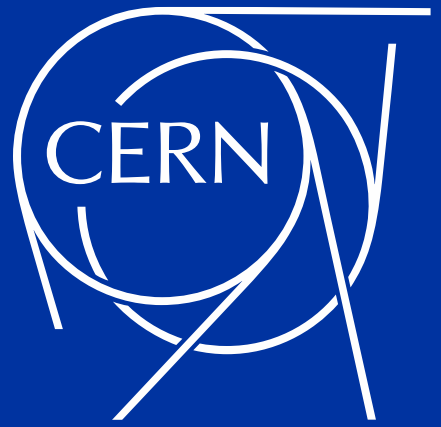


Sustainable Procurement Workshop

SCE environmental initiatives

28.11.2024

Fred Magnin

Energy – New-Built – Consolidation

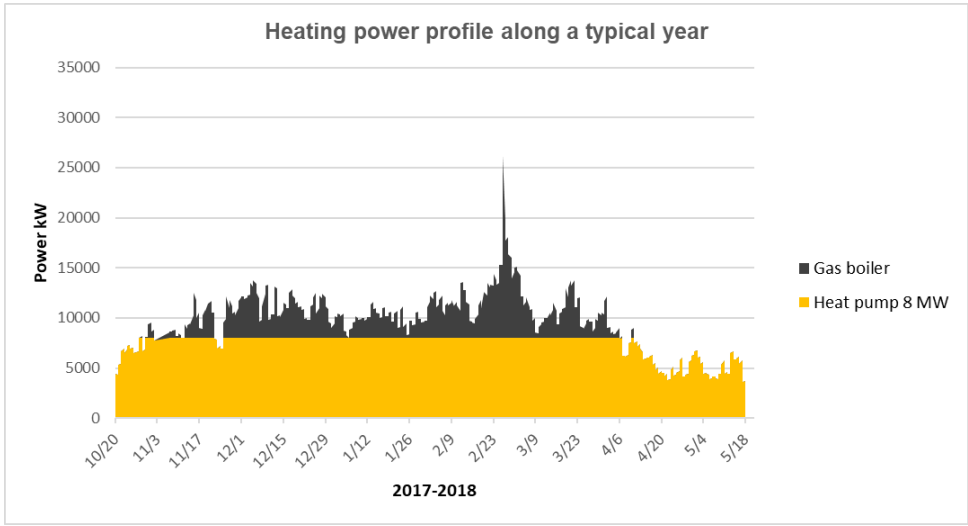
NEW HEATING PLANT MEYRIN B200

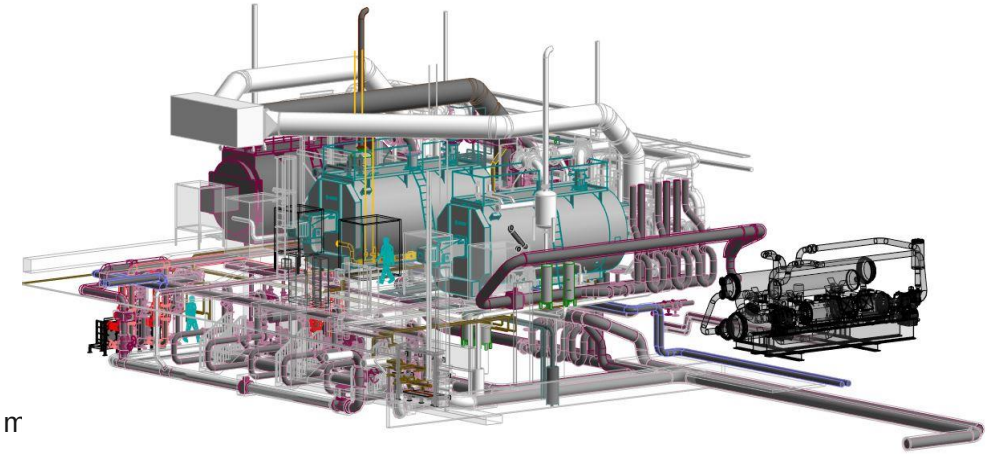
- **Heating plant configuration:**
  - 3 boilers, 15 MW each (existing).
  - 1 heat pump 6 MW.
  - Space for future heat pump.
- **Objectives:**
  - Basis: winter 2021-2022.
  - Flexibility with gas boilers.
  - 1 heat pump 8 MW heating capacity (6 MW evaporator = PA1 load).
  - Space for future heat pump. No phase 2.
  - Total gas consumption 2021-2022: 46,8 GWh gas (9600 tonsCO2).
  - Total consumption 2027: 17.6 GWh gas + 15.4 GWh elec.
  - Total consumption 2027: 3600 tonsCO2 gas + 340 tonsCO2 elec.

