syrius Program | STUDY 1

The SYRIUS Program aims to accelerate the decarbonization of industry as part of France 2030. To achieve this goal, SYRIUS mobilizes major industrial players in the region, identifies structuring projects, and optimizes their implementation. The ambition is to reduce greenhouse gas emissions from industry by 80% by 2050, by mapping out decarbonization pathways through some 30 studies divided into five thematic blocks.

DECARBONIZATION PATHWAYS AND INDUSTRIAL ECOLOGY

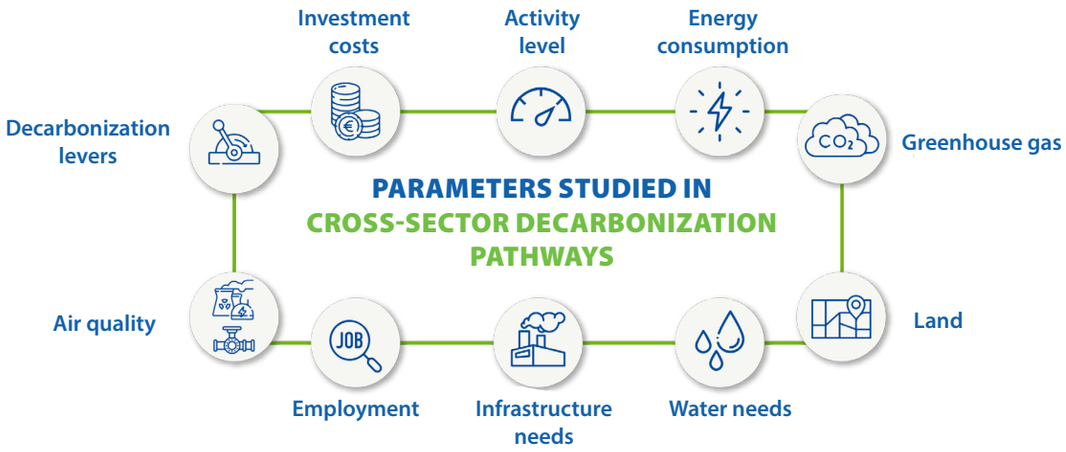
Study 1: Decarbonization pathways

Background and objective of the study

This study aims to consolidate and synthesize the analyses conducted during the first phase (2023-2024) of the Program. It capitalizes on the results of 25 studies conducted since 2023 to highlight cross-sectoral decarbonization levers for the areas of Fos, Étang de Berre, and the Gardanne-Meyreuil basin, while anticipating the transformation of this territory. The main objective is to propose and characterize different decarbonization pathways based on these analyses.

The specific objectives of Study 1 are as follows:

- Develop several contrasting scenarios for reducing greenhouse gas (GHG) emissions by 2030, 2040, and 2050, taking into account existing decarbonization projects, new industrial facilities, and the development of essential infrastructure.
- Assess the impact of these pathways on regional transformation, particularly in terms of jobs, energy mix, investment needs, land use, water resource management, and improved air quality through reduced air pollutant emissions.



Key steps in conducting Study 1

MAY 2024	MAY - JUNE 2024	JUNE - JULY 2024	EARLY JULY 2024	AUGUST - SEPTEMBER 2024	SEPTEMBER 2024
Kick-off	Consolidation of pathway hypotheses	Elaboration of scenarios	Results of the ambitious scenario	Summary	Delivery of results for the different pathways

