

Dunkirk

Building a leading territory for low-carbon industry

BUILDING A LEADING TERRITORY FOR LOW-CARBON INDUSTRY



Patrice VERGRIETE
Former minister
Mayor and President of the
Greater Dunkirk Urban Council

Dunkirk is now clearly recognized on a national and international scale as a model region for the low-carbon reindustrialization of France. Our region has also been known for its collective-led energy transition strategy since 2014.
Our industrial projects are taking shape. Verkor and Neomat, both of whom are recent arrivals, are no longer promises for the future: they have already provided the first few thousand jobs for local residents. At the same time, our legacy industries are being transformed: ArcelorMittal has now committed to its electric furnace; Aluminium Dunkerque is expanding.

Our territory will be engaging in major developments in the coming years, with the construction of two EPR2 reactors, ***strengthening our position as Europe's leading energy hub.*** *Accommodating the worksite and adapting our public services is a big challenge. But this is also a huge economic opportunity for our local SMEs and VSBs. At the same time, we are diversifying our local economy – a priority to avoid becoming dependent on a single sector of industry:this has led to us developing a range of businesses, especially in the agri-food sector and industry. The brownfield site previously occupied by SRD is now home to the ATLAS project and Technip, seeking to produce sustainable aviation fuel – a reflection of our decarbonization aims and of the industry of the future.*

And to stay on the cutting edge of the industries of the future, we'll be welcoming SoftBank and Schneider Electric for a project involving a supercomputer and the manufacture of datacenter hardware. This will be the largest investment in our history, one that will make Dunkirk a standard-bearer in AI technology in the years to come. In addition to the 20,000 jobs we are going to create, it is this daring collective, this head start we have taken, that I want to remember.

It's this head start that the European Union has acknowledged by including us in its NetZeroCities initiative, to support the "100 climate-neutral and smart cities by 2030", alongside Barcelona, Antwerp, Copenhagen, Stockholm and Amsterdam. Indeed, the World Economic Forum has recognised us as one of the world's top 20 regions for our environmental commitment.
This recognition led to Dunkirk and its port being selected to represent France in the 'sustainable cities and ports' category at the Osaka World Expo.

Such recognition is an honour and motivates us. Climate change is ramping up. So we must catch up with it in the quest for new industrial sectors and new energy solutions, and also to get our 200,000 residents involved in this daily revolution and to ensure that they are the primary beneficiaries.
In this regard, ***decarbonization is the ideal triptych that enables us to reconcile the region's economic development, climate crisis management and environmental challenges.*** *It's all about building the economy and city of the 21st century.*

This continuing decarbonization, the driving force behind the development model, permeates all spheres of public policies, from resource management to housing and education in particular, where our collective efforts have helped us to land new engineering courses and recognition for our university as the national spearhead for training in the new areas of industrial decarbonization. As the European capital of free public transport, Dunkirk is also innovating in low-carbon mobility and engaging in its second transport revolution by introducing the concept of car-park-free factories, reinventing commuting to deliver better energy sobriety and better quality of life for employees.

These commitments lie at the heart of the 'Climate City Contract' that the Greater Dunkirk Urban Council is submitting to the European Union, along with Dunkirk Port, the Chamber of Commerce and Industry and all the economic and institutional stakeholders that make up our Dunkirk ecosystem; this 'ÉcoSystèmeD' has lent its name to our collective and to a facility dedicated to our new model of low-carbon development, which we launched in September 2024.

Over ten years after the Local Jobs Summit at which we launched this industrial, economic and social revolution, the Dunkirk area continues to assert its ambition of becoming a landmark industrial territory in Europe and worldwide.

14 Mt/years
the amount of industrial CO_2 emitted in 2019 by the Dunkirk basin, now aiming to become **carbon neutral by 2050**

35 billion €
investment in the coming years to decarbonize and transform Dunkirk's industries

600 MW
capacity from Dunkirk's planned offshore wind farm

Gravelines Power Station:
5,400 MW
installed capacity from EDF's nuclear power plant
+
3,340 MW
from two future **EPR2** reactors
planned to come on stream in 2038/2039

6 project
relating to the battery industry by 2030 with an investment of
8.5 billion €
and total capacity of 64 GWh

Up to
20,000
jobs created in the next 10 years

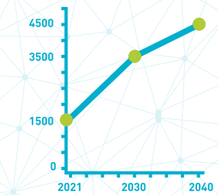
Our territory and industry are major users of fossil fuels; the energy consumption mix will undergo a profound transformation

12,329 GWh
total power used in the territory of Dunkirk in 2021, **18.5% in the form of electricity**

36,416 GWh
Energy consumed by Dunkirk's industry in 2024

Energy by source
21% electricity
72% fossil (coal, fuel oil, etc.)
7% network gas

1.5 billion €
investment by operator RTE to upgrade the electricity grid



1,500 MW
Dunkirk's electricity consumption in 2021
3,500 MW
Anticipated electricity consumption in the region in 2030, requiring French electricity transmission system operator RTE to provide 3,500 MW of power
4,500 MW
Anticipated electricity consumption in the region in 2040, requiring French electricity transmission system operator RTE to provide 4,500 MW of power

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Dunkirk at the heart of French national low carbon strategy

With the European Green Deal, the European Union has set itself the ambitious goal of becoming the first climate-neutral continent by 2050. France's National Low-Carbon Strategy (Stratégie Nationale Bas Carbone, SNBC) charts the course for this nationally, setting greenhouse gas emissions reduction targets for all economic sectors.

For industry, SNBC aims to see a 46% drop in CO_2 emissions by 2030 and a 90% drop by 2050 (compared to 1990 levels).



Maurice GEORGES

Chairman of the Grand Port Maritime of Dunkirk Executive Committee

"A major transformation is underway in Dunkirk's port area. Industry, energy, transport and logistics are changing as together, they address the challenges of the energy and environmental transition. Alongside the Greater Dunkirk Urban Council (CUD) and the territory's other institutional and economic stakeholders, Dunkirk-Port is contributing to this group dynamic and the goal of becoming carbon-neutral by 2050. The collaborative effort is embodied by ÉcosystèmeD, which brings together Dunkirk-Port, the CUD, the Littoral Hauts-de-France Chamber of Commerce and Industry (CCI), the Hauts de Flandre Greater District Council (CCHF) and many partner companies.

First and foremost, the transition involves the transformation of our industrial activities. Dunkirk-Port is supporting the development of shared infrastructures for CO_2, heat, gas and non-standard water, encouraging the decarbonization of industrial processes, the circular economy and synergies between different industrial players. At the same time, the port is hosting new arrivals that are helping to renew and diversify local industry: electric batteries, agribusiness, alternative and sustainable fuel production, datacenters and more.

Energy is a core pillar of this transformation. The Dunkirk area is a major energy platform that is set to experience a step change with the construction of two EPR2 reactors at Gravelines and an offshore windfarm. Major investments in the electricity grid are needed to address the growing demand from port and industrial activities.

Decarbonization extends to transport, too. As France's leading port served by rail and the Hauts-de-France region's leading river port, Dunkirk-Port is modernizing its rail network, prioritizing rail freight and combined transport, and anticipating the Seine-Nord Europe canal as well as the increased freight consolidation it will allow.

Maritime transport and port services are also changing, with LNG and Bio-LNG now available along with dockside electrical power, ready to cater for the electric and hybrid ferries of the future and the roll-out of low-carbon equipment and service vessels.

Dunkirk-Port is also adapting the port area in step with the city district's new soft mobility modes. The challenge is to achieve more sustainable connections between the port industrial area and the rest of the territory, facilitating employees' and users' daily commutes and supporting changing mobility practices."

THE DKARBONATION PROJECT: BUILDING A LEADING TERRITORY FOR LOW-CARBON INDUSTRY

The Dunkirk area and its near hinterland have a long history of industry – and currently emit more CO_2 of industrial origin than anywhere else in France, accounting for almost 20% of the national total.

In view of this, local industries have launched the 'CO_2 Collective' with the support of institutional stakeholders.

One outcome is the DKarbonation project, supporting the transformation of local industry towards a low-carbon model whilst ensuring sustainable and competitive economic growth.
ÉcosystèmeD has been a key driver of this project since 2022, bringing together a consortium of over 27 industrial and other partners to respond to the Low-Carbon Industrial Areas (Zones Industrielles Bas Carbone, ZIBaC) request for proposals. In 2023, this led to a Memorandum of Understanding being signed to structure the first phase of the programme, and to over 37 studies being carried out. These allowed emitting industries and infrastructure operators to consolidate their decarbonization projects, assess the feasibility of the shared infrastructures needed to deploy them and identify the appropriate legal and business models for the transformation of the port industrial area.

DKarbonation

The DKarbonation project is a key component in the 'Dunkirk – Creative Energy' initiative, embodying the collective aim of progressing the territory towards a more resilient model combining the preservation of the environment, economic development and social cohesion.

The transformation of the territory is currently underway at ground level. The first worksites for renewables (offshore wind and solar power) and low-carbon power (EPR2 reactors) will be launched in late 2026, contributing to industrial decarbonization through the electrification of industrial processes. ArcelorMittal's low-carbon steel production project will enter the works phase in 2027. Forthcoming industrial locations and investment announcements will further strengthen this dynamic and confirm the territory's commitment to a transition that is now vital for its economic, environmental and social future, as well as for the fight against climate change.





François LAVALLÉE

First Vice President of the Hauts-de-France Chamber of Commerce and Industry
President of the Littoral Hauts-de-France Chamber of Commerce and Industry
President of the Calais-Boulogne/Mer Port
Vice President of the Dunkirk Port Board of Trustees

For several years now, local economic, industrial, institutional and academic stakeholders have worked alongside the Littoral Hauts-de-France Chamber of Commerce and Industry to ensure these events make a meaningful contribution to industrial decarbonization. Successive editions of the event have seen it become a key discussion forum where experience is shared and practical solutions shaping the industries of the future are highlighted.

Today, the Dunkirk territory plays a unique role in this dynamic. It has become nothing less than a laboratory for the industrial transition, where innovative projects dedicated to cutting carbon emissions are developed, tested and deployed. Our collective aspirations bear witness to the ability of our businesses to anticipate changes and turn challenges into opportunities.

This is a crucial issue. The effects of climate change are now visible. In response, each actor is taking the measure of their responsibility in this respect. Evolving a low-carbon economy is a way to prepare for the future, preserve our competitiveness and act on behalf of future generations for the world that we will be leaving to our children.
Despite the prevailing uncertainties surrounding the economy, energy and geopolitics, we cannot afford to relent. The transition must continue with determination, pragmatism and confidence.

And indeed, this is the course the Dunkirk territory has committed to: progress and innovation as we build the sustainable industrial solutions of tomorrow – today.



SKILLS TRAINING – A KEY VECTOR FOR TRANSITION

Dunkerque, l'Énergie Créative ('Dunkirk – Creative Energy') is a collective dynamic that combines industrial transformation, the green transition and local development. The Hauts-de-France region is responsible for a large proportion of France's industrial CO_2 emissions. In response, the Dunkirk area is asserting itself as a place to experiment and accelerate the transition: a territory that can be economically competitive, create jobs, innovate, deliver quality of life and combat climate change.

