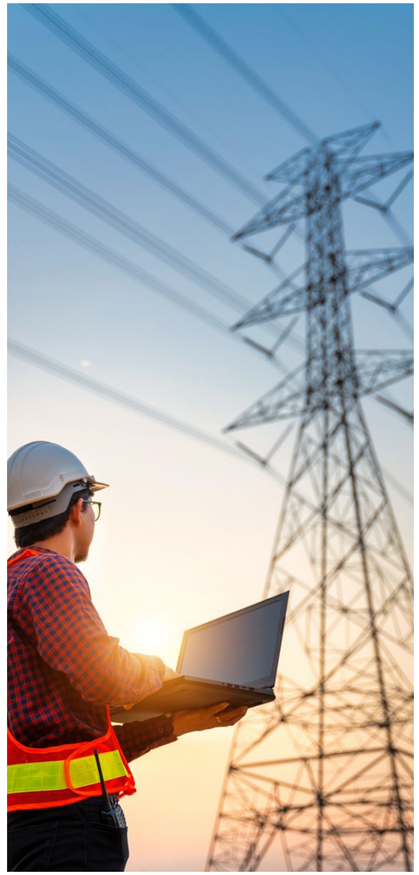
To facilitate the high penetration of renewable energies on the grid and the increase in consumption of decarbonised industrial electricity, we have increased our battery energy storage capacity in France.

At the beginning of 2024, we inaugurated our first large-scale power plant, Claudia (105MW/1H - increase to 2H planned for the end of 2025), the largest of its kind in the country.

Building on this initial success, we intend to maintain our leadership through a significant portfolio of energy storage projects.

In this context, Amarenco, a pioneer in terms of commitment and innovative energy solutions, has won the tender for the supply of battery electricity storage for the period 2022-2028, with the aim of securing the RTE network.

Amarenco's vision and commitment validate the development and success of such a project.



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We live in an electric world

The market for battery storage units is set to intensify, given the growing need for electrification in all sectors:

- **Growing demand in the energy sector**
  More than 90% of global demand for batteries now comes from the energy sector, with a 130% increase in battery deployment in the power sector by 2023, adding 42 gigawatts to the world's electricity systems.

- **Growth in electric vehicles**
  Sales of electric cars have jumped from 3 million in 2020 to almost 14 million in 2022, and this trend is set to continue.

- **Climate and energy targets**
  To meet energy and climate targets such as those set at the COP28 summit, the deployment of batteries will have to be stepped up considerably. Global energy storage capacity needs to increase sixfold by 2030, with batteries accounting for 90% of this increase.

- **Energy transition**
  The transition to renewable energy sources requires efficient storage solutions to manage the intermittency of these sources. Batteries play a crucial role in this transition, enabling renewable energies to be integrated more reliably into the electricity grid.

Lithium-ion batteries, initially designed for consumer electronics, are now mainly used in the energy sector, which accounts for more than 90% of demand.

By 2023, the deployment of batteries in the electricity sector will have increased by 130%, adding 42 gigawatts to the world's electricity supply. Sales of electric cars have risen from 3 million in 2020 to almost 14 million in 2022.

The IEA says that battery deployment must accelerate to meet climate targets by 2030, increasing energy storage capacity sixfold.

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Growing need for flexibility services with increase in intermittent RE penetration and growing electrification (1)

(1) Source: Baringa

1 Growth of renewelables

- Though still dominated by nuclear. France's generation mix is transforming and diversifying. French wind and solar have grown rapidly, in 2022 representing 13% of total electricity generated (55 TWh of a 438 TWh total).
- Net Zero and decarbonization targets in the EU and France are driving the continued growth in renewelables share.
- In Reference Cases, projections double French onshore wind capacity by 2033 and solar PV by 2028. By 2024, French onshore wind, offshore wind and solar PV is projected to reach 50.1 GW, 21.8 GW and 82.4 GW respectively.