Basic data*

1 m3 gaz	11.4 kWh	2.337 kg CO2
1 kWh gaz		0,205 kg CO2
1 kWh elec		0,0221 kg CO2
1 l diesel		2,5 kg CO2

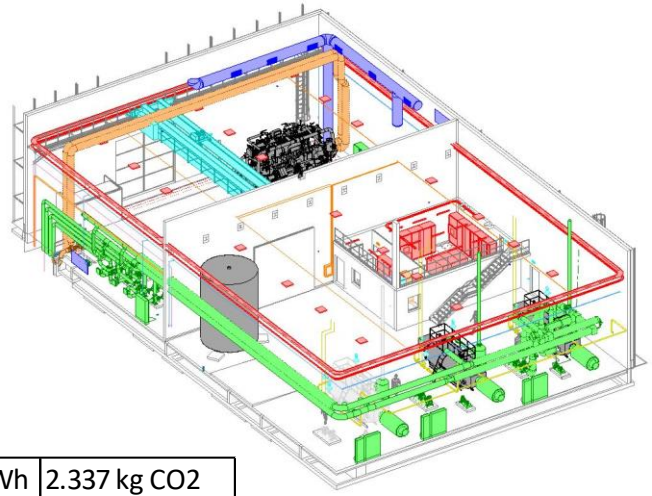
* The ratio for the gas 0.205kgCO2/kWh could increase due to important part of the GNL gas in the European gas m





NEW HEATING PLANT PREVESSIN B776

- **Heating plant configuration:**
  - 2 boilers, 2MW and 4MW boiler Gas&Fu
  - 1 heat pump 2 MW.
  - Space for future heat pump.