Dunkerque 2030 is the territory's plan for European-scale industrial and ecological renewal. The development of an electric battery industry, the far-reaching transformation of major legacy industrial sites, new EPR2 nuclear reactors, renewables and more recently an innovation ecosystem (with the launch of Innov'CAMP) are all strengthening the local dynamic that seeks to make Dunkirk a national benchmark for low-carbon industry.

This swift transformation calls for an **innovative local dialogue** to support local residents and help them understand the changes that are now taking place. ÉcosystèmeD makes sense of industrial projects, energy issues, economic opportunities and the jobs of tomorrow through awareness-raising, special events and initiatives directed at the general public, ensuring that local transition is widely shared and understood.





Paul-Loup TRONQUOY,
President of the Hauts de Flandre Greater District Council
Mayor of Bergues

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Climate change reminds us of the need to adjust our policies to face the issues of the future. Decarbonizing our economy is one of the strategic avenues we need to pursue. All stakeholders need to respond in their own way, depending on their various assets, limitations, resources and history.
The Hauts de Flandre Greater District Council (CCHF) covers a rural and agricultural area. The transition we are putting together is rooted in this identity.

We're already looking in detail at how to reuse local production within our community. The flax shive boiler in Wormhout is one practical example: a byproduct of local agriculture has become a source of energy to heat public facilities. This initiative is a good illustration of the CCHF's 'promote local' policy. Renewables, short circuits and the Local Food Project (Projet Alimentaire Territorial, PAT) are further illustrations of the same policy, making it possible to create local loops and gradually reduce our dependency on fossil fuels. The new Local Housing Plan for the next six years (approved in February 2026) is also linked with this policy, supporting the improvement of existing homes. We can also leverage other resources such as the development of public transport and green mobility. For instance, the CCHF offers free bus services and demand responsive transport.
Our aim is clear: building the right transition. To do this, we need to draw on our agriculture, expertise, values, assets and collective creative abilities and I invite all those concerned to do so.

Decarbonization is an opportunity for our agriculture, our local economy, our countryside and the autonomy of our territory.

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Careers advice and training are also key levers in this dynamic. Amid the prospect of thousands of new jobs, the territory is structuring local resources to support young people, families, jobseekers and employees as they transition to developing industries and energy-related sectors.
The Dunkirk territory Education Pact (Pacte Éducatif du Dunkerquois), careers advice schemes, '20,000 jobs' spaces, forums and social inclusion initiatives all seek to link schools, business and career paths for the long term.

Skills and training are at the heart of the ecological, digital and demographic transitions. As the winner of the Call for Expressions of Interest for Jobs and Skills of the Future with the C-DéCIDé project, the territory has been working to develop six broad areas of training relating to industrial transformation (electrification, renewables, CCS/CCUS, heat recovery, the circular economy, digitalization and the optimization of industrial processes). Since 2020, the Dunkirk employment area has been home to two engineering schools offering courses in energy engineering (EILCO and IMT Nord Europe).

In response to demand, the Greater Dunkirk Urban Council has launched a **Jobs, Business Lines and Skills Observatory** (Observatoire des emplois, métiers et compétences) as part of the C-DéCIDé project, anticipating changes in the job market, identifying business lines suffering from labour shortages and adjusting the local training offering. The Observatory acts as an interface between industry, employment organizations, training bodies and local authorities, and seeks to establish a coordinated response to demand for skills relating to reindustrialization and decarbonization.

At the same time, **the ÉcosystèmeD building** is both a showcase and a resource hub for the transformation. The low-carbon energy-plus facility is home to innovation, training, applied research, experimentation and support for projects. Its technology halls, collaborative workspaces, Innovation Park and business incubator premises make it a tool for companies, start-ups, students and local stakeholders committed to the energy transition, industrial ecology and decarbonization.

Innov'CAMP extends this same aim, linking two complementary structures: an Incubator to nurture and accelerate innovative projects and a Campus for training, experimentation and networking. Focusing on issues relevant to industry, the port and territories in transition, it is part of a partnership approach bringing together public, economic, academic and innovation stakeholders to produce ground-level solutions designed to help transform the Dunkirk area.



Frédéric MOTTE

Hauts-de-France regional advisor and delegate for economic transformation

President of the Rev3 Mission.

"

Recent heatwaves have had a major impact on local residents and several economic sectors playing a key role in developing Hauts-de-France, reminding us that action to combat climate disruption is urgently required. We need to act for the future and actively prepare the way for future generations.

Fortunately, here as in many other areas, the Region has had the wisdom to anticipate change. The energy mix adopted in 2018 remains unique in France in terms of the scope of its ambitions: ongoing support for the installation of innovative heat networks in all territories, support for solar power, ramping up geothermal energy and more.

***We are pursuing these aims. Every year for the past ten years we have taken a step further with the rev3 initiative** rolled out across the entire Hauts-de-France Region. Transforming both the way we produce and the way we consume is vital to address climate challenges.*

It's also an excellent opportunity to reduce our dependency on fossil fuels and boost the competitiveness of our economy.

Today, we are placing a special emphasis on supporting local businesses as they define their decarbonization strategies, especially in the field of electrification.
Indeed, behind every investment, equipment modernization and locally-produced renewable energy lies the issue of our energy sovereignty.

With rev3, we can make this transformation into a major strength for our businesses, local people and the future of Hauts-de-France.

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Région Hauts-de-France

3 FORWARD LOOKING SCENARIOS TO REACH CARBON NEUTRALITY

As part of Phase 1 of the ZIBaC programme, a global strategy study covering the Dunkirk industrial cluster was conducted.

The study covered the area's top 14 legacy industrial sites ranked by emissions and subject to ETS in 2019, plus 7 industrial stakeholders in the process of locating to the territory with a high impact on energy use and/or CO_2 emissions

To guide low-carbon strategic planning, three different future scenarios were developed and modelled. These three narratives describe different potential trajectories for France's industrial development, taking into account EU policies, local authority governance, economic outlook and innovation dynamics.

All three scenarios allow the decarbonization goals set by SNBC for 2030 and 2050 to be met. They are based on using a combination of nine decarbonization levers, listed below.



DECARBONIZATION LEVERS

Energy transition:

• Sobriety and energy efficiency

Sobriety and energy efficiency are a fundamental component of decarbonization. They offer scope for 'no-regrets' emissions reductions that are often economically beneficial and reduce the use of energy, water and raw materials.

Energy sobriety policies aim to rethink needs and uses to cut consumption at source. Energy efficiency measures, meanwhile, are based on the optimization of industrial processes through the deployment of new technologies, data mining and continuous improvement of operational performance.

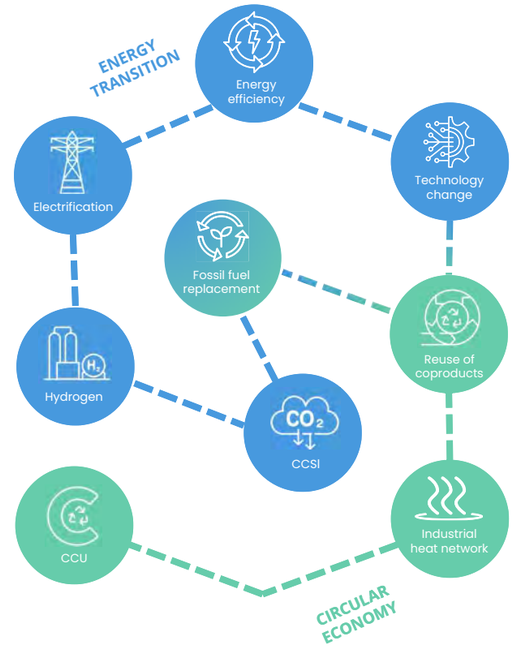
• Replacement of high-emissions fossil fuels

In 2024, the local energy mix was still dominated by fossil fuels (72%). Decarbonization of the industrial cluster therefore involves shifting this energy mix towards electricity and other low-carbon energy.

The first stage in cutting emissions is to replace the highest-emitting fuels with lower-carbon-intensity alternatives. In particular, this could involve replacing heavy fuel oil by natural gas in certain industrial processes. This approach allows significant emissions reductions to be achieved, but does not lead to full decarbonization. Biofuels and other low-carbon energy sources have more potential in this respect, and need to be considered in studies.

The transition must be gradual and supported by technological innovations geared to the particularities of certain industrial sectors and the development of new energy sources such as hydrogen.

This lever also includes the replacement of coke (used as a reducing agent in some industrial processes) by bioreducers; this calls for the setting up of new supply chains.



• Electrification

Electricity produced in France has a low carbon intensity, so electrification of processes is also a major lever for decarbonization. This involves replacing equipment that uses fossil fuels by electrically-powered technology.

However, implementing this transformation is dependent on several conditions. The main challenges are grid capacity (involving the commissioning of a 400kV power line serving the port and surrounding industries), the adaptation of technologies to highly complex industrial processes, the corresponding investments and controlling the cost of electricity.



• **Hydrogen**

Hydrogen is destined to play a major role in achieving carbon neutrality. It can replace fossil fuels in several high-emissions industrial processes, in particular in the steelmaking, chemicals and refining industries. Over and above its industrial applications, hydrogen can also be used as an energy source in transportation for specific uses such as long-distance refrigerated transport.

However, at present, hydrogen is not widely used in this way by local legacy industries. The development of this solution is therefore a key factor in diversifying the local energy mix and strengthening European energy sovereignty.

• **Technological change**

Technological change involves the adoption of innovative technologies capable of achieving in-depth transformation of industrial processes and cutting the related emissions. These changes can facilitate electrification, the use of hydrogen, and the recovery of byproducts.

The main technologies contributing to this lever include the production of direct reduced iron (DRI), inert anodes and electric arc furnaces (EAF), all structural solutions for the decarbonization of industries responsible for the most emissions.

• **CCS**

Carbon Capture and Storage (CCS) involves capturing CO_2 emissions directly from specific industrial sources, in particular high-temperature operations, and transporting the CO_2 to storage sites elsewhere, such as geological formations in the North Sea.

CCS is envisaged mainly for 'hard-to-abate' CO_2 emissions, i.e. emissions from sectors of industry in which the implementation of other decarbonization levers is technically or economically difficult.

Successful deployment of CCS is dependent on several factors: availability of transport and storage infrastructures, applicable regulatory frameworks, the definition of responsibilities relating to long-term storage, and alignment with European Union climate policies and incentive mechanisms.

The circular economy:

• **Recovering materials and byproducts**

Transforming local resources into competitiveness levers

The circular economy has been transforming industry in and around the port of Dunkirk for several decades now. Ecopal, a non-profit body set up by key local stakeholders in 2001, is leading the way in this collective dynamic of 'industrial and territorial ecology' (Écologie Industrielle et Territoriale, EIT).
The Dunkirk area is a pioneer of EIT in France, developing an ecosystem grounded in cooperation, resource-pooling and industrial synergies.

