

CLIMATE-RELATED RISKS AND THE POTENTIAL IMPACTS ON VERKOR BUSINESS ACTIVITIES

I. Introduction

Since the beginning, sustainability is at the core of Verkor's mission of making **Europe a key global manufacturer of low-carbon batteries** to tackle climate-related issues in the energy storage and transport sectors. As such, Verkor is *powering the way forward with sustainable batteries for a responsible energy transition* in line with its initial mission to rehumanise, decarbonise, and re-localise the battery value chain.

A first Climate Change Risk assessment has been performed in 2023, providing an initial assessment of the physical risks at the Gigafactory.

To go deeper in the analysis, a second CCRA has been performed in 2025 including additional hazards to be covered for taxonomy, vulnerability metrics and risk management assessment. The objective of the assessment was to achieve a full diagnosis of climate risks and develop an adaptation plan in accordance with the criteria of the European Taxonomy.

II. Methodology

This study is based on the OCARA methodology, developed by Carbone 4 to analyze the resilience of organizations to climate change.

Perimeter

The analysis covers both Scopes A and B of the OCARA methodology, excluding tier 1 customers and suppliers.

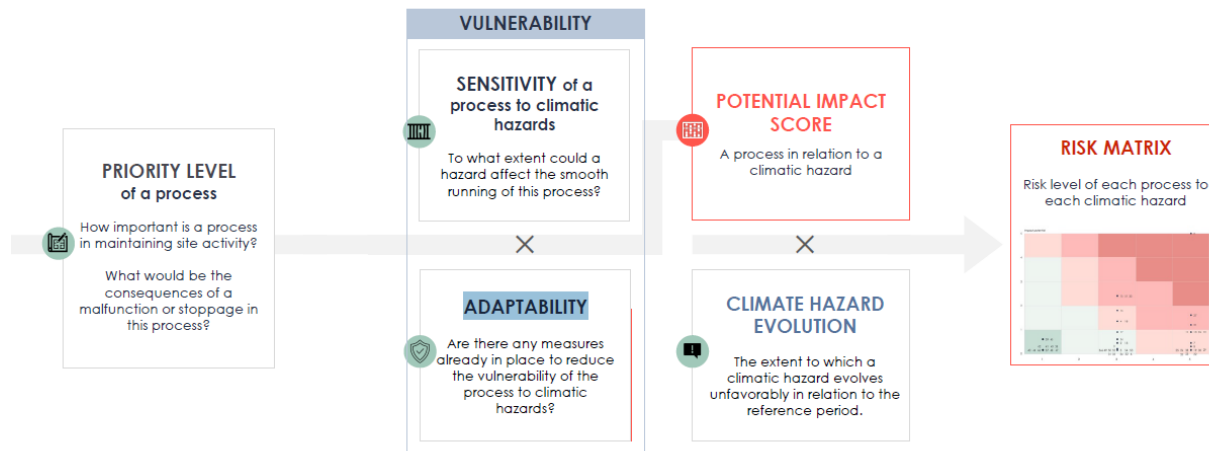
The study focuses on the physical dependencies that make activity possible on the site. These dependencies are called "processes".

"Processes" correspond to all the physical objects and flows (resources, fluids, networks, equipment, etc.) on which the site depends to operate.

2 scopes are examined:

- **Scope A** = the direct perimeter of the company, i.e. assets directly controlled or operated by the company (e.g. buildings, stocks, equipment, vehicles). Maintaining working, production and storage conditions is also covered in this scope.
- **Scope B** = all stakeholders with whom the company has a direct relationship, including network infrastructure (e.g. water, power, waste disposal, upstream or downstream transport). Suppliers and customers were not included in this study.

The different stages of the OCARA physical risk analysis framework



Priority levels: assess the relative importance of processes for the proper functioning of the site.

Sensitivity: reflects how sensitive a process is to a given climate hazard.

Adaptability: existing adaptation actions are identified and evaluated to determine the site's current state of preparedness.

Numerous actions have already been implemented at the Dunkerque Gigafactory, reducing the overall risk level.

Examples of actions identified:

- The installation of retention/containment basins and trenches (total capacity of 8,300 m³) is a very effective action against floodings of all types.
- The air-conditioning of production areas is an effective action to protect production equipment against heat-related events.
- The installation of cooling towers to supplement dry coolers during the hottest months is a moderately effective action against heat spikes and heat waves.
- The interchangeability of the two production lines 1 & 2 is a low effective action in case of failure of production equipment.

Analysis of climate data: Scenarios, time horizons and data sources

- **Scenarios:** The RCP4.5 and RCP8.5 scenarios are studied for all Taxonomy hazards relevant to the site (after studying the local context, forest fires, cyclones, hurricanes, typhoons for instance are not relevant to the Dunkerque site).
- **Time horizons:** The near term (2021-2050, centred around 2035), the medium term (2041-2070, centred around 2055), and the long term (2071-2100, centred around 2085) are studied. The reference period is 1976–2005.

- **Extracted data:** Most climate projections extracted correspond to the median of the multi-model set available on the DRIAS platform. Other climate projections are extracted from local studies.
- **Method of analysis:** The evolution scores for hazards are calculated based on the median of the models for RCP 8.5 - 2055.

