# A cobbled road to an electrifying future

## Executive summary

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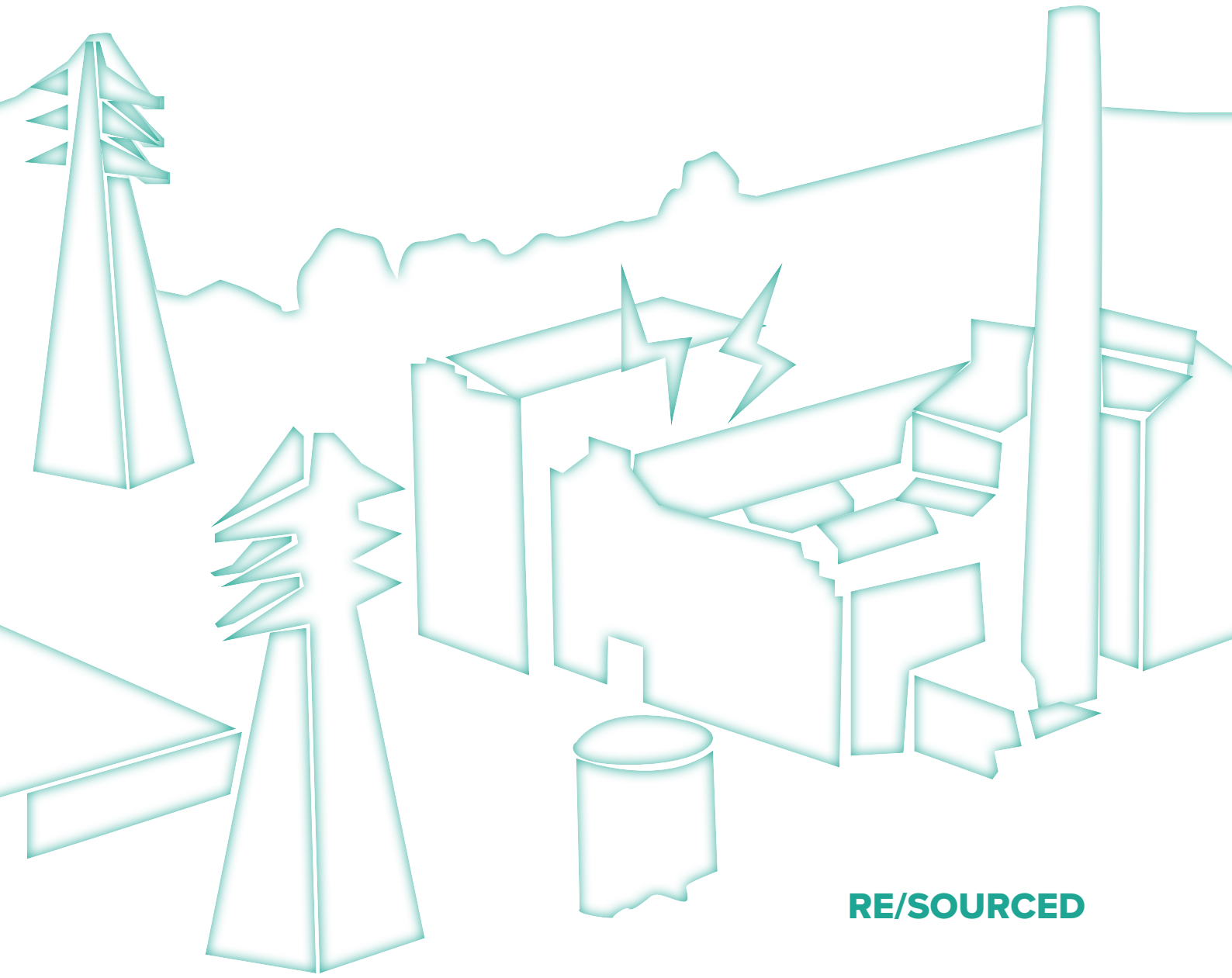

RE/SOURCED


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## EXECUTIVE SUMMARY

This document summarises the lessons learnt by the consortium of project partners who led the implementation of the RE/SOURCED project. RE/SOURCED stands for "Renewable Energy SOlutions for URban communities based on Circular Economy policies and DC backbones". The document is designed to be read by those interested in circularity, renewable energy, community engagement in energy and especially those who are interested in combining all three of these topics.