Turning each material into a resource

The fact that major industrial sites, SMEs and VSBs, social and solidarity economy stakeholders, local authorities and public-sector partners are close together makes it easy to identify complementary factors and transform materials, coproducts and byproducts from a given process into resources for other businesses.
These synergies decrease the use of virgin resources as well as cutting waste and related emissions – they open up new applications and strengthen supply chain resilience, too.
In the port industrial cluster, this approach has seen developments such as the recycling of scrap metal to produce low-carbon steel, the use of lower-carbon inputs and better use of slag.
The approach also supports decarbonization and industrial sovereignty through the use of local resource loops.

Existing recovery loops

Dunkirk's port industrial cluster already boasts many synergies between industry, logistics and agribusiness:

- Slag from blast furnaces is reused in the manufacture of low-carbon cement;

- Wooden pallets are directly reused or turned into furniture;

- Sediment from dredging is reused in the highways and construction industries;

- Used edible oils can be supplied to new industries such as biofuels production, with the oils in question being recycled into methyl esters;

- Metals from batteries can be recovered to make other equipment such as bike frames and frying pans;

- Paper and cardboard are collected and recycled for reuse;

- Aluminium is reused in industrial processes and can be recycled almost indefinitely.

• **Industrial heating network**

The industrial heating network will add to the Dunkirk area's attractiveness and synergies, as well as cutting greenhouse gas emissions and energy demand, recovering industrial waste heat and promoting new, low-carbon means of production to address the territory's existing and future needs.
However, stakeholder coordination and long-term risk management in this area are still challenges.

• **CCU**

Carbon Capture and Utilization (CCU) involves capturing CO_2 from industrial processes and reusing it as a raw material in chemicals, fuels and construction materials. CCU thus encourages the development of new industrial value chains and reduces the use of fossil resources.

• **The water loop**

Water management is at the heart of the Dunkirk area's industrial and territorial ecology, having been part and parcel of its industrial development for over fifty years. Recognized internationally as a pioneer in this field, the territory has boasted a non-potable industrial water network supplied from canals since the 1970s. Fifteen companies draw a total of 22 million cubic metres per year from this network, thus saving drinking water for other uses.

In the face of climate change, evolving industrial demand and decarbonization projects, industrial players, government authorities, Grand Port Maritime of Dunkirk (GPMD) and local authorities are anticipating higher demand for this resource by implementing enhanced sustainable management policies.
These involve several core initiatives:

Optimizing industrial water use by supporting existing businesses and new projects as they shift to more 'sober' solutions such as the use of rainwater, internal re-circulation, storage, and the temporary postponement of certain actions if needs be. The initiative is being spearheaded by GPMD, the Dunkirk Area Water Syndicate and ÉcosystèmeD.

Developing a circular water economy, re-using water discharged by one company for processes on a neighbouring site, reducing resource consumption and creating new synergies.

Diversifying non-conventional water resources through the reuse of treated wastewater from urban wastewater treatment plants, led by the Dunkirk Area Water Syndicate and the Greater Dunkirk Urban Council.

Evaluating new uses for seawater to replace canal water where processes allow, headed up by the Greater Dunkirk Urban Council, GPMD and ÉcosystèmeD.

Dunkirk's port industrial area thus aims to become a European leader in sustainable water management, demonstrating the feasibility of using non-conventional water and its compatibility with economic development, climate resilience and resource preservation on an industrial scale.





DEVELOPING DECARBONIZATION-FRIENDLY INFRASTRUCTURES

Collective infrastructures are a structural lever for the decarbonization of existing industrial activities and a way of making the territory more attractive. Developing these infrastructures helps strengthen territorial resilience by creating synergies between industrial sites, sharing costs, optimizing resource management and installing new businesses.

For cross-border territories such as that of Dunkirk, they need to be planned at national or even European scale. As such, they must be fully integrated into France's national decarbonization strategy.
At local level, the main collective infrastructures being considered as part of the DKarbonation programme relate to electricity, water, hydrogen, the industrial heating network and CO_2.



> Electricity

The electrification of industrial processes is one of the main levers for the decarbonization of industry. The strategy study estimates that demand for electricity could increase threefold by 2050 compared to 2024 levels.
In view of the needs relating to the decarbonization of existing industries and the installation of new businesses within the port industrial cluster (ZIP), French electricity transmission system operator RTE is predicting a rise in the demand for electricity to some 3,500 MW by 2030 and 4,500 MW by 2040. RTE is planning grid upgrades with an investment value of more than €1.5 billion to absorb the increased demand and allow the 600 MW of capacity from the Dunkirk offshore wind farm and the 3,340 MW of capacity from the two forthcoming EPR2 reactors at Gravelines to be dispatched into the grid.



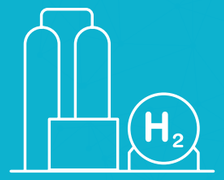
> Water

Starting in the 1970s, Dunkirk has developed an industrial water network with a total capacity of 22 million cubic metres of non-potable water, thus preserving and optimizing the resources for all types of use across the territory.
Preserving water resources is all the more relevant in the light of the need to adapt to climate change and welcome new industrial activities. It is achieved in several ways:
- implementing water-saving measures and optimizing water use;
- seeking the best available technology for new industrial projects;
- developing ways of re-using treated wastewater;
- returning water from industrial processes to the network;
- setting up water exchanges between industrial sites.

All local stakeholders are engaged in the work to make such initiatives a reality, thereby enhancing the attractiveness, resilience and sustainability of Dunkirk's leading industrial cluster.

> Hydrogen

Large-scale use of hydrogen is part of the solution for achieving CO_2 emissions reduction targets. Renewable and low-carbon hydrogen can replace fossil fuels in many industrial applications, and in doing so contributes to better air quality and the development of a new industry for France.
However, the sector is currently stagnating, with several projects being reassessed at present. Whether the end use of hydrogen is in steelmaking, chemicals, heat production or mobility, its economic competitiveness is the main determining factor in its development.
Deploying a competitive hydrogen ecosystem in Dunkirk is therefore a key challenge, calling for the implementation of a supply and production mix capable of delivering flexibility and cost control.



> Industrial heating network

Almost 70% of the energy used by industry in France goes towards producing heat. This energy can be broken down into three roughly equal parts:
- one third is used for low-temperature requirements (less than 100 °C);
- one third is used for temperatures between 100 °C and 400 °C;
- one third is used for temperatures above 400 °C.

Some industrial processes call for temperatures in excess of 1,000 °C, notably in steelmaking and the construction materials industry*.
Locally, the development of an industrial heating network would allow the waste heat from some industrial sites to be recovered and used by other industries, thus decreasing the use of fossil fuels.
The network could also be supplied from new low-carbon heat production installations shared by multiple industrial players, thus improving energy efficiency and the territory's competitiveness.
*Source: Polenergie and je-decarbone.fr



> CO_2

The Dunkirk area has set itself the goal of cutting its greenhouse gas emissions by 46% by 2030 (compared to 2019) and becoming carbon-neutral by 2050. To do so, large-scale community infrastructures are currently being developed. So-called 'hard-to-abate' emissions (those that are difficult to reduce by means of other decarbonization solutions) must be dealt with by implementing technologies such as carbon capture, transport, use or storage (CCUS).
CO_2 storage in deep underwater geological formations is a key component of decarbonization, recognized as such by the IPCC and supported by state authorities for its role in the decarbonization of industry at national and European level.
With this in mind, local stakeholders are working together to create an open-access CO_2 Hub designed to share carbon transport and management infrastructures for all industries.





DUNKIRK'S CO_2 HUB, THE FIRST OF ITS KIND IN FRANCE

In 2019, Dunkirk's industrial clusters were responsible for 14 million tonnes of CO_2 emissions, a figure that rises to 16 million tonnes if the near hinterland industries are included. On average, this is equivalent to 20% of all French industrial emissions. These emissions include some 'hard-to-abate' CO_2, i.e. emissions from heavy industry for which the only viable solution is for them to be captured and stored, known as CCS (Carbon Capture and Storage). This calls for the installation of a CO_2 transport infrastructure as well as a Hub to collect and export the CO_2 in question to geological storage sites.

In the Dunkirk area, two projects have been identified: the D'Artagnan project overseen by Air Liquide and Dunkerque LNG and the DKharbo project overseen by NaTran. Ultimately, these infrastructures will make up France's first CO_2 Hub.

The D'Artagnan project

The D'Artagnan project is the first CO_2 infrastructure project in France to have secured support from the European Union, with a subsidy of over €160 million as part of the CEF-E (Connecting Europe Facility for Energy) funding programme. It would transport CO_2 captured in Lhoist and Eqiom facilities. Both have secured EU Innovation Fund support.

The project would involve a pipeline network to transport CO_2 captured at the Lhoist and Eqiom facilities and a terminal for intake, liquefaction and storage prior to transportation or reuse as biogenic CO_2.

The CO_2 processing and export terminal at the port would be located adjacent to Dunkirk's LNG terminal operated by Dunkerque LNG (a subsidiary of the Fluxys Group); this is close to many local industries and has direct access to the sea. Stored CO_2 can then be loaded onto dedicated vessels and transported to natural storage sites in the North Sea, or reused.

The initial projected capacity of the CO_2 terminal is 1.5 million tonnes per year collected and shipped (CO_2 from Eqiom and Chaux et Dolomies du Boulonnais (part of the Lhoist Group)). Additional capacity could come later, depending on the needs of the basin's industrial players and funding.

The DKharbo project

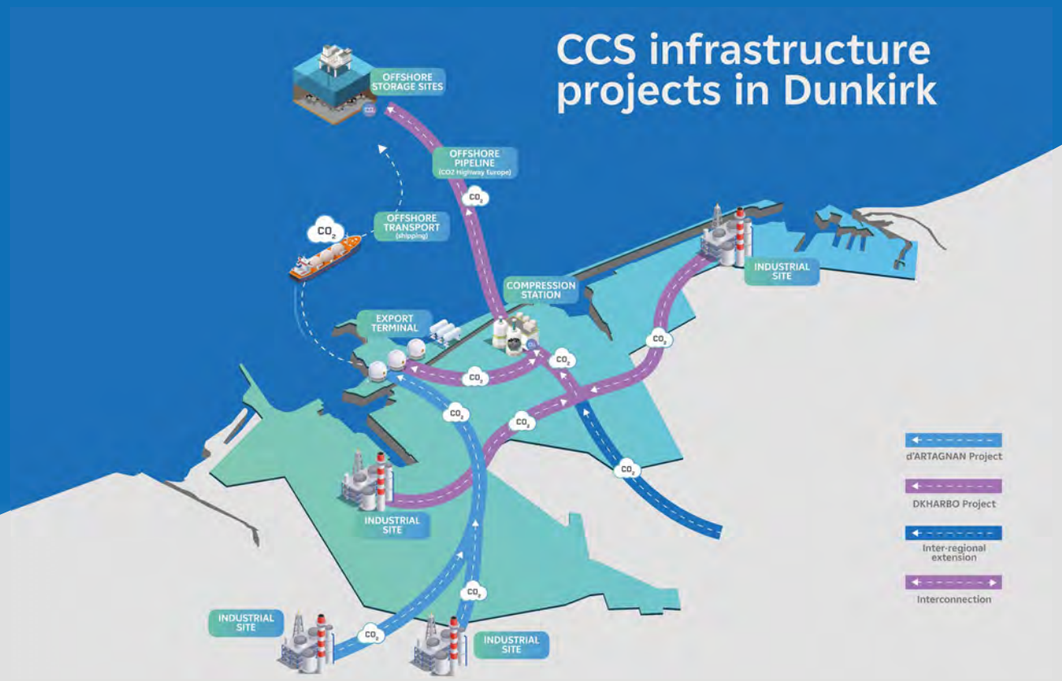
Overseen by NaTran, the DKharbo project aims to develop a CO_2 transport infrastructure in Dunkirk's port industrial cluster to reuse CO_2 or export it via an offshore pipeline to permanent geological storage sites. This second strand of the infrastructure will interface with Equinor's CO_2 Highway Europe project.