2 Need for energy flexibility

- Increasing penetration of intermittent wind and solar generation creates a higher, more unpredictable balancing requirement on the system.
- Non-thermal flexibility is seen as an enabling, low carbon solution to manage the peaks and troughs in renewable output.
- Further, the retirement of thermal generators and rise of renewables means lower inertia on the grid, making it more susceptible to sudden changes in frequency.
- The remaining thermal plant are running for fewer hours in the wholesale electricity markets, meaning TSOs face insufficient provision from traditional providers of system services, such as volatge regulation and frequency response.

3 Demand for battery storage

- Compared to other forms of flexibility, batteries are versatile, considered relatively smallcale, can be deployed to access multiple revenue streams and, largely due to the proliferation of EVs, are seeing falling capital costs and improved business case.
- Gas peaking plants offer similar benefits to batteries, but do not offer the same level of fast flexibility as batteries, are not versatile and not considered to be as low-carbon.
- Growing need to store excess energy during high wind and low demand periods and provide dispatchable capacity during periods of low wind in winter.

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Getting out of fossil fuels

Meeting the challenges of consumption, the economy and the environment by rethinking systems and transforming the energy mix.

Scenarios with a very high proportion of renewable energies require major technological investments if we are to achieve carbon neutrality by 2050.

To meet climate targets, it is crucial to reduce energy consumption through efficiency and sobriety, while increasing electricity consumption to replace fossil fuels. The electrified reindustrialisation of the country will increase electricity consumption while reducing the carbon footprint.

Achieving carbon neutrality by 2050 will require significant development of renewable energies, with or without new nuclear reactors.

The development of renewable energies must be spatially balanced and anticipate tensions over mineral resources.

The energy transition can be achieved at a controlled cost, requiring urgent action to develop renewables.

The economy justifies optimising storage and consumption management systems. The installation of batteries to accompany solar power is a key strategic avenue for meeting the challenges of low-carbon production, increasing the chances of achieving the «-55% net» target of the new European package by 2030.

Claudia @ a glance

- **One of Europe's largest storage units, with 105 MW of power**
- **Derived from the expertise of an innovative renewable energy developer**
- **Amarenco, an IPP with added value because it is also involved in soil regeneration and biodiversity restoration programmes**

A project aligned with the requirements of the storage market and 100% compliant with the AOLT

In January 2020, the French Ministry for the Ecological and Solidarity Transition and RTE (Réseau de Transport d'Electricité) launched a call for tenders for the development of low-carbon electricity capacity.

Amarenco has won the tender to supply 75MW of battery storage for the period 2022-2028, enabling RTE to ensure the security of electricity supply in France during periods of tension on the grid.

The project is in line with the ambitions set out in the Multiannual Energy Programme as part of the integration of renewable energies: «Batteries provide new, greener, flexible capacities that are useful for security of supply».

This is a project of worldwide scope that will enhance the region's visibility and attractiveness.

This storage facility, based in the commune of Saucats in the Gironde, is powered by the latest-generation Li-ion batteries, the safety and efficiency of which have been proven in a number of projects around the world.

Claudia is the first project in a portfolio of identical projects to be completed between now and 2028 throughout France.

Project Identity Card

Name	Claudia
Power	105 MW
Energy BOL	99,58 Mwh (1h)
Location	Saucats, Gironde (33) France
RTE Substation	Saucats
Securing the land	03/06/2022
PTF Signature	18/12/2020
Building permit order	15/10/2021
Modification permit order	16/05/2022
Start of works	01/08/2022
Commissioning	09/04/2024
Surface area	3 hectares
Cost	50 M€

