

Energy and resource management

Sustainable transition

Renewable energy systems

Techno-economic models

Circular energy and materials

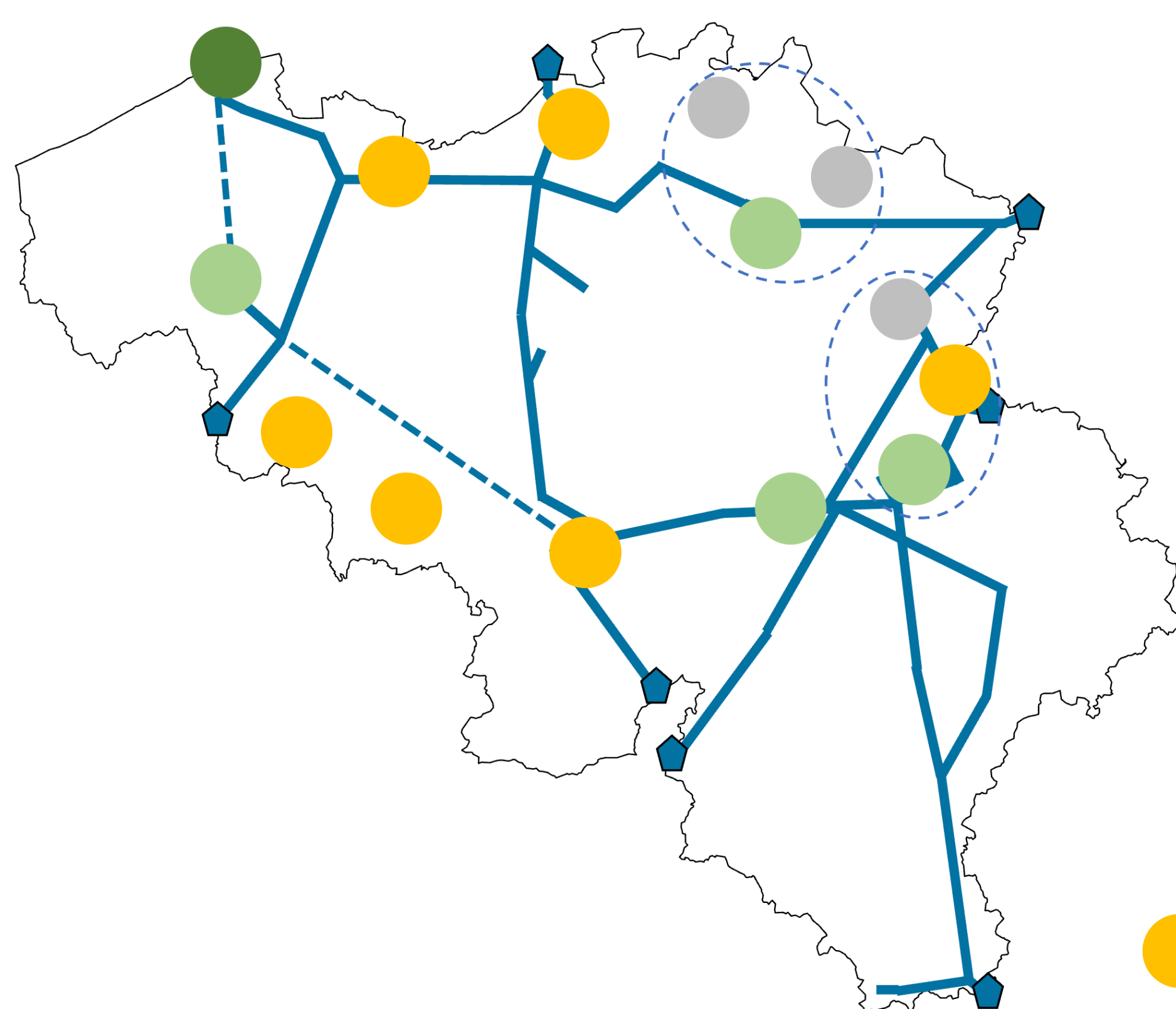
Industrial clusters

Non-technical challenges

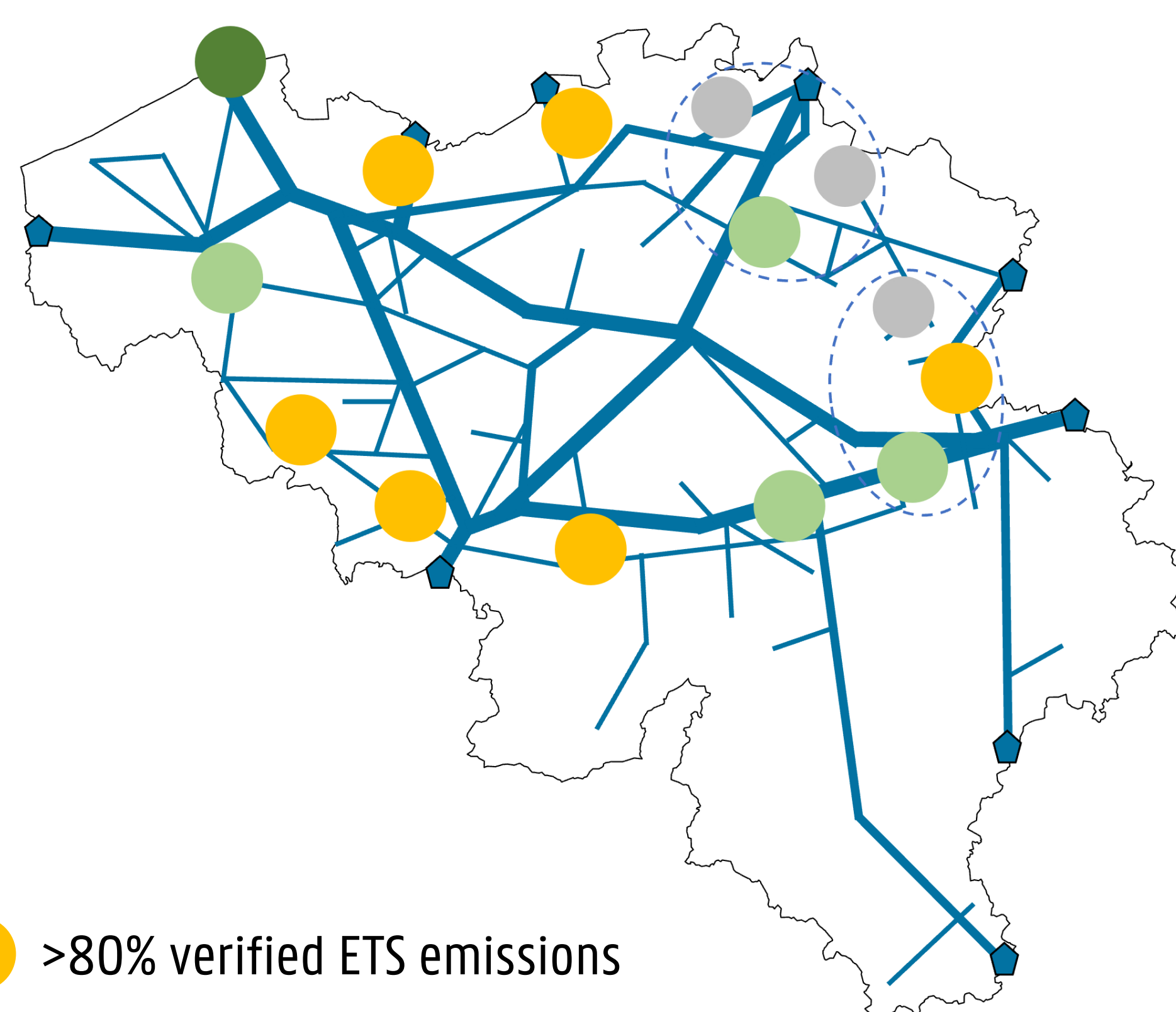
TRILATE (BE-ETF)

To reach Europe's climate neutrality and renewable energy targets, industry requires infrastructure that guarantees **available, accessible, affordable** and **sustainable** supply of **renewable energy and resources**. The presence or absence of supporting infrastructure affects the selection of possible mitigation pathways and the future of **energy-intensive process industries**. Substantial electron, hydrogen and carbon grid developments are required to ready the supply backbones in time to answer the needs of the European industry. The TRILATE project (ETF Belgium) recognises the urgency of this matter and analyses the requirements for energy transport infrastructure for **industrial clusters** in Belgium and neighbouring regions.