The project also includes the compression facilities needed to link the network to the underwater pipeline system developed by Equinor.

DKHARBO is part of the EU2NSEA Project of Common Interest (PCI). Together with the Highway Europe CO_2 project, it has secured European Union Connecting Europe Facility (CEF) funding in view of its contribution to decarbonization of the economy and the construction of the European energy market of the future.

Related feasibility studies have been supported by France 2030 via the ZIBaC programme, from which the DKarbonation project has secured funding.

NaTran launched an inter-regional Call for Expressions of Interest in 2026 to study the feasibility of a CO_2 infrastructure linking the Normandie, Île de France, Grand-Est and Hauts-de-France regions to Dunkirk's CO_2 Hub.



CO_2 Hub

The two projects could result in Dunkirk becoming France's first ever CO_2 Hub.
The infrastructure would offer local, regional and national industry shared capacity for the collection, transportation, intermediate storage and export of CO_2. Designed to be forward-compatible, this hub could gradually be extended with the creation of new injection points for other industries. Two CO_2 export solutions are being considered:

- **Shipping,** with the CO_2 being liquefied prior to transportation;
- **Transport by offshore pipeline,** this requires the CO_2 to be compressed before being dispatched into the dedicated infrastructure.

Neither project rules the other out; indeed, they could complement each other, effectively addressing scheduling, infrastructure availability and volume considerations.

CO_2 capture is the first link in the decarbonization chain. The technology allows carbon dioxide to be recovered directly as it is discharged from industrial processes, before it reaches the atmosphere.

After capture, the CO_2 can be reused as a raw material in various industrial processes or exported to permanent geological storage sites.

These solutions have now been recognized by the IPCC and French environment agency ADEME as decarbonization levers for 'hard-to-abate' industrial emissions.



DUNKIRK: BUILDING A LEADING TERRITORY FOR LOW-CARBON INDUSTRY

Joint testimonial by Lhoist and EQIOM

"Within Cap Décarbonation, the Lhoist and Eqiom Groups are working in lockstep to develop their CO_2 capture projects for the Chaux et Dolomies du Boulonnais facility at Réty (the 'CalCC' project) and the Eqiom cement works in Lumbres (the 'K6 Phase 2' project).
Working closely with Air Liquide and Dunkerque LNG and with the invaluable support of public authorities at local, regional and national level, our shared ambition is to make our two sites pioneers in the decarbonization of Europe's industry.

Cap Décarbonation is the first and to date the only project in France to have secured all the required permissions, but further barriers still need to be overcome, not least the economic challenges. Nevertheless, we remain convinced that projects like Cap Décarbonation are vitally important to secure our business in Europe in the long term."


Lhoist facility at Réty



Recovery and use of CO_2

CO_2 should not be seen simply as 'waste' that needs to be disposed of: it is also a resource that can be re-used as a raw material in many industrial applications.
CO_2 consists of one carbon and two oxygen atoms, and can be used in several ways:

Direct use
CO_2 can be used directly in several industries. Examples include:
- production of dry ice;
- cooling fluids and liquids;
- water treatment;
- food production processes;
- industrial carbonation processes.

Biological use
CO_2 can also be used in biological processes, including the use of photosynthesis to grow microalgae, opening up the way for new applications in chemicals, food and energy.

Chemical use
One of the most promising avenues for reusing CO_2 is chemical transformation.
Combined with other compounds, CO_2 can be used to make many high-value products. These include:

- urea, used as a nitrogen-rich fertilizer for agriculture;
- salicylic acid, a chemical precursor to aspirin;
- polycarbonates, used to make eyeglasses, contact lenses, CDs and DVDs;
- polyurethanes for the manufacture of foam, elastomers and insulating materials.

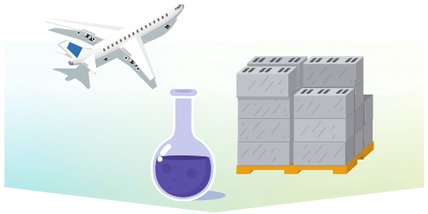
Materials and construction
Advanced research is also being conducted into CO_2 mineralization and carbonation, in particular for it to be integrated into construction materials and to harden concrete, thus helping cut the construction industry's carbon footprint.

Production of energy and synthetic fuels
One of the most promising applications is the production of energy using biogenic CO_2. Processes such as hydrogenation, reforming, electrolysis, photo-electrocatalysis and various thermochemical processes allow CO_2 to be used to make the following:
- methanol;
- formic acid;
- synthetic fuels.

Technologies like these could play an important role in the decarbonization of sectors of industry for which direct electrification is difficult, notably some forms of transport and heavy industry.

For synthetic fuels to qualify as renewable fuels of non-biological origin (RFNBO), the RED III Directive will require the use of biogenic CO_2 (from biomass, anaerobic digestion or compliant biological processes, or captured directly from the atmosphere (DAC)) by 2041.

Broad-potential CO_2 uses


E-fuels, chemicals, materials

REUSE

THREE POTENTIAL WAYS OF REUSING CO_2 CAPTURED AS THE FIRST VITAL LINK IN THE CCU CHAIN

DIRECT	BIOLOGICAL	CHEMICAL

Source: ADEME

An example of a CO_2 recovery project:

- **Critical Polymers**

Critical Polymers develops innovative processes combining the recycling of plastic and the reuse of CO_2 emitted by the industry. Critical Polymers first process uses CO_2 in its supercritical state (high pressure and moderate temperature) as a solvent to decontaminate plastics such as flexible PVC. The carbon footprint of this process is at least 50% smaller than the production of virgin plastic. Critical Polymers transitioned to semi-industrial scale in early 2026, commissioning a pilot plant with annual capacity of several hundred tonnes at Dunkirk port; to date, performance has achieved all technical and economic goals in full.

Critical Polymers is now preparing to build a factory to recycle plastics that are not currently recycled, including floor coverings, boots, cable ducts and blood bags.

DUNKIRK'S INDUSTRIAL AND PORT FACILITIES: COMMITTED TO THE ENERGY TRANSITION

Towards a low-carbon energy mix

For many years now, Dunkirk has positioned itself as one of Europe's leading energy platforms. The territory is home to infrastructures dedicated to the production, import and distribution of many forms of energy, including electricity, liquefied natural gas (LNG), methane, biofuels, hydrogen, heat and steam. This diversity, as well as the presence of major energy companies such as EDF, Engie, Air Liquide, Dunkerque LNG, Gassco, GRDF, NaTran, RTE, Enedis and TotalEnergies, is a major asset when it comes to supporting industrial transformation.

Dunkirk is close to EDF's nuclear power plant at Gravelines. With an installed capacity of 5,400 MW and thanks to major grid connections, it is a prime access to low-carbon-intensity electricity. This production is a key asset in the territory's competitiveness and for industrial players seeking to cut their carbon emissions, in particular through the electrification of certain production processes.

However, the territory's energy consumption mix is still mostly fossil-fuel-based, due in particular to major demand from industry for natural gas, fuel oil and coal to power various processes. The challenge is thus to transform production processes so that they use more low-carbon energy and develop solutions geared to industrial requirements.

Major investments to transform our energy model

The transformation is already underway. Industrial, energy and public-sector stakeholders are investing to adapt production capacity, strengthen networks and address the expected rise in energy demand. The aim is to allow industrial activities to grow whilst gradually decreasing their emissions.

Electrification is a central lever in the transformation

To support the decarbonization of industrial processes and the installation of new businesses, French grid operator RTE is planning to invest €1.5 billion in the Dunkirk area by 2030. The programme includes the construction of the Flandre Maritime substation, the creation of a new substation at Puythouck and two 400,000 V overhead power lines, as well as the restructuring of parts of the existing grid. This infrastructure will enhance the territory's electrical supply capacity and provide a response to increased demand from industry. Demand is expected to increase to 3,500 MW by 2030 and to 4,500 MW by 2040.



Puythouck 400,000 V substation at Grande Synthe for ArcelorMittal's decarbonization project in Dunkirk
Copyright: RTE ACHphoto



Daudruy's RAMERY Anaerobic digestion facility - ©ACHphoto

With potential additional capacity of 3,340 MW, the two planned EPR2 nuclear reactors at Gravelines would increase production capacity by 2038/2039. With a capacity of 1.4 GW, the GridLink electrical interconnector between France and the UK planned for 2030 is another potential way of addressing future energy requirements.

The development of renewable energy is also helping to diversify supply

The increasing numbers of solar power installations placed on roofs and canopies and the offshore wind farm with installed capacity of 600 MW are all part of this dynamic.
The transition also extends to gas infrastructure. Dunkirk is a key location for gas imports to France, with the Gassco underwater gas pipeline and the Dunkerque LNG terminal with its 600,000 m³ of LNG storage capacity. This extensive network opens up plenty of scope for supporting energy diversification.

The development of renewable gases is the final component in this transition

Biomethane, bioNGV and bioLNG can help reduce emissions from applications for which electrification is difficult. One illustration of this dynamic is the commissioning in 2025 of NordMetha, the largest anaerobic digestion facility in Hauts-de-France, developed by Daudruy.

New industrial projects to speed up decarbonization

Dunkirk-Port has recently selected two projects for the brownfield site formerly occupied by the SRD refinery, combining the production of sustainable fuels and new energy supply chain infrastructures, illustrating the territory's aim of offering a diversified energy mix.
The Rebound project will be developing a sustainable aviation fuel (SAF) facility. The development of an industry devoted to alternative fuels (annual production of 160,000 tonnes of fuel using second-generation ethanol) aims to help the decarbonization of the aviation industry.
In parallel, Tepsa is investing in a new import-export platform with storage capacity of 145,000m³ destined in particular for energy transition businesses. It will provide the logistics needed for Rebound's sustainable fuel production project.

The success of this transformation will depend on complementary investments in electricity production, enhanced networks, renewable energy, renewable gases and new industrial processes, all moving forward in coordinated fashion.