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Claudia in detail

TRANSFORMER STATIONS
LOW VOLTAGE /
MEDIUM VOLTAGE

SECONDARY SUBSTATIONS
DISTRIBUTING ELECTRICITY
TO THE DIFFERENT AREAS OF THE SITE

225 KV UNDERGROUND ELECTRICITY LINK
BETWEEN THE SUBSTATION
RTE 225/63/33 KV SUBSTATION
AND THE STORAGE SITE

FIRE BRIGADE WATER RESERVE
OF 120 M3

BATTERY CONTAINERS
LITHIUM-ION

INVERTERS
TO CONVERT
DIRECT CURRENT
INTO ALTERNATING CURRENT

WATERTIGHT CHANNEL USED TO RETAIN
EXTINGUISHING WATER IN THE EVENT
OF FIRE

INFILTRATION BASIN
ISOLATED FROM THE WATERTIGHT CHANNEL
IN THE EVENT OF FIRE

ELECTRICAL SUBSTATION
TRANSFORMER STATION
MEDIUM VOLTAGE / HIGH VOLTAGE
WITH A POWER OF 100 W,
MAIN SUBSTATION

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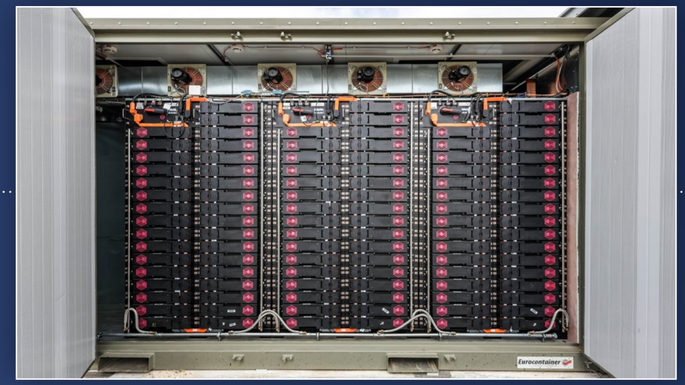
Main infrastructure elements

- **Lithium-Ion battery containers**
- **Inverters to convert direct current from the batteries into alternating current for the power grid**
- **A set of transformer stations Low Voltage / Medium Voltage**
- **An electrical transformer station Medium Voltage/High Voltage with a capacity of 100 MW**
- **A buried 225 kV electrical link between the RTE 225/63/33 kV substation and the storage site**



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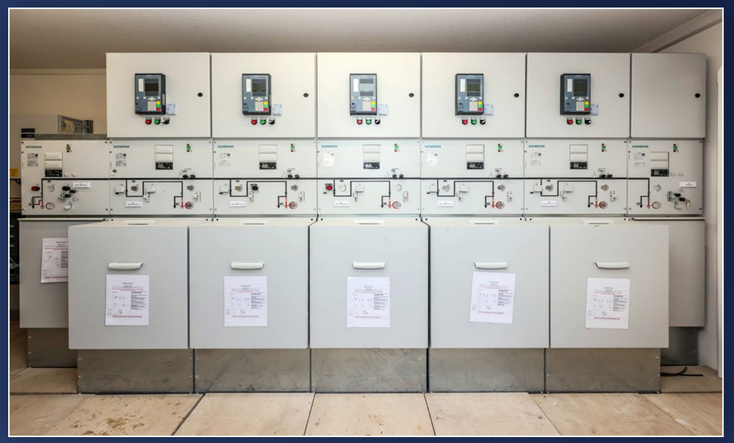

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CLAUDIA'S GENESIS

CLAUDIA'S OVERVIEW

Partners of choice

The EIB, a major support for the deployment such a project

The European Investment Bank (EIB) is backing solar energy producer Amarenco, which is developing one of Europe's largest battery storage projects in Saucats, Gironde.

- With €16.5 million from the European Investment Bank, Amarenco Group will host a 105 MW battery energy storage system (BESS) in Saucats to provide flexibility to the national grid.
- This project represents 50% of the battery energy storage capacity allocated under RTE Réseau de Transport d'Electricité's «AOLT» long-term call for tenders for new carbon-free energy capacity.
- This funding is part of the European Commission's mandate for energy demonstration projects (EDPs) under the #Innovfin scheme. Its aim is to support projects that are likely to contribute to the EU's energy and climate objectives, first and foremost the European Green Pact, which aims to make Europe carbon neutral by 2050.
- This funding for a highly innovative technology aims to demonstrate the commercial viability of one of the largest BESS projects in Europe, while increasing the stability of the electricity distribution network and enabling greater integration of renewable energy projects within the EU.