RE/SOURCED is an Urban Innovative Actions project, supported in the 5th round of UIA project funding, that aimed to create a renewable energy smart microgrid on the site of a former (heritage) coal-fired power station site that is being redeveloped. The redevelopment comprises offices, a range of social amenities and residential housing. The core energy generation assets have been retained for heritage and educational purposes.

The project partnership comprises seven discrete but complementary partners:

- 2 local/regional public authorities: Leiedal Intermunicipal Organisation and Zwevegem municipality.
- 1 university: Ghent University.
- 1 regional public authority: province of West Flanders.
- 2 business support organisations: Flux50, REScoop.eu.
- 1 research organisation: Flemish Institute for Technological Research (VITO).

The project was structured around five topics:

- energy transition
- energy efficiency
- energy system design
- the (heritage) listed Transfo site
- the educational infrastructure

Commenced in 2019, the project encountered the full impact of the COVID-19 pandemic at the critical midstage of its implementation. This had a direct and notable impact on the procurement of key technologies at a critical stage

of the project's delivery as providers were either not available or chose not to respond. The impact of COVID-19 also significantly elongated the procurement process and the project was granted an additional 12-month term by UIA to enable it to complete its delivery.

Initial implementation was slow. The project anticipated being able to utilise a regulatory sandbox (in Flemish law) to create its renewable energy living lab, but found that this route was not supported by key energy industry stakeholders. In attempting to find a solution, the Flemish Energy Agency (VEKA), the Flanders Energy Regulator (VREG) and Distribution System Operator (DSO – Fluvius) each put forward different proposals as solutions, but none agreed with the other. In an attempt to break the deadlock, the lead partner posed an interpretative question to DG Energy asking it to provide a legally binding decision. In its reply, DG Energy said the decision fell within the competence of the VREG energy regulator so it would not be appropriate for them to provide an opinion.

This challenge was overcome through the project team negotiating a solution with the DSO, Fluvius, whereby it would construct the network and use it as a test bed for DC circuits. It will be responsible for the maintenance of the network in the future.

An aim of RE/SOURCED was that renewable energy produced on site would be offered to local active users first, with any unused energy being injected in the public grid. This goal proved challenging to deliver due to:

- Legislation at the Flanders level that prevented groups from being classified as active users (only individuals could be active users).
- The small number of potential energy community members already available on site, which made the energy community financially non-viable.

The project team is still trying to overcome these challenges by providing the renewably generated electricity directly to a single end-user (EV chargers) with the revenue going to an existing energy cooperative. In the meantime, the lead partner (Leiedal) stays owner of the assets and will operate the smart grid for at least the next five years.

Legislation also applied to the heritage aspects of the project. These were addressed through close working with the Flemish heritage agency, very regular communication and frequent site visits.

As might be expected given its novelty and stretching goals, the project encountered technical challenges. These were competently addressed through engaging and utilising the expertise of the partnership: Leiedal Intermunicipal Association and Zwevegem municipality (local/regional public authorities), Ghent University, province of West Flanders, Flux50, REScoop.eu (business support organisations) and the Flemish Institute for Technological Research (VITO).