With its energy infrastructures, nuclear power production and stakeholder engagement, Dunkirk has major assets for the transformation of its energy model. The aim is to shift from an energy consumption mix in which fossil fuels still dominate to a low-carbon model that reconciles industrial competitiveness, territorial attractiveness and greenhouse gas emissions reductions.

DECARBONIZING TRANSPORT AT DUNKIRK PORT

In Dunkirk, the transition to a low-carbon economy also involves transforming logistics. Dunkirk-Port is working with all its partners to achieve leaner, more consolidated, lower-carbon supply chains for both maritime and land transport.

Decarbonizing maritime transport

The decarbonization of maritime transport is already well underway in Dunkirk. The LNG terminal allows LNG and bioLNG powered vessels to refuel.
Quayside electrification is also being installed. In 2020, the port of Dunkirk became the first in Europe to use cold ironing to recharge container vessels. This development will now accelerate, with the installation of further dockside recharging facilities for ro-ro vessels and cruise ships by the end of 2029. The installations will allow increasing numbers of vessels to shut down their auxiliary engines during port calls, thus cutting quayside CO_2 emissions.
Set up by Dunkirk-Port and the Commercial and Maritime Union (Union Maritime et Commerciale, UMC) in 2021, the 'Port services and handling decarbonization working group' brings together port stakeholders to achieve a shared goal: developing the use of electricity and alternative fuels for port servicing vessels, vehicles, handling equipment and the road transport of goods.

As part of a 'cross-channel green corridor' project, Dunkirk-Port is also working with shipping company DFDS and the ports of Boulogne-Calais and Dover on a range of solutions to provide electrical power and related electrical connections to recharge new-generation hybrid and all-electric ferries.

Consolidating and decarbonizing land transport

Consolidated land transport is all about improving supply chain efficiency, reducing the carbon footprint, streamlining deliveries by road and ensuring the Dunkirk port industrial cluster is ideally integrated into international transport networks.
As France's leading port served by rail and the Hauts-de-France region's leading river port, Dunkirk has major assets in this respect; rail and inland waterway transport already account for 25% of land transport relating to maritime operations.

Dunkirk-Port is continuing to develop combined rail transport, modernize its rail network and link in new industrial and supply chain facilities.

The Port Ouest rail freight terminal entered service in mid-2026, serving industry in the Dunkirk area and cross-Channel traffic.

This allows trailers and containers to be transferred to rail for long-distance shipping: a reliable, competitive and low-carbon solution.

The waterway completes the multimodal offering.
With almost 3 million tonnes of freight shipped every year, Dunkirk provides efficient service to Lille, Dourges, Valenciennes and the Belgian and Rhineland networks.

The port is also preparing for the commissioning of the Seine-Nord Europe Canal in 2032. This new link will extend its inland waterway hinterland southwards in Hauts-de-France and to the Paris region, and further increase scope for freight consolidation.

Developing sustainable mobility within the port

As businesses grow and the number of jobs increases, employee mobility is becoming a key issue for the Dunkirk area as a whole. Dunkirk-Port is investing in new highway infrastructure to support the development of mass transit, spearheaded by the Greater Dunkirk Urban Council. At the same time, a network of 30 km greenway cycle routes is currently being developed to facilitate the growth of soft mobility within the port industrial cluster.



Bernard MEÏ
Founding chairman,
MODAL GROUP

*"**The reason MODAL GROUP exists is to build an ecosystem to serve low-carbon multimodality.** Our decision to be located within the Dunkirk port area is an embodiment of that aim.*

Outcomes include the construction and operation of a brand new road/rail transfer terminal, together with the launch of a rail freight service to Lyon (to be followed by services to the south of France and Italy). The terminal caters for trailers and containers from our clients in industry, transport and supply chain sectors."



The Modalis rail/road terminal project



©Michel Guilbert

INDUSTRY COMMITMENTS TO CARBON NEUTRALITY

Dunkirk and its hinterland are home to several of the industries in which decarbonization is the most difficult due to energy-hungry processes and emissions that are sometimes directly linked to materials processing. Worldwide, industry remains one of the largest CO_2 emissions categories. The most recent data from the International Energy Agency reveals that in 2024 a small number of heavy industries still accounted for most industrial CO_2 emissions:

iron and steel, cement, chemicals and aluminium. These sectors account for most industrial emissions: the International Renewable Energy Agency estimates that these four areas are responsible for over 70% of industrial emissions relating to energy and processes. The World Resources Institute notes that industrial processes, particularly in the cement and chemicals industries, account for 6.2% of the world's greenhouse gas emissions.

It is therefore only natural for local stakeholders in these sectors to be fully engaged using all the levers available to them.

Sources: International Energy Agency, Industry – Tracking Clean Energy Progress, 2024 data, last update: 2026; International Renewable Energy Agency, reports on the decarbonization of heavy industry; World Resources Institute, Climate Watch / World Resources Institute: worldwide breakdown of greenhouse gas emissions by sector.

- **Energy efficiency and sobriety**
- **The circular economy**
- **Electrification and process transformation**
- **Use of hydrogen or biogas**
- **CO_2 capture, transport and storage**
- **CO_2 use and recovery**

Decarbonizing these sectors of industry has an impact on the climate trajectory, industrial competitiveness, and the future of the local economy – and Dunkirk-based companies have a strategic role to play in this transformation.

With all this in mind, leading local industries are now rolling out ground-level decarbonization projects as part of a collective strategy coordinated by ÉcosystèmeD, with the aim of making Dunkirk a benchmark low-carbon industrial territory.

FOCUS ON KEY PROJECTS

ALUMINIUM DUNKERQUE

Aluminium Dunkerque is the European Union's leading producer of primary aluminium and a world leader in low-carbon aluminium, emitting four times fewer greenhouse gases than the sector's global average (Scopes 1, 2 and 3) and having lowered its emissions by 17% (Scopes 1 and 2) since 2013.

Aluminium is very much a strategic material in the low-carbon transition: it is light, conductive and very easy to recycle compared to many other metals, making it a perfect fit for the development of the circular and low-carbon economies.

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© Bastien Créqui

Guillaume DE GOŸS

Chairman,
Aluminium Dunkerque

In full awareness of our responsibilities and true to our values, more than ever before, *we are committed to playing our role in the collective dynamic to hasten the emergence of a world that takes better care of people and the environment.*



© Michel Guilbert

- **The 'LowCal' decarbonization plan**

• Aluminium Dunkerque has invested in the construction of a melting furnace capable of recycling 7 kt of aluminium and producing 20 kt more per year with a much-reduced environmental impact.

• The ACCEL CO_2 capture and storage project will allow 50% of the facility's CO_2 emissions to be captured before being transported to a secure geological storage site in the North Sea.

The aim is to significantly reduce the facility's carbon footprint by recycling aluminium and capturing 50% of its CO_2 emissions.



© Mohamed Henni

ARCELORMITTAL

- **Steel recycling**

Steel is the most recycled material in the world, and can be recycled indefinitely.

At ArcelorMittal France, steel is reused by being melted down again in the production process. 60% of this used steel is production waste recovered from the company's own sites. The other 40% come from external sources such as cans, household appliances, cars and construction materials.

The steel produced by ArcelorMittal France today contains up to 25% recycled steel. This means it uses less natural resources such as iron ore and coal, and emits less CO_2.

- **Decarbonization project**

ArcelorMittal is engaged in a major transformation of steel production at its Dunkirk facility, with an innovative project designed to reduce CO_2 emissions significantly.

The project centres on the installation of an electric arc furnace (EAF), the first for the group's flat steel products in Europe, and a ladle metallurgy furnace (LMF) that opens up the way for more sustainable steel production.

The new installations will make it possible to produce up to 2 million tonnes of raw steel per year whilst gradually decreasing the use of the existing blast furnace, a key milestone in the facility's decarbonization.

Target: - 2.3 Mt of CO_2 per year



Bruno RIBO

CEO ArcelorMittal France

In February 2026, we formally committed to investing €1.3 billion for the installation of an electric arc furnace on our Dunkirk site.

This project is a key milestone on the road to a more sustainable steel industry, at the heart of the green transition. It also allows us to ensure the long-term future of our ArcelorMittal France sites locally.
The ArcelorMittal group is committed to decarbonizing its business and has set itself the goal of becoming carbon neutral worldwide by 2050.



ASTRAZENECA

The AstraZeneca facility in Dunkirk is a worldwide flagship for the Group in the production of inhalers for asthma and COPD sufferers.

To address fast-growing demand, over €600 million has been invested since 2020 to boost production capacity and recruit over 200 employees, for a total headcount today of almost 800.

The site is also undergoing major environmental transformation, with a reduction in its direct emissions of around 96% through the decarbonization of processes and the use of low-carbon energy.

A new generation of inhalers using a propellant with a global warming potential close to zero has also been developed here, illustrating the site's commitment to sustainable innovation to better serve patients.



© Michel Guilbert

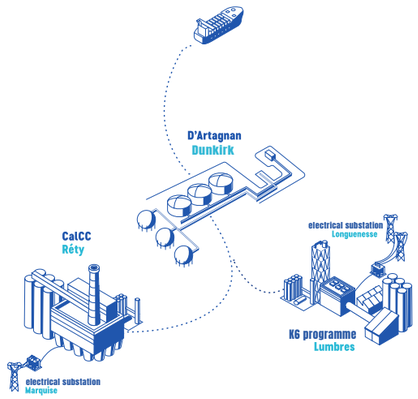
CAP DÉCARBONATION

'Cap Décarbonation' is the name given to an umbrella carbon emissions reduction initiative covering three complementary projects: Phase 2 of the K6 Programme at the Lumbres cement works, the CalCC project at the Réty lime plant, and the D'Artagnan project for CO_2 pipelines and terminal at the port of Dunkirk.

Five contracting authorities are involved: Eqiom, Lhoist (Chaux et Dolomies du Boulonnais), Air Liquide France Industrie, Dunkerque LNG and French grid operator RTE. The challenge is to capture unavoidable residual CO_2 emitted by Eqiom and Lhoist in their industrial processes using Air Liquide's CryocapTM technology and then transport it via an 80km underground pipeline network to a CO_2 terminal, planned to be located near the Dunkerque LNG terminal at the port of Dunkirk.

Temporarily stored CO_2 could then be loaded onto dedicated vessels and transported to natural storage sites in the North Sea.

The goal of this collective initiative: -1.5 Mt of CO_2 per year.



COCA-COLA EUROPACIFIC PARTNERS

Socx facility:

- Optimizing the consumption of natural gas through the use of a heat recovery loop on refrigeration units and 40-bar compressors
- Using nitrogen instead of CO_2 in some production processes
- Cutting the weight of packaging, optimizing transport and electrifying internal logistics installations
- Ongoing studies into innovative decarbonization technologies such as CO_2 capture

CCEP's target: cutting its greenhouse gas emissions by 30% by 2030 (2019 benchmark) and becoming carbon-neutral by 2040.



