RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

DKarbonation

ADEME AGENCE DE LA TRANSITION ÉCOLOGIQUE

EXPERTISES

ZIBAC - Studies required for the installation of photovoltaic panels on buildings and ancillary surfaces of the industrial-port zone (ZIP)

Nov. 2025

FRANCE 2030

CFP ZIBAC - Identification of photovoltaic potential and assessment of collective self-consumption operations

1. Context and objectives :

The Dunkerque Industrial-Port Zone (IPZ) is the first winner of the ADEME ZiBaC call for projects with its "DKarbonation" project, led by the public interest group EcosystèmeD. This group brings together private and public stakeholders from the territory, including the Grand Port Maritime de Dunkerque (GPMD), to promote the sustainable transformation of the area.

This study is divided into five work packages with the following objectives:

1. Precisely assess current and future electricity needs in the zone;

2. Identify capacities or potential renewable energy production that can be mobilized on the industrial-port complex;

3. A lign electricity consumption needs with local production and/or storage capacities in a short-circuit electricity logic (collective self-consumption);

4. Identify flexibility levers to activate on the public distribution network to optimize investments required for new activities and process decarbonization;

5. tudy opportunities to implement mature technologies over a 5–10 year horizon to enhance the resilience and management of distribution networks.

Work packages 1 to 3 were assigned to the engineering firm OPTE, while Enedis / Enedis R&D handled work packages 4 and 5.

2. Main results

For work packages 1 to 3 :

The main objective was to identify opportunities for renewable electricity self-consumption—both individual and collective—on the Industrial-Port Zone, while making use of available surfaces (roofs, parking lots, brownfields, basins) and promoting synergies between public and private actors.

The study reveals a significant photovoltaic potential, especially due to the large extent of unused roof and parking surfaces. However, it also highlights that a majority of the roof surfaces are unsuitable by default.

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Lot 4 :

Based on current electrical capacities and assumptions of very high future consumption, the public distribution network is sufficiently sized to allow electricity transit to customers. One source substation transformer in the zone could be overloaded for up to two hours per year under unfavorable weather conditions, with an exceedance of less than 1 MVA. In this specific case, the study concludes that it could be relevant to develop an Alternative Connection Offer with Consumer Power Modulation (ORA MP) as a flexibility solution. Currently, this solution exists only for producer clients. It would allow faster and cheaper customer connection than the Reference Connection Offer, in exchange for temporary and occasional power modulation up to a defined limit, ensuring that local transit capacities are not exceeded.

Lot 5 :

Direct current (DC) networks present a potential worth exploring. In the context of the Grand Port Maritime de Dunkerque, the preferred use case is a hybrid network incorporating a DC segment. The controllability of a DC network, combined with new DC-native usages, could facilitate the deployment of renewable energy production such as photovoltaics, as well as new energy transition uses like electric mobility and storage.

Conclusion

For lots 1 to 3, the results encourage continuing the current momentum by:

- Deepening the two GPMD collective self-consumption pilot projects for operational implementation;
- Extending future self-consumption loops to other public entities (municipalities, departmental services, public institutions) at the intermunicipal level (EPCI);
- Utilizing new surfaces (including covered parking and floating photovoltaic installations) to increase the share of local renewable energy.

Regarding flexibility (lot 4), current network development methods are sufficient, so the use of an ORA MP consumer offer is justified only in very specific cases. However, as energy transition progresses and GPMD activities expand, the ORA MP could become relevant as a complementary flexibility tool.

Similarly, DC technology will only reach maturity in 7–10 years, which is beyond immediate operational needs. Nevertheless, since industrial decarbonization projects also span several years, it is considered relevant to anticipate future electricity needs now, exploring this long-term innovation to accelerate the energy transition.

RÉSUMÉ

First winner of the ZiBaC call for projects through its “DKarbonation” initiative, the Dunkerque Industrial-Port Zone (ZIP) hosts a significant share of the territory’s energy-intensive industrial activities.
To meet the growing electricity demand linked to the decarbonization of industrial processes and to optimize energy flows as a whole, this study characterizes electricity needs, assesses the potential for renewable energy production available at the Grand Port Maritime de Dunkerque (GPMD), and examines the opportunity to integrate these sources into collective self-consumption loops. It also identifies available flexibility levers and future technologies to enhance the resilience and management of electrical networks.
The identified collective self-consumption loops are energetically coherent and could represent an economically viable model under certain tariff and regulatory conditions. Moreover, future network simulations show minimal congestion, favoring adaptation through network investments and proposing an Alternative Connection Offer with Consumer Power Modulation (ORA MP) as a flexibility solution.
Finally, direct current (DC) technology stands out for its ability to adjust the power produced or consumed by each client. Its flexibility is an asset for integrating intermittent renewable resources and anticipating new native DC uses.

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ADEME
20, avenue du Grésillé
BP 90 406 | 49004 Angers Cedex 01

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