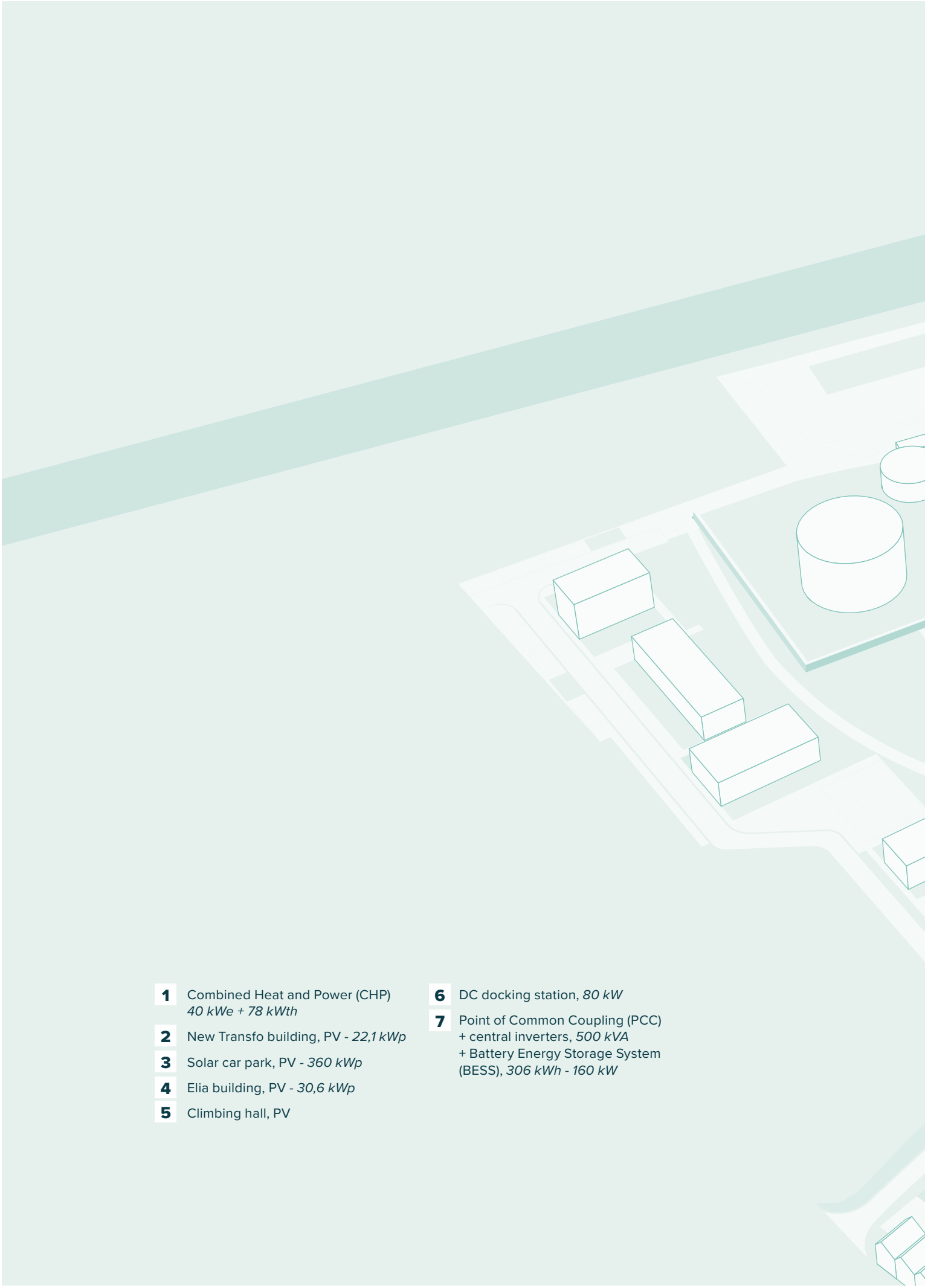
The challenges were not all technical – to be successful, the project had to marry the requirements of circular economy with those of constructing a renewable energy smart grid and finding a way to engage the community of users effectively. The document provides a detailed summary of issues around the five topic themes, but key points worth noting include:

- While the energy community could have been created, there was a challenge to find a model that would be financially sustainable, so an existing energy cooperative was engaged for this purpose.
- Energy generation will be from solar PV panels and a combined heat and power plant (CHP) with electricity storage achieved through end-of-life EV batteries.
- Some planned generation technologies proved technically unfeasible:
  - Pumped storage using the Transfo water tower was not used due to insufficient height to make the system viable combined with an absence of tenders through procurement (conducted during COVID-19 lockdown).
  - Wind turbine on site – national regulations changed, rendering the Transfo site too close to high-voltage power lines, so the turbine was not installed.
  - Reuse of PV panels proved impossible as no supplier was making these units available yet, so new panels had to be procured.
- One of the storage technologies proved a challenge – the use of a flywheel to store energy was not pursued for lack of providers in the marketplace who could provide this technology.
- The educational aspects were challenging to deliver as they had to "fit in" with the construction programme, and this necessitated very good communication between the construction contractors and those delivering the educational assets.

- Some educational elements could not be accommodated as planned while others had to be adapted – experience highlights the importance of ensuring that exhibits that access privately owned data via APIs agree to future access and provision contractually with the provider.
- A further project goal was to reuse materials and it was planned to reuse a steel structure for a new car park on which a large solar PV array would be mounted. This steel structure was located within a local industrial building that was about to be demolished. However, the contractor could not extract it without damaging it to the extent that made it unusable, so a new steel structure was procured yet designed for disassembly in the future.

The project has constructed a renewable energy DC smart microgrid using circular principles. It has included key renewable energy technologies (for generation and storage). It has found a workaround to the challenge of creating a financially viable energy community for a small group by engaging an existing energy cooperative to fulfil this role.

As could be expected, challenges were encountered, but through the pragmatic leadership of the project team, successful and viable solutions were found.