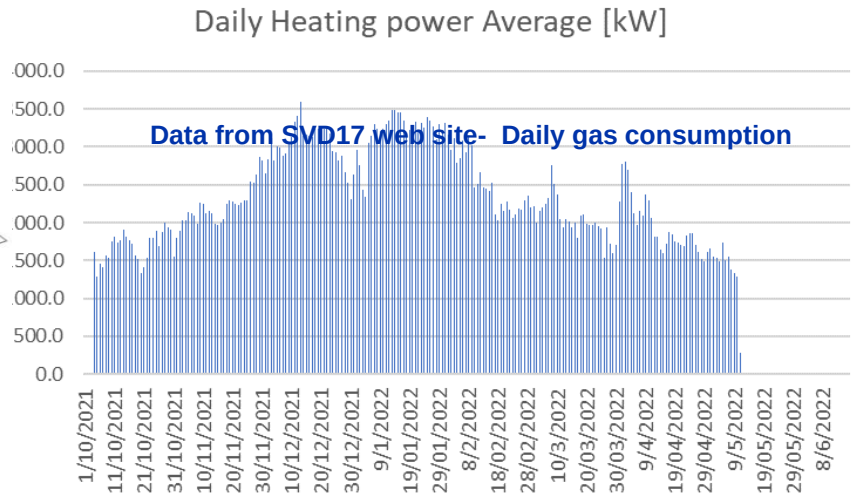


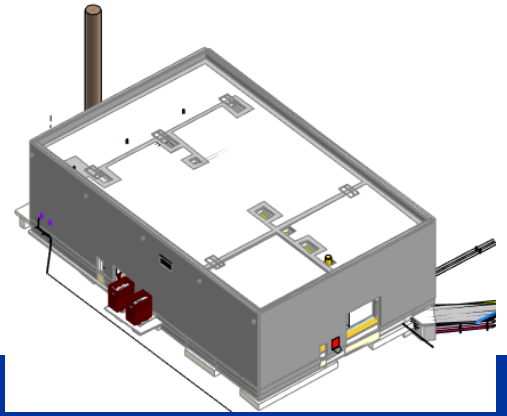
- **Objectives:**
  - Basis: winter 2021-2022
  - Flexibility with gas boilers.
  - 1 heat pump 2 MW heating capacity (1.6 MW evaporator = IT load).
  - Total gas consumption 2021-2022: 12.337 GWh gas (2529 tonsCO2).
  - Total consumption 2027: 1.46 GWh gas + 3.66 GWh elec.
  - Total consumption 2027: 299.3 tonsCO2 gas + 80.9 tonsCO2 elec.

Basic data*

1 m3 gaz	11.4 kWh	2.337 kg CO2
1 kWh gaz		0,205 kg CO2
1 kWh elec		0,0221 kg CO2
1 l diesel		2,5 kg CO2

Heat pump = 80%





***** The ratio for the gas 0.205kgCO2/kWh could increase due to important part of the GNL gas in the European gas mix.

ELED campaign

- The ELED campaign, launched in January 2023, aims to replace all fluorescent tubes with energy-efficient LED tubes in tertiary buildings.
- The campaign is expected to take five years.
- To date, **44,424 tubes** have been replaced, reducing installed power by **977,4 kW**.
- A dedicated monitoring system has been established to plan and track the campaign's progress.

B.36 – Energy performance Renovation

B.864/865 Landscape parking

- Planting of 210 trees
- Rainwater infiltration and retention system improvements
- Installation of 3,300 m² of cellular paving for parking spaces.
- Creation of 3,000 m² of flower meadow, including 1,300 m² of vegetated ditches for:
  - Rainwater infiltration.
  - Natural water retention before infiltration, *during heavy rainfall.*
- Installation of electric vehicle charging stations for CERN's cars.
- New cycle path and installation of bike and motorcycle shelters.

New built project

- Increase renewable material
- Integrate renewable energy installation
- Consider nature and biodiversity
- Account for wellbeing
- Embrace circularity
- Formal certification

Life Cycle Assesment

Life cycle analysis

5 enjeux sont envisagés[1] et donc 5 indicateurs d'ACV sont associés

Enjeu : réduction des impacts sur le changement climatique
Méthode : IPCC 100y 2021
Unité : kgCO2e

Enjeu : réduction des consommations d'énergie et en particulier des énergies fossiles
Méthode : CED (Cumulative Energy Demand)
Unité : kWh par vecteur

Enjeu : réduction des consommations d'eau
Méthode : AWARE (Available WAter REmaining)
Unité : m^3

Enjeu : réduction des consommations de ressources naturelles
Méthode : CML (Guinée et al., 2002) pour l'épuisement des ressources abiotiques
Unité : kg équivalent

Enjeu : réduction des déchets produits
Méthode : RECIPE pour la gestion des déchets
Unité : kg équivalent