Co-financer

Coordinator and facilitator

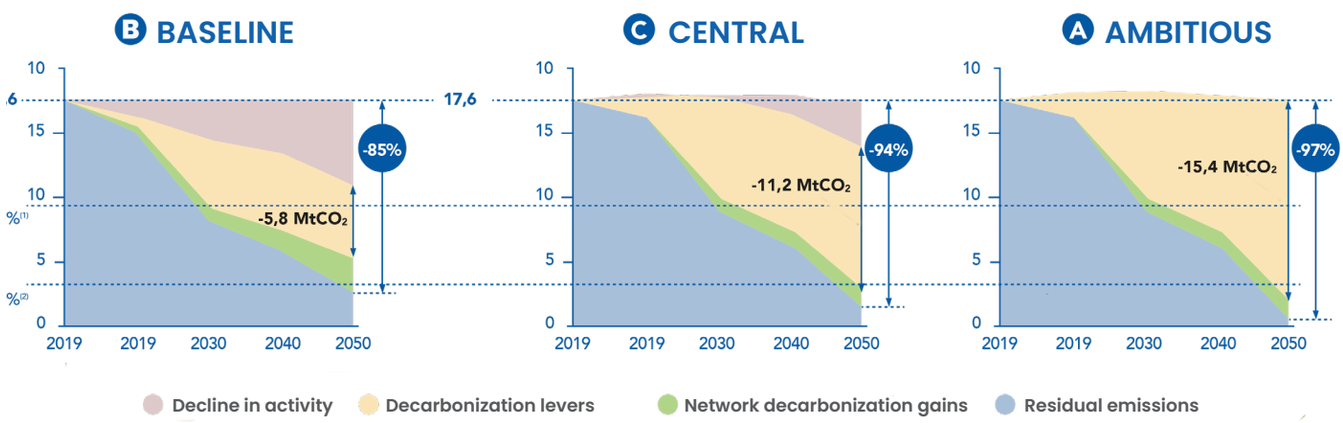
Service Provider

Results

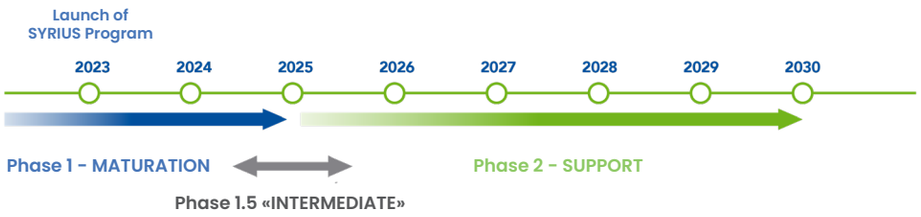
Three scenarios (baseline, central, ambitious) were analyzed and characterized, and two were deemed desirable for the region (central and ambitious) because they enable both **significant decarbonization and the preservation or even development of local economic activity.** The baseline and central scenarios would be accompanied by a sharp reduction in economic activity. All scenarios lead to a significant reduction in GHG emissions by 2050 (more than 80% reduction compared to 2019). The scenarios are calculated by identifying more than 200 projects and decarbonization options based on more than 30 interviews with industrial stakeholders. The energy mix would evolve with a reduction in the use of fossil fuels, offset by an increase in the consumption of electricity and decarbonized hydrogen.

The main drivers of decarbonization would include energy efficiency, the electrification of industrial processes, the substitution of raw materials, particularly the use of hydrogen, as well as the Carbon Capture Use and Storage (CCUS) from 2030 onwards, and in the longer term, the substitution of fossil fuels with carbon-free hydrogen.
It appears necessary to activate all these levers in order to move towards **carbon neutrality by 2050.** Implementing these decarbonization pathways could require significant investment but could also result in a notable reduction in emissions across the country. Although this would lead to an increase in land and water resource requirements, these transformations should contribute to a **significant improvement in air quality.**

EVOLUTION OF FOSSIL FUEL EMISSIONS PATHWAYS IN THE AREA (INCLUDING NEW ACTIVITIES) ACCORDING TO THREE SCENARIOS
[2019; 2050] MILLIONS OF TONS CO_2 FOSSIL EQUIVALENT / YEAR – Fossil emission reduced or transformed into biogenic emissions



Perspectives



The study highlighted several priority areas to guide the transformation of the region and the follow-up to the SYRIUS Program:

1. Hub structuring

Conduct further studies on shared infrastructure (electricity grids, CCUS, hydrogen ecosystem), as well as on water requirements, waste heat recovery, and local energy diversification.

SHARED INFRASTRUCTURE:

OTHER :

2. Pathway optimization

Extend research to other dimensions such as the impact on other pollutants, socio-economic aspects, territorial attractiveness, and skills and job requirements.

3. Organization of stakeholders

Supporting public and private stakeholders in the transformation of existing industrial sites and the implementation of new pilot and demonstration projects.

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