© SITE COCA-COLA EUROPACIFIC PARTNERS

COMILOG DUNKERQUE

- Renovation of production facilities in 2024: total investment of €42 million, securing the site's future for the next 20 years and the production of silico-manganese for the European steel industry. The use of very low-carbon electricity means that the finished product corresponds to half the greenhouse gas emissions of non-EU competitors' products.
- In this process, the use of bioreducers instead of metallurgical coke is the preferred method for cutting CO_2 emissions. Industrial testing is underway at the Groupe ERAMET's other manganese alloy factories, and the results are promising. The expected gain in emissions is around 50% within 5 years (provided there is a sufficient supply of bioreducers).
- Residual emissions will have to be captured (CCU or CCS). Prototypes are currently being tested at the group's sites, with the prospect of an industrial solution in Dunkirk in the medium term.

Target: cutting CO_2 emissions by around 50% within 5 years by replacing blast furnace coke with bioreducers and capturing residual emissions.

DAUDRUY

Companies in the Daudruy group are leveraging the circular economy to speed up decarbonization of their business lines.

Byproducts from industrial processes in refining and biofuel production can be reused to produce biomethane (CH_2) and liquid biogenic CO_2.
Biogas is dispatched into the urban gas network; liquid CO_2 can be used in the food industry.
Today, over 94% of waste is reused thanks to optimized industrial processes and the Nord-Métha anaerobic digestion facilities.



© Alexis Delespierre

The approach helps cut greenhouse gas emissions, reduce the use of fossil fuels and supports the transition to more sustainable industry.

Target: - 3.26 kt CO_2 per year.

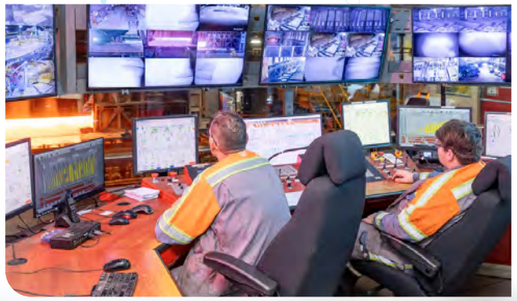
DILLINGER FRANCE

Dillinger France is part of the Dillinger group which, together with Saarstahl and ROGESA in the SHS group, are spearheading **Power4Steel,** one of Europe's most ambitious steel decarbonization projects.

The programme involves **€5 billion worth of investment** in direct iron ore reduction installations and electric furnaces. From 2028-2029 onwards, several million tonnes of low-carbon-footprint steel will be produced. Dillinger France will then transform this 'green steel' into heavy plates that are more environmentally-friendly.
The company has been ISO 50001 certified since 2013; cutting its carbon footprint is a core pillar of its strategy as it implements a whole range of initiatives to improve energy efficiency: electronic variable speed control of electric motors, optimization of compressed air networks, comprehensive use of LED lighting, heat recovery from reheating furnaces and cutting energy use during quieter periods.

These commitments have been supported by a €1.8 million grant from French environment agency ADEME for the renovation of a pusher furnace, as part of a total investment worth €10 million, resulting in a **2.7% drop in the facility's CO_2 emissions**

Dillinger France is also continuing to look at innovative decarbonization solutions; one study has confirmed the feasibility of CO_2 capture and storage. The company intends to accelerate its energy transition by benefiting from Dunkirk's industrial and port ecosystem and future low-carbon hydrogen infrastructures.





ECOCEM

Ecocem, Europe's leading independent producer of low-carbon cement, is investing €50 million in the construction of a new plant in Dunkirk.

Due to enter service in early 2027, the project comprises an ACT cement production unit, based on an innovation which cuts the carbon content of the cement by up to 70%. .

With an annual capacity of 300 kt of ACT cement, the unit will take the Dunkirk site's total annual capacity to over 1 million tonnes of low-carbon-footprint cement.

Target: a new ACT cement production unit cutting carbon emissions by up to 70%.



IMERYS

Imerys Aluminates Dunkerque is currently carrying out three decarbonization projects:

- **Precize,** launched in September 2024, funded by France 2030 and managed by French environment agency ADEME.
Precize uses innovative methods with the goal of reducing the carbon footprint of calcium aluminate cement, based on the use of hydrogen and the mineralization of CO_2 for the construction industry.
The hydrogen trials were validated in 2025; a carbonation pilot is now being examined.

- **The 4F project,** launched in 2017, aims to replace heavy fuels with natural gas.
The plan is to upgrade furnace burners to cut the related carbon footprint.
This is expected to achieve a 10-15% reduction in CO_2 emissions by 2030.

- **ERA,** also launched in 2017, seeks to maximize the use of materials from the circular economy.
ERA is targeting a 3-7% drop in CO_2 emissions by 2030 through the replacement of raw materials.



LESIEUR COUDEKERQUE-BRANCHE

Lesieur has **halved its CO_2** emissions in the space of 4 years by using several levers:

- energy optimization;
- waste heat recovery;
- process innovation.

In 2025, a €7 million investment in desublimation technology using ammonia resulted in a significant reduction in steam consumption.

This has delivered a robust trajectory towards carbon neutrality, with new targets already set for 2027.

The acclaimed initiative is a focus for employee engagement and enhances site attractiveness.



Lesieur Sublimax

REBOUND

Located within Dunkirk's Grand Port Maritime, the Rebound project seeks to produce sustainable aviation fuel (SAF) using Alcohol-to-Jet technology, which converts advanced bioethanol from agricultural and forest residues into aviation fuel. SAF emits at least 70% fewer greenhouse gases than its fossil-based equivalent. The project recycles waste from France and elsewhere in Europe and as such forms part of a circular economy approach that contributes to a locally-based low-carbon industry. REBOUND will be one of Europe's largest SAF facilities, thus strengthening Europe's energy sovereignty.

Target: producing 160 kt/year of SAF and avoiding emissions of some 500 kt of CO_2 per year.



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TEPSA

The DARA project aims to create a new multimodal liquid bulk storage terminal for chemicals and other products relating to the energy transition, covering the intake, storage, blending and secure shipping of liquid products. More specifically, DARA is also destined to provide the logistics solutions for the REBOUND project's inputs and SAF.

Target: 145,000 cubic metres of new storage capacity to support the development of new low-carbon industries and strengthen the territory's supply chain capabilities.



Air Liquide photo library

DUNKIRK, AT THE HEART OF FRANCE'S BATTERY VALLEY



VALLÉE DE LA BATTERIE
HAUTS-DE-FRANCE

The major issue on the way of France's aim to become carbon neutral by 2050 is reducing greenhouse gas emissions in the sectors with the highest emissions: energy (41% emissions), transport (24%) and construction (24%). – *Source: IEA, 2021, World Energy Outlook*

Electric vehicles are one way of cutting emissions of the gases in question. However, the strategic nature of the metals required to manufacture electric batteries and their end-of-life recycling pose ongoing challenges.
The EU Battery Regulation adopted in July 2023 has tightened requirements spanning the whole of battery life cycle.

Today, the main regulatory challenges for the industry revolve around cutting its carbon footprint, ramping up collection and recycling, implementing digital passports for batteries and ensuring the traceability and management of the critical raw materials involved.
These changes in legislation are designed to enhance circularity in the industry and minimize its dependency on external supplies.
Reuse and recycling of these metals, and the circular economy in general, are at the heart of electric mobility. Hauts-de-France is France's leading automotive region, home to seven carmaker sites, 800 companies and 55,000 jobs in the industry. Like Dunkirk itself, it is progressing in this respect through several large-scale industrial projects.

6 major projects in the territory: from battery production to recycling

Within the space of a few years, Dunkirk has become the **centre of France's 'Battery Valley'**, with the installation of Verkor's gigafactory for the manufacture of battery modules (since 2025), the Neomat CAM plant for the production of cathode active materials (by the end of 2028), the ProLogium lithium ceramic battery factory (by 2028), the installation of Enchem for the production of electrolytes and the creation of a line to produce boric acid for cathodes for Borax France. These new developments further expand the sector in the region: both ACC in Douvrin and Envision in Douai are less than 200km from Dunkirk.

A total of almost €8.4 billion will be invested over the coming years in the port and industrial area to produce and recycle electric batteries (total power of around 64 GWh by 2030).

Dunkirk's ecosystem is fertile ground for the emerging battery industry.

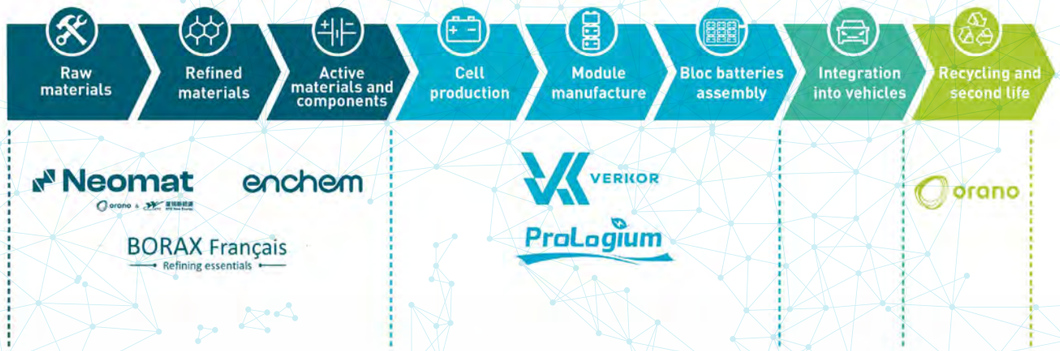
THE TERRITORY HAS MANY ASSETS TO ITS NAME:

- **The 3rd largest port in France,** boasting an excellent connection to logistics networks
- **A strong industrial culture,** a dynamic ecosystem
- **Turnkey sites** helping companies to get up and running quickly
- **Effective cooperation** between all the area's stakeholders
- **Raw materials** (steel, aluminium) and low-carbon energy

155,000 tonnes per year of 'electric' steel will be produced by ArcelorMittal at its Mardyck plant from 2025 onwards as part of a €500 million investment project. This steel is intended for electric motors in general and is characterised by its magnetic and mechanical properties.

60,000 tonnes of alloy ingots for the automotive sector will be produced by Aluminium Dunkerque from 2025. Aluminium is used to make vehicles lighter.

The vehicle electrification value chain





DUNKIRK: BUILDING A LEADING TERRITORY FOR LOW-CARBON INDUSTRY



XTC New Energy and Orano *announce the construction of their first Neomat CAM factory in Dunkirk. Left to right: Patrice Vergriete, Philippe Hatron, Michael Liu and Maurice Georges.*
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Michael LIU, CEO of Neomat CAM

"Neomat CAM seeks to play a key role in the electric vehicle value chain as it supplies reliable, sustainable materials for the batteries of today and tomorrow. Together with over twenty years' expertise in China, our high-quality technology and continuous research and innovation are sound foundations for achieving this aim. We're grateful for the commitment of all of our employees, and we would especially like to thank all local, national and European stakeholders who believed in the vision for the Neomat project."

Philippe HATRON, programme director, Batteries Orano, member of the board of directors, Neomat CAM

"In less than three years, together with our partner XTC New Energy we have helped lay the industrial foundations of a key ecosystem at the heart of France's Battery Valley. Now, with the construction of Neomat CAM, I'm proud to see this industrial project become a reality, along with the new jobs it will create, together with other French partners acclaimed for their know-how and expertise."