Electrical backbone grid



Molecule backbone grid



● >80% verified ETS emissions

Role of industrial clusters

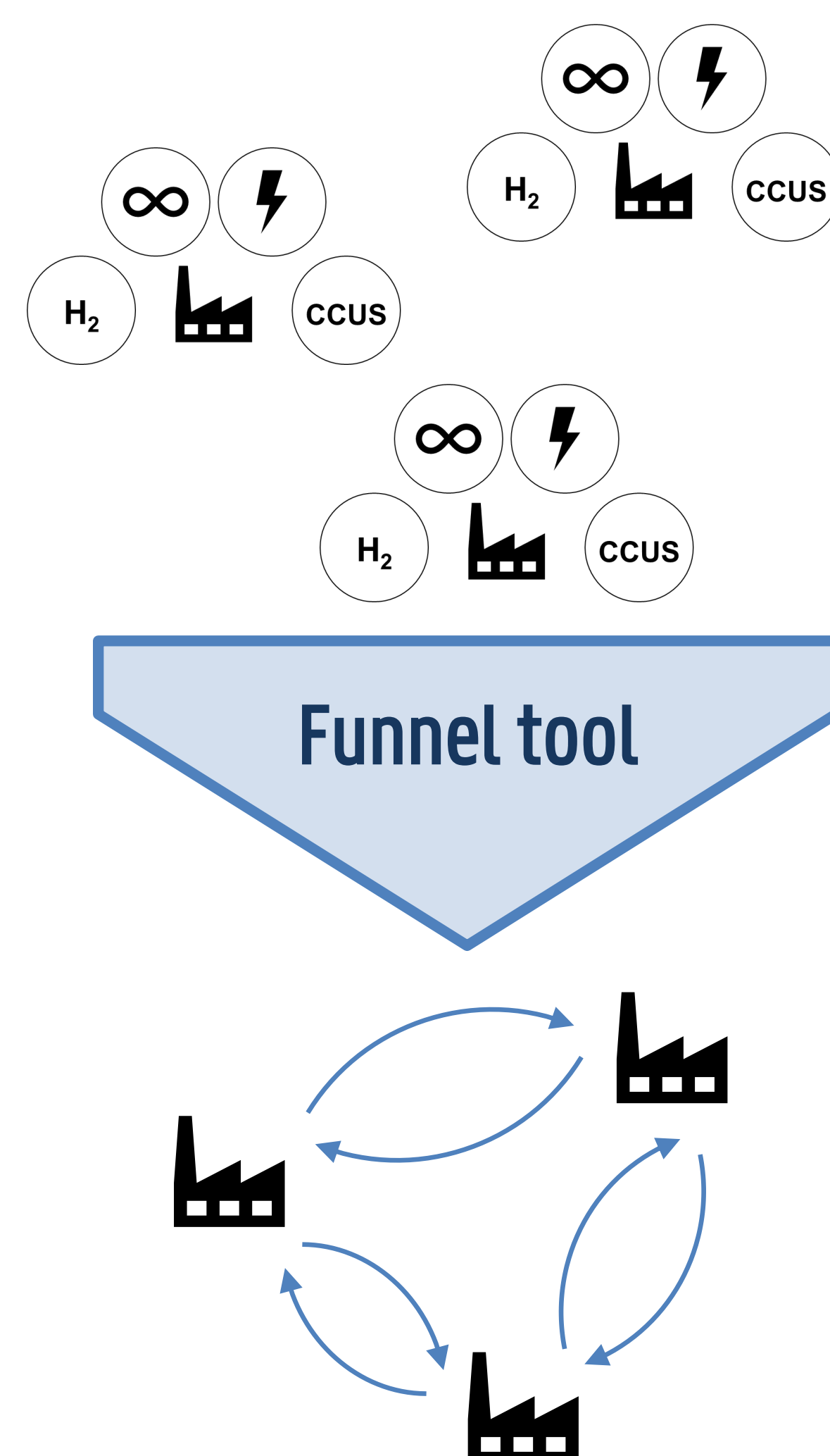
For ease of access to material and energy flows, energy-intensive industries tend to be densely grouped together in a certain region, port areas being a typical example. These regions are often referred to as industrial clusters or **hubs for circularity**, based on their strong interactions in the supply chains of energy and resources. Optimal cluster integration **maximises system value**. This can only be achieved by crossing the borders of industry sectors, regions and energy commodities. Such (cross-)sectoral cooperation in clusters, also known as **industrial symbiosis**, seizes opportunities by creating economies of scale and scope, spreading risks, and optimising resources and infrastructure.