**1** Combined Heat and Power (CHP)
*40 kWe + 78 kWth*

**2** New Transfo building, PV - *22,1 kWp*

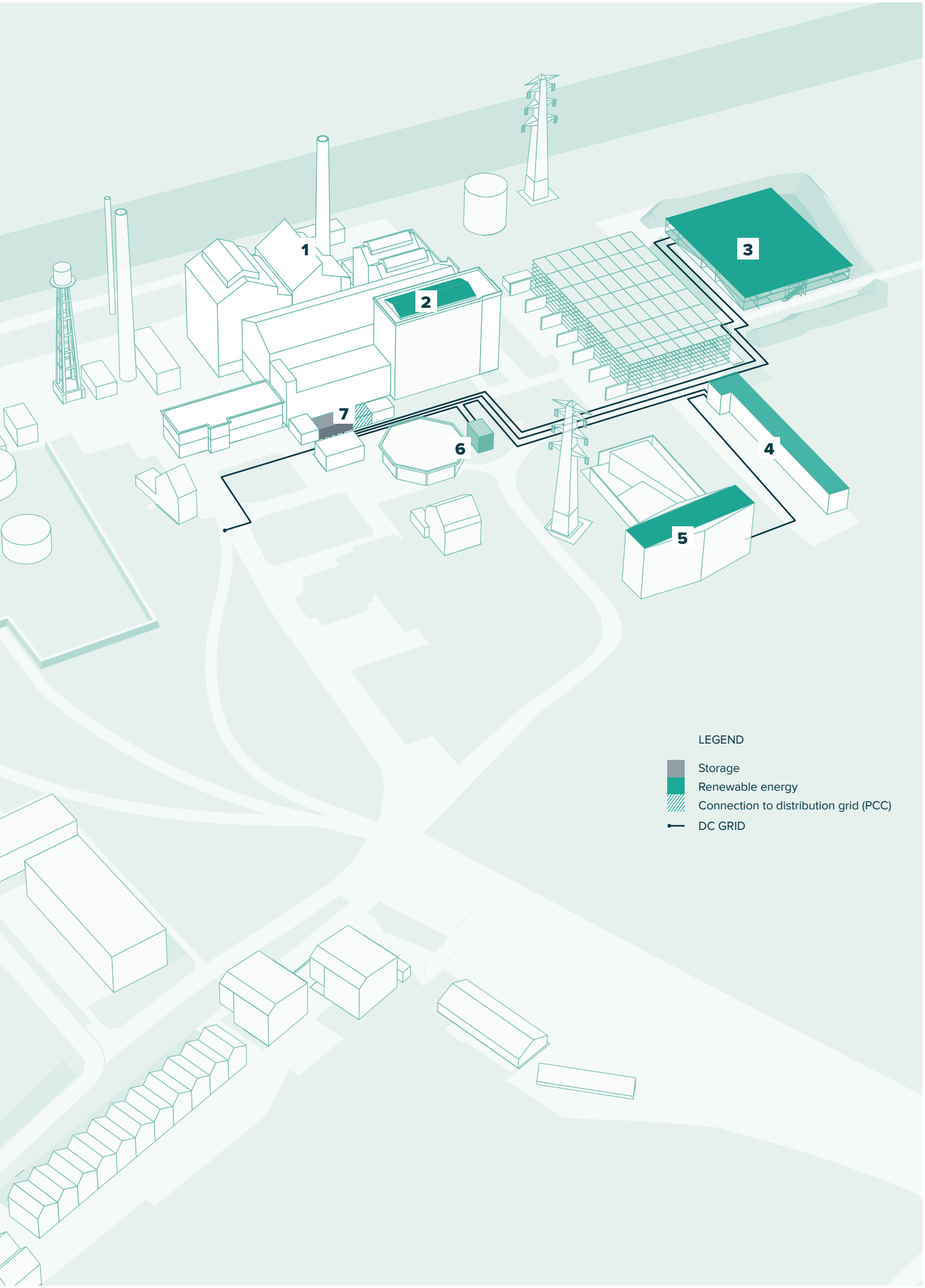
**3** Solar car park, PV - *360 kWp*

**4** Elia building, PV - *30,6 kWp*

**5** Climbing hall, PV

**6** DC docking station, *80 kW*

**7** Point of Common Coupling (PCC)
+ central inverters, *500 kVA*
+ Battery Energy Storage System
(BESS), *306 kWh - 160 kW*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LEGEND
Storage
Renewable energy
Connection to distribution grid (PCC)
DC GRID

## SMART GRID SETUP

Energy community