NEOMAT:

A joint-venture between Orano and XTC New Energy

Neomat CAM is a joint venture between XTC New Energy and Orano. In summer 2026 it started work on its cathode active materials (CAM) plant. CAMs are essential components for gigafactories, used in the manufacture of electric vehicle batteries. The plant is located in the municipalities of Gravelines and Loon-Plage within Dunkirk's Grand Port Maritime. With investment of almost €500 million, this major industrial project illustrates the industrialization dynamic in play across the Dunkirk area and more especially in the development of Europe's electric vehicle battery industry. The project is due to go live in late 2028, after which the two partners plan to commit resources to research and development by setting up a dedicated team and deploying specific installations to secure local expertise.
If market conditions allow, going forward the Neomat industrial platform could be expanded with a plant manufacturing precursor cathode active materials (pCAMs) as well as a hydrometallurgical plant to recycle gigafactory waste and end-of-life materials.

Nominal capacity of 40,000 tonnes — equivalent to equipment for 500,000 electric vehicles per year

1st — expected production run: late 2028

1 — R&D centre

400 — direct jobs, 200 indirect jobs



3D view of Neomat's site



PROLOGIUM:

Expertise: World leader in new-generation battery technologies.

Project: Construction of a gigafactory for the production of lithium-ceramic batteries for electric vehicles and other future markets (e.g. defence and aerospace).

Key dates: The gigafactory's foundation stone was laid in February 2026; production is scheduled to start in late 2028.



20 — years of expertise, over 13 of them in industry

€5.2 — billion worth of investment

1,100 — patent applications filed

130 — hectares

End goal — annual factory capacity of 44 GWh



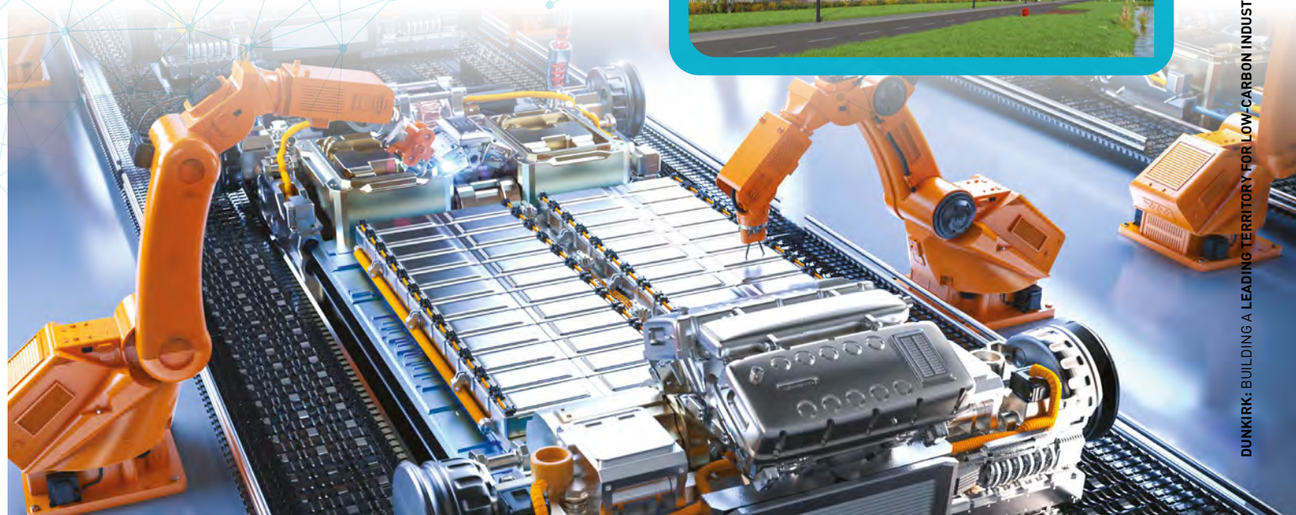
Vincent YANG
Founder and Chairman of ProLogium

"ProLogium is opening up the way for a new generation of lithium-ceramic batteries combining enhanced safety, superfast charging, high performance even at low temperatures and large-scale production capacity. By removing the main barriers to electrification, the technology is helping to create the conditions for a faster, more efficient and more sustainable energy transition, whilst accelerating the decarbonization of strategic sectors of mobility and industry. The Dunkirk gigafactory will reach a key milestone in 2026, transitioning from innovation to industrialization. Located in the heart of Europe's 'battery valley', it will benefit from largely low-carbon energy and a top-level industrial ecosystem capable of meeting the growing demand for advanced energy storage solutions.

In addition to electric vehicles, the installation will support the development of strategic applications in aerospace, defence and datacenters, thus helping improve competitiveness, resilience and Europe's industrial sovereignty."

Read the full testimonial by scanning the QR code





VERKOR:

Expertise: Production of high-performance low-carbon batteries.

Project: Creation of an electric battery cell and module production plant for electric mobility and stationary energy storage.

Key dates: Inauguration of Gigafactory 1 in 2025, first GF1 cells marketed from 2026 onwards.

€1.5 billion worth of investment

1,200 direct jobs forecast at Gigafactory 1

70 hectares of land for Gigafactory 1

16 GWh /year production capacity of the first Gigafactory, set to rise ultimately to 50 GWh/year

300,000 Up to 300,000 vehicles per year powered by its electric batteries

Cutting the carbon footprint of cells to below market average is a key ambition.



Laurent DEBRUE
CEO, Verkor

"Verkor was set up in 2020 with the clear aim of producing low-carbon batteries in Europe and supporting the transition towards more sustainable electric mobility. From the outset, we have opted for controlled development, building the industrial, technological and human foundations of our project step by step.
Today, our business is based around two complementary sites.

In Grenoble, Verkor Innovation Centre develops our technologies, industrial processes and the skills to support our growth. In Dunkirk, our Gigafactory has now entered its production phase, with target annual capacity of 16 GWh of battery cells and modules.
Dunkirk was a natural choice for this business.

Its logistics and industrial infrastructures, access to the rest of Europe and the presence of a leading industrial ecosystem are all major assets. We were also won over by the territory's commitment and the quality of the talents who live and work here.

We've seen this dynamic at work every day since we first arrived in Dunkirk. Our recruitments have also been highly successful; we are continuing to engage in training, in partnership with local schools and colleges and other employment stakeholders. At the end of the day, the success of any industrial project depends on the women and men bringing it to life.

Today, we have passed a decisive milestone as our production facility ramps up. Dunkirk is at the heart of this industrial adventure, and we're proud to be contributing alongside other local stakeholders to a new chapter in its economic and industrial history."



BORAX FRANÇAIS:

Borax Français, a subsidiary of Rio Tinto, makes specialist borates for the pharmaceuticals and nuclear industries, for agriculture, and more recently for electric vehicle battery cathodes and semiconductors. The planned production of borate salts for cathodes is in response to specific demand from the battery market for very fine boric acid (5-17 microns) devoid of magnetic impurities (< 100 ppb), in particular in NMC cathode materials with a high nickel content.

Current output: 5 kt per year for the pharmaceuticals and nuclear industries and agriculture

Additional output for cathodes: 1.5-4 kt per year



ENCHEM:

Expertise: Leading manufacturer of electrolytes.

Project: Installation of an electrolyte production plant for batteries, cathode suspensions, and NMP* recycling

** N-Methyl-2-pyrrolidone is an essential solvent in the production of lithium-ion batteries, enhancing battery component cohesion and separator performance.*

Key dates: Electrolyte and cathode suspension production and NMP recycling is planned to commence in 2027.

5 hectares

150,000 tonnes of electrolytes

57 million euro investment

100 direct jobs





Local decarbonization strategy study commissioned for the ZIBaC programme operated by ADEME

All three scenarios allow the goals to be met, but industry, state authorities and society at large have different aspirations and thus different paths to achieving a low-carbon, competitive economy in Europe.

EDF EPR2 Gravelines
Architect's impression, subject to alteration
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2019-2030

- ENERGY EFFICIENCY
- TECHNOLOGY CHANGES ELECTRIC ARC FURNACE

2031-2040

- REPLACEMENT OF HIGH-CARBON FOSSIL FUELS
- ELECTRIFICATION
- BIOREDUCERS
- REUSE OF BYPRODUCTS
- INDUSTRIAL HEATING NETWORK
- TECHNOLOGY CHANGES
- HYDROGEN
- CCS

2041-2050

- TECHNOLOGY CHANGES: INERT ANODES, ELECTRIC CRACKER, CCS

THREE FORWARD LOOKING SCENARIOS IDENTIFYING DECARBONIZATION LEVERS TO ACHIEVE CARBON NEUTRALITY BY 2050

SCENARIO: 'LANTERNE ROUGE'



In this scenario, the energy transition stagnates; low-carbon electricity remains underexploited and the technology transition does not draw on innovation or produce significant changes.
Technology change remains the leading decarbonization lever, followed by the development of CCS infrastructure.
This scenario involves a decrease in industrial production.

SCENARIO: 'ROULEUR'



The scenario envisages ongoing transformation.

New infrastructures are developed, with the exception of hydrogen, which lacks the necessary economic environment.

SCENARIO: 'ÉCHAPPÉE'



This scenario represents buoyant European industry and the application of coordinated decarbonization measures, including green hydrogen.

Production returns to 2018 levels; low-carbon energy meets over 78% of energy demand thanks to electrification.
Innovation allows new technologies to emerge; shared infrastructures support the transition.

ADAPTING TO CLIMATE CHANGE

Dunkirk and its port industrial area are particularly exposed to the effects of climate change. With a long history of resilience, the territory has gradually developed infrastructure and expertise that make the most of the fact that it is a polder, drawing on a core network of drainage structures, canals and dikes.

This experience strengthens the territory's ability to anticipate climate change, secure essential resources and support long-term industrial and agricultural development – as well as protect natural environments.

The Baseline Warming Trajectory for Climate Change Adaptation (Trajectoire de Réchauffement de Référence pour l'Adaptation au Changement Climatique, TRACC), defined in France's National Climate Change Adaptation Plan (Plan National d'Adaptation au Changement Climatique, PNACC) serves as a reference for anticipating the effects of climate change in France. The related forecasts point to a gradual increase in extreme weather events in terms of both intensity and frequency. Heatwaves, drought, heavy rainfall, storms and storm surges are therefore likely to occur more often, potentially with more serious consequences.

These developments underscore the need for Dunkirk's industrial cluster to anticipate future vulnerabilities as of now, and implement a collective adaptation programme to boost resilience.
To address this challenge, ÉcosystèmeD has launched a local climate change adaptation initiative for the industrial cluster, coordinated jointly by the Greater Dunkirk Urban Council and the Grand Port Maritime of Dunkirk with the support of France 2030 via the ZIBaC programme operated by French environment agency ADEME. This brings together industrial sites (on an opt-in basis) and network and infrastructure operators as they shoulder a shared responsibility: anticipating climate risks, preserving business continuity and securing the conditions required for local development.