In the TRILATE project, cluster-level research aims at locally optimising industrial demand and supply. Outcomes are translated to national energy system modelling. In order to leverage industrial **symbiosis opportunities** in clusters the **Funnel tool** was developed. The tool provides a rapid screening of viable synergy opportunities from a longlist of energy transition pathways in industrial clusters.

Purpose of the Funnel tool:

- cover transition pathways of individual industries
- generate & compare cluster configurations
- identify & evaluate synergy opportunities
- optimise integration in energy system.

This poster builds on the work conducted and results obtained in the energy transition funds project 'Trilate' organised by the FPS economy, S.M.E.s, Self-employed and Energy, Belgium.



RISERS (EU-HEU)

80% of referenced industrial symbiosis (IS) opportunities are cross-sectoral, hence synergies are greatly undervalued due to a lack of knowledge and understanding of the 'other' sector. Setting a standard is believed to facilitate cross-sectoral interoperability.

Although R&I projects clearly indicate a high potential of resource and energy exchanges within and across sectors, the valorisation of these results remains limited. This restricts the market entry of viable IS cases, and causes a downward spiral in R&I involvement and investment in IS. More collaboration incentives and policy frameworks are needed.

This RISERS project aims to:

- develop a roadmap for standardisation to promote IS
- set R&I priorities to support IS, transfer of R&I-results
- draw policy recommendations and frameworks to support IS
- improve cross-sectoral collaboration in industry
- establish a community of stakeholders.

The main role of UGent ECM is

- to identify IS potential of priority resources and their impact
- to identify gaps and opportunities for IS standardisation in priority synergies.

FlexIntensity

In order to reach climate and resource neutrality, industry and society have to advance the use of renewables. In industry, electrification is considered a prime pathway to replace fossil fuels where possible, preferable using clean or green power. In addition, molecules such as low-carbon hydrogen and bio-based fuels/feedstock will play a key role in the near future.

Due to its strategic location at the North Sea coast, the province of Zeeland is a textbook example of engaging its industry in the energy transition. The province has access to several **offshore wind** parks providing intermittent **green electricity**, ready to fuel industrial processes that require **green hydrogen**.

The main focus of the FlexIntensity project is on **system integration**: the optimal utilisation of the renewable power generation for the production of green hydrogen, taking into account the **energy system constraints** (energy markets, grid constraints, industrial constraints).

The main role of UGent is

- develop and validate electrical grid model
- investigate energy vector coupling (spatial, temporal)
- organise ancillary and congestion services participation
- perform design-for-flexibility analysis.

Clustering towards collaboration

Industrial symbiosis drives circular economy strategies by including urban-industrial and cross-sectoral collaboration

• facility clustering • conference rooms • infrastructure • pipelines • tanks • equipment • machines • utilities • logistics • purchasing • catering • open days • personnel • job fairs • reception • file panel & services • control • security guards • video surveillance • site lighting • window cleaners • building, road & equipment maintenance • water treatment • waste collection • storage facilities • waste streams • waste heat • byproducts • CCUS • resources • wish • need • duty • renewables • energy • electricity • grid mgt • VPP • transport service • parkings • car pooling • fitness rooms • running tracks • CSR • site shops • post office • nursery • catering • restaurants •

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