III. Summary of net risks

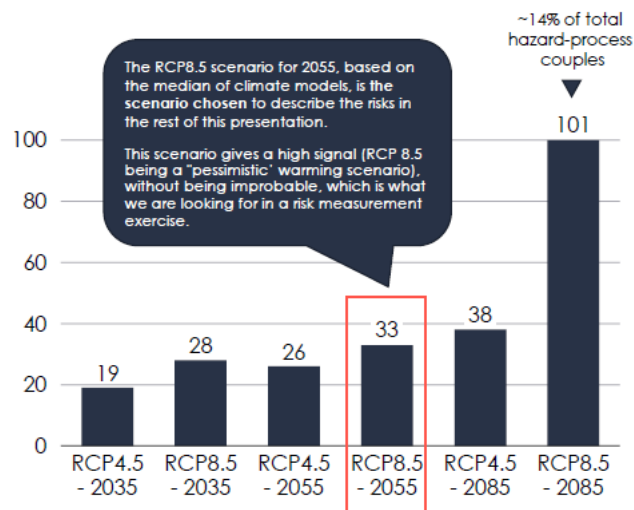
Focus on flood risk on direct perimeter:

A dedicated analysis has been conducted regarding the flood risk on the Gigafactory site. The study revealed that the flood risk for the Verkor site is very low, due to its elevated construction platform and its favourable integration into the port's hydraulic network. No direct marine submersion is anticipated, even under aggravated scenarios combining storm conditions, surge, and high tide, or within long-term climate projections to 2100.

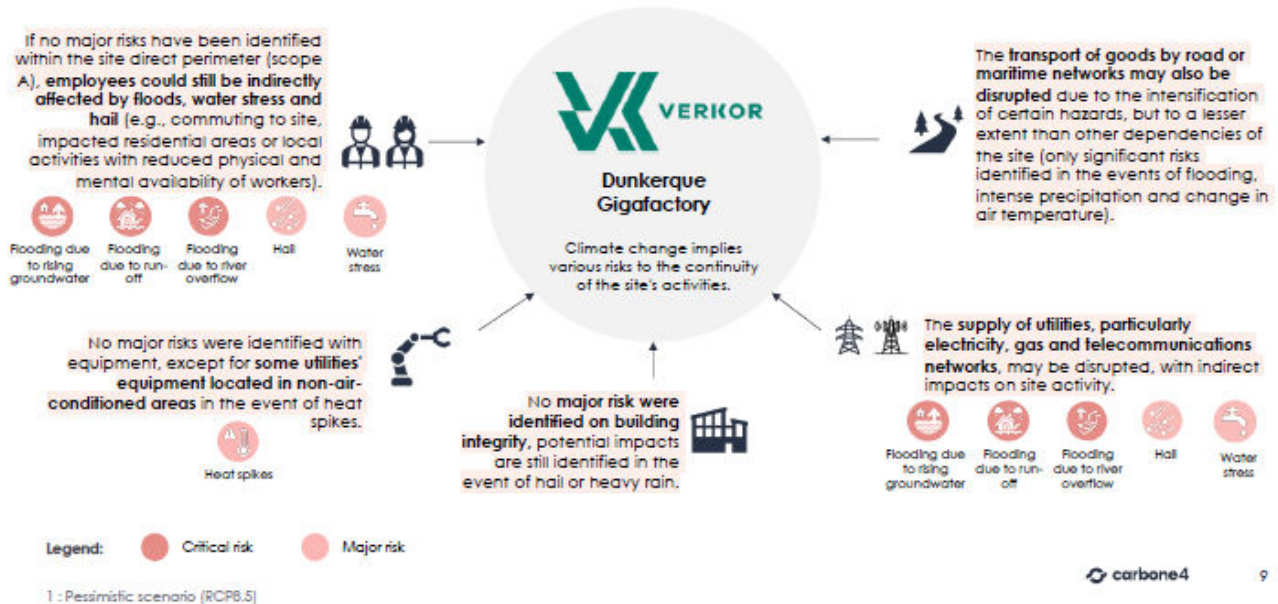
Climate change risks assessment:

Considering the mitigation measure already implemented, the central scenario identifies 33 major and critical risks by 2055.

Number of process-hazard couples posing a major or critical risk among the 1,060 couples (53 processes x 20 hazards selected):



The diagram below shows the result of the risk analysis for Verkor by 2055, pointing out especially three critical risks on our direct dependencies (scope B).



- **Critical risk #1: Grid electricity supply to the site.**

Site operations fully depend on grid power. In an outage, production lines stop, automated stock-management systems are unusable (even in degraded mode), and recovery is slow (machines must be reset). Flooding and hail could cause power failures at inundated substations and interrupt supply.

- **Critical risk #2: Telecoms and internet availability/quality.**

Flooding and hail can trigger power loss and service disruption due to flooded or damaged infrastructure (cables, connection nodes). No potential adaptation actions have yet been considered on IT processes (external networks Scope B, and on-site IT equipment Scope A).

- **Critical risks #3 and #4: Worker availability and stability of the Dunkerque area.**

Floods and water stress are events with possible extreme impacts that can reduce the availability of workers (physical or mental unavailability of affected employees) and undermine the social stability of the Dunkerque area (limited emergency services and delays in restoring essential public services (hospitals, schools...))

➔ **Mitigation measures:**

- Verkor assessed adaptation solutions and identified a list of potential measures to be implemented ranked by priority level, technical feasibility, effectiveness, implementation time, cost estimation, etc. Additional work is ongoing to turn these potential measures into a solid action plan.
- Verkor is taking part in the ZIBAC 2 project, led by ECOSYSTEM D, a Public Interest Grouping (PIG) in the Dunkerque area. This project aims to assess climate risks and identify adaptation solutions in the industrial area of the port of Dunkerque (GPMD) and the urban community of Dunkerque (CUD).