LENDOPOLIS, the RE crowdfunding platform

Amarenco has turned to the Lendopolis investment platform to help finance its lithium-ion battery storage unit in Saucats. 1,076 investors raised €4 million. The fund was closed on 29/07/2022.

Structure of the transaction

The investment required to develop and build the storage unit amounts to around €56m.
These investments will be financed by :

Contributions from the Amarenco Group

- Long-term senior bank financing
- Long-term senior bond financing
- Lendopolis simple bond financing
- Other short-term bonds

European Investment Bank

LENDOPOLIS

Partners of choice

NALDEO, a lasting collaboration between energy pioneers

The Naldeo teams initially supported Amarenco on the Claudia project, but their expertise did not stop there. They have continued to support Amarenco on various other projects.

Amarenco chose to work with Naldeo because of their in-depth knowledge of the markets. Their expertise in project sizing project sizing was decisive. Their understanding of how batteries work and their knowledge of the various players in the sector were key factors in the decision to work with them, Naldeo has successfully supported Amarenco on these smaller but equally important projects, because what is experimental today could become the standard tomorrow. become tomorrow's standard.

The Naldeo Group has been supporting industries and regions in the energy transition for over 60 years. Its branch, Naldeo Technologies & Industries, is involved in all aspects of innovation in industry. The teams bring together skills in strategic consulting, process engineering, industrial risk management, operating safety of complex systems, energy efficiency and environmental protection. of complex systems, energy performance and digital tools.

Their customers benefit from independent, objective support, from strategic thinking through to the implementation of innovative solutions.

Naldeo
TECHNOLOGIES & INDUSTRIES

NIDEC, partner in battery energy storage

The Claudia project is being developed in partnership with Nidec Industrial Solutions, a pioneer in the supply of battery energy storage solutions, for the construction of the asset.

Nidec Industrial Solutions, based in Roche la Molière, is responsible for supplying the inverters and battery management technology for the project.

The « Claudia » project comprises 54 containers equipped with lithium-ion batteries, designed to ensure the security of supply and stability of the electricity system in France.

Nidec

Amarenco, a pioneer in regenerative solar energy

Our ECHO program reflects a long-term commitment to a future where renewable energy powers a healthier, fairer and more sustainable world. By putting regeneration at the heart of our mission, we're not just changing the way the world produces energy; we're redefining the role of solar in society, making it a vehicle for environmental and socio-economic regeneration.»

Alain Desvigne
CEO Amarenco

ECHO PROGRAM

Rethinking energy production to deliver a sustainable and exciting future.

Amarenco, an innovative and independent player in the production and storage of solar energy, embodies a revolutionary vision of renewable energy, which goes beyond electricity production to embrace a global regenerative approach.

Driven by a mission that is at once environmental, socio-economic and cultural, our group is committed to transforming the global energy landscape. Our signature «Invest RE.Generation» symbolises this vision, proposing a sustainable business model that combines technological progress with environmental preservation.

Strategic expansion and measurable impact.

With a clear ambition to become a world leader in the solar energy sector, we have planned a significant expansion, targeting a capacity of 25 GW by 2050.

This growth is anchored in a reality of projects already up and running, producing hundreds of megawatts of clean energy. The impact of these initiatives goes beyond numbers: each GW installed by Amarenco represents a substantial reduction in emissions, making a significant contribution to the fight against climate change.

Roadmap


2022
2023
PIONEERS
Define regeneration potential, identify solutions, start pilots
2024
2025
UNIFIERS
Apply ECHO solutions to our portfolio
2025
2030
CHANGEMAKER
Change the scale of our impacts
2030
2050
REGENERATION
Adapt to the evolution of our world's ecological reality as the results of regeneration become visible

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