The work is largely based on studies commissioned by the Greater Dunkirk Urban Council and the Grand Port Maritime of Dunkirk investigating rising sea levels, freshwater drainage and the availability of water resources. It also leverages diagnostic studies undertaken by certain industrial players for their sites, and will allow those stakeholders who have not already done so to carry out an individual diagnosis and join the collective undertaking. The approach extends beyond the boundaries of any individual site to include all the networks and infrastructures required for it to operate: energy, utilities, transport, logistics, communications, decarbonization, and water management.

A climate change adaptation committee will bring together stakeholders to share knowledge, experience and priorities for action. The ultimate aim is to develop a shared strategy and a collective action plan based on analysis of individual and shared vulnerabilities so as to strengthen long-term resilience of the Dunkirk area industrial cluster.

A world that is 3 °C warmer, in which France is 4 °C warmer

In the absence of any additional measures, existing policies and commitments by States imply the following global warming trajectory



compared to the 1850s

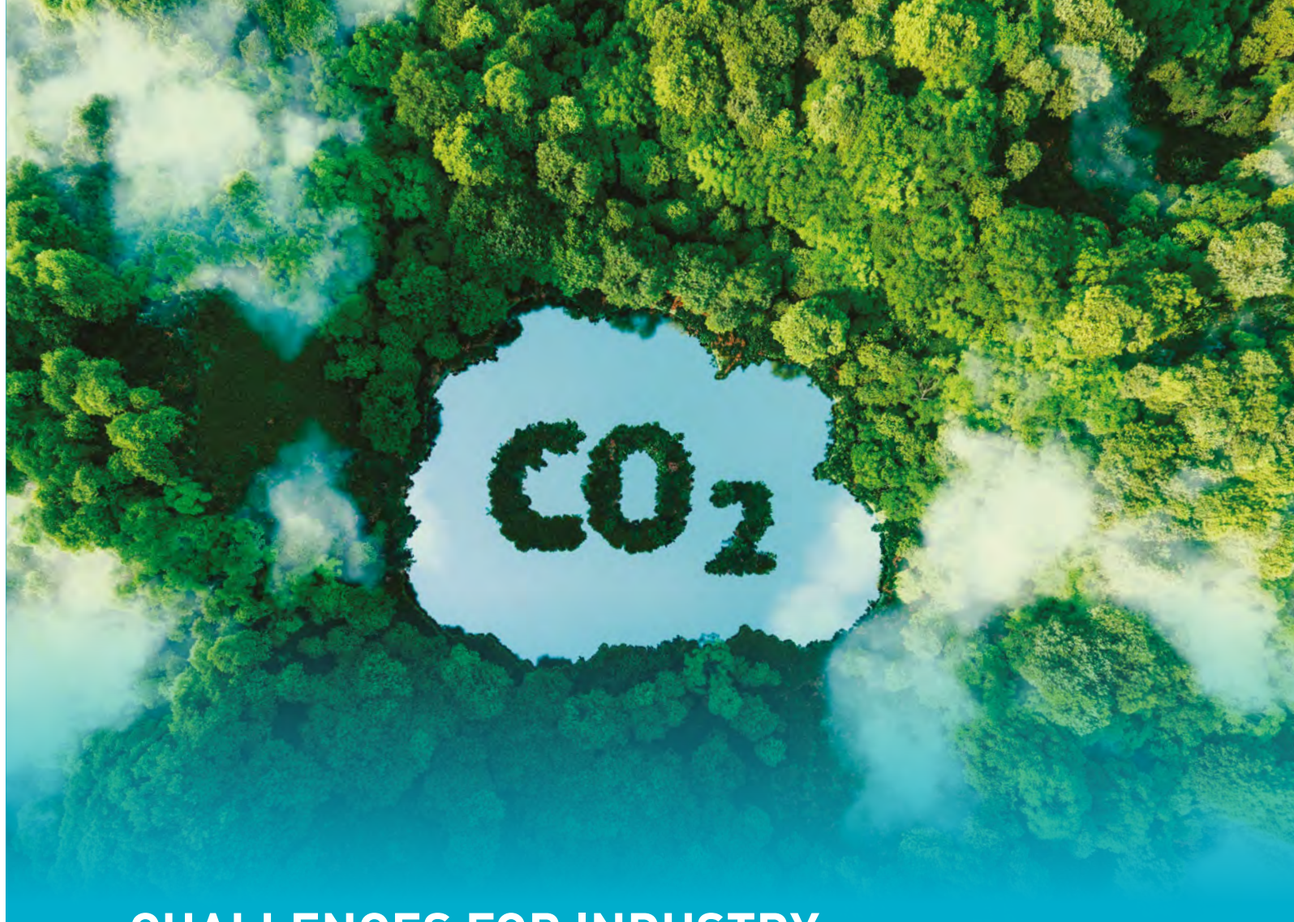
In metropolitan France, temperatures will rise even higher:



Average warming in France was estimated to be +1.7 °C in 2020.

Figure: TRACC by date and temperature rise, worldwide and for metropolitan France. Source: PNACC 3





CHALLENGES FOR INDUSTRY:

The first decarbonization lever that can be used by industry is the improvement of energy efficiency and the optimization of production processes. However, for the industrial sites producing the most emissions, becoming carbon-neutral also requires the use of new technologies – both those already available and those currently in development. Implementing these solutions calls for especially large amounts of investment, often at unprecedented levels for the installations in question.

Against an international backdrop of growing geopolitical, economic and commercial uncertainty, industry needs long-term visibility to undertake transformations on this scale, as well as mechanisms to reduce the risks surrounding decarbonization projects.

Several instruments play a vital role in achieving this. They include public financial support mechanisms such as CCfDs (Carbon Contracts for Difference): long-term financial agreements between a State and a company guaranteeing a fixed carbon price. Tax credit schemes can also help secure investment decisions by offsetting part of the additional costs attached to low-carbon projects.

France 2030 offers other support mechanisms, many of them earmarked for the decarbonization of heavy industry, alongside Energy Savings Certificates (Certificats d'Économies d'Énergie, CEE), which help fund energy efficiency projects.

Other regulatory mechanisms and public policies are also needed: stable, competitive energy prices that are consistent with the aims of France's multi-year energy programme (Programmation Pluriannuelle de l'Énergie, PPE) for the supply of affordable low-carbon power for industry; protective mechanisms such as the Carbon Border Adjustment Mechanism (CBAM) and the Steel Plan; requirements for public procurement of low-carbon products; sustained investments in research and innovation.

The success of the industrial transition depends on the implementation of coherent, ambitious public policies across the European Union and domestically to deliver a stable, coherent framework that is favourable to long-term industrial investment. This is the vital condition to ensure our industry remains competitive even as it accelerates its transition towards carbon neutrality.



Bruno BONNELL
Secretary general for investment for the France 2030 plan

As France's port and industrial area with emissions of more than 15 million tonnes of CO_2 eq per year, or around 20% of CO_2 eq emissions from French manufacturing and construction industries, the Dunkirk territory is leading many projects for the decarbonization of industry. This is exactly the case with Dkarbonation, a project submitted as part of the ZIBac call for projects (Low-Carbon Industrial Areas Support and Development Scheme). Backed by the French Government as part of France 2030, this programme aims to accelerate the decarbonization of the top ten industrial areas with the highest levels of emissions by providing them with support to consolidate consortiums, encourage partnerships in order to elicit synergies among industrialists, identify the infrastructures required and conduct the research needed for a joint decarbonization action plan.

The Dkarbonation project aims to meet the targets set by the ZIBaC, particularly concerning the difficult issue of the development of energy infrastructures, hydrogen and carbon dioxide networks, which need to be synchronized with decarbonization projects and industrial investments.

This ambition mobilises the territory's many stakeholders (industrialists, local authorities, infrastructure managers, economic development stakeholders, etc.) and enables the implementation of a coordinated strategy, which includes the topics of land use, thanks to shared infrastructures in particular, while guaranteeing coherent industrial projects in the territory. All of the foregoing help to reinforce the territory's economic attractiveness and ensure local employment thanks to a major upstream training section.

First, the TIGA programme (Territoires d'innovation de grande ambition – programme for innovative territories with major ambition), then the ZIBac, and in the future gigafactory projects, the support provided by public authorities through France 2030 for the many ambitions of the Dunkirk territory will be achieved over time: these innovations will most likely inspire other industrial basins in the future.



The decarbonization challenge, especially becoming carbon neutral, is major. The efforts and investments undertaken for the radical transformation of production methods are starting to bear fruits. Thanks to a complete decarbonization chain, Dunkirk is aiming to reduce its industrial CO_2 emissions by 55%. As a result, Dunkirk is laying the groundwork to become carbon neutral by 2050.

Over recent years, the territory has emerged as one of the pioneers of the European industry of the future. By building a dynamic ecosystem around the transition and providing operational solutions for decarbonization, Dunkirk is attracting new types of industries (fine chemistry, green hydrogen, electric batteries, etc.) but also future talents, those devoted to living in a territory at the epicentre of climate and ecological transition challenges.

*Thus, Dunkirk and its **"Creative Energy"** are role models to follow and are encouraging other industrial territories to test and share their innovations. Working together makes us undeniably stronger.*

Whether it is training courses, infrastructures, public policies, Dunkirk is now, more than ever, a real laboratory for all the transitions.

Dunkirk, Creative Energy!

Building a leading territory for the low-carbon industry



1. Air Liquide
2. Aluminium Dunkerque
3. ArcelorMittal Dunkerque
4. ArcelorMittal Mardyck
5. AstraZeneca
6. CO_2 liquefaction and export station
7. BASF
8. Borax
9. Gravelines nuclear power plant
10. Clarebout Potatoes
11. Comilog Dunkerque
12. CrystALrod
13. CVE
14. Daudruy
15. Dillinger France
16. DK6 Engie
17. Ecocem
18. Enchem
19. EDF EPR2
20. EMD-RTE
21. Eni Versalis
22. Ferroglobe
23. CO_2 compressor station
24. HSWT France
25. Imerys Aluminates
26. ProLogium
27. Neomat (Orano-XTC New Energy)
28. Rebound
29. SNF Flocryl
30. SoftBank Schneider Electric
31. Tepsa
32. Container terminal
33. Total Energies
34. Verkor

Shared Decarbonization Infrastructures

- Industrial Heat Network
- CO_2 Pipeline
- H_2 Pipeline
- 400 kV Electricity Grid
- Industrial Water Network
- Electrical Substation
- Port Industrial Zone

DUNKIRK IS HOME TO THE LOW-CARBON INDUSTRY, HYDROGEN PRODUCTION AND E-MOBILITY SECTORS

- ☑ Industrialists seeking optimal technical and economic decarbonization solutions
- ☑ Resources of co-products to recover
- ☑ Existing infrastructures
- ☑ Access to renewable and low carbon energy
- ☑ Proven industrial symbioses
- ☑ A dynamic and ambitious territory focused on development around the energy transition
- ☑ A battery sector under development

écosystème D

contact@ecosysteme-d.fr
www.dunkerquelenergiecreative.fr

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