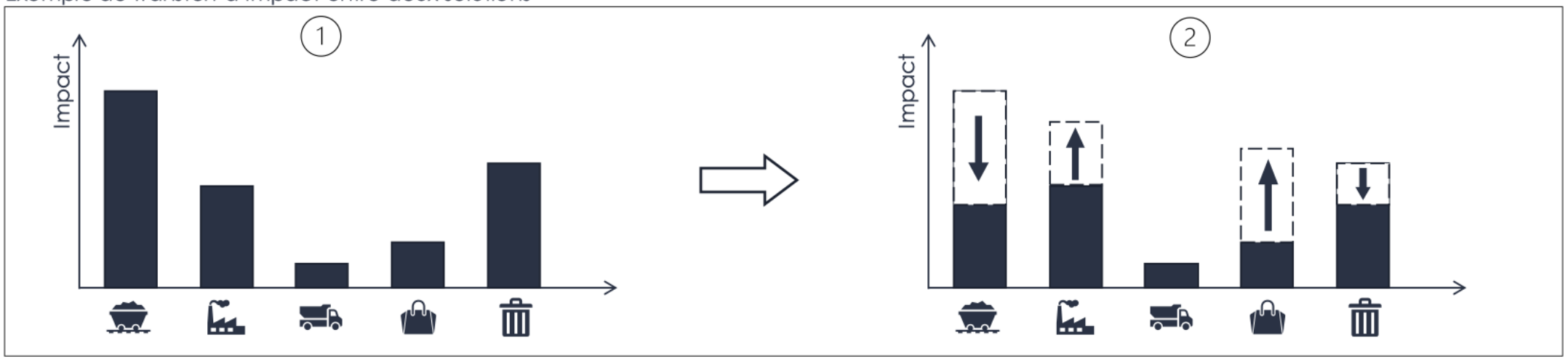
Life cycle analysis

	PUR	Mineral wool	Woodfibre	Cotton	Cellulose	Hempcrete
CO_2	49,07	8,16	37,88	20,95	3,63	-34,65
			86% bio-based	70% bio-based	85% bio-based	26% bio-based
	Available on reuse market	37% recycled		85% recycled	85% recycled	
		90% recycled				
	0,27	0,27	0,27	0,18	0,18	0,17
	D-s2-d0	A1	E	B	B-s2, d0	E
	15cm	22cm	24cm	38cm	38cm	46cm

Life cycle analysis

Focus | Une ACV permet de révéler les transferts d'impacts potentiels entre deux solutions et de choisir en conséquence

Exemple de transfert d'impact entre deux solutions



Éviter les déplacements de pollutions entre les différents indicateurs **et** entre les phases du cycle de vie

CERN RESP

Regenerative Environment and Social Programme

Our Vision

The CERN Campus is the Gateway to CERN's Science and discovery. Our vision is to enable science excellence where our community and natural environment thrive in harmony, for future generations. Our approach is one of regenerative environmental stewardship and positive social purpose, with nature being an integral part of an efficient, low carbon campus, protecting it and being protected by it.

Implementing the Vision

This vision shall be delivered through CERN Campus Regenerative Environment and Social Programme (RESP). Through this programme CERN builds on its significant achievements of the Site Consolidation Programme and starts to build on these renewed ambitions. A holistic impact framework (HIF) has been created as a decision making support to enable accountability and transparency of decisions to progress towards these ambitions. The HIF considers carbon emissions and integrates areas of the Campus' environmental and social context. It will be visible through a digital dashboard showcasing the decisions and rationale.

RESP contributes to CERN taking the lead and rise to the pressing planetary challenges of our time.

Regenerative Environment and Social Programme

Home | Progress summary | Interventions | Benchmarking | Project impacts (HIF) | Campus impacts (HIF) | Campus map | Assumptions

ARUP

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CERN Campus Regenerative Environment & Social Programme (RESP)

Overview

This dashboard summarises the decarbonisation progress of CERN's tertiary buildings across Meyrin and Prevessin campuses since the baseline year of 2017. Significant carbon reduction achievements have been made through the CERN Campus RESP through renovations, energy-efficient new builds and the installation of two new heat pumps coming online in 2027. The dashboard focuses on the operational heating and capital carbon impacts of the Programme and the costs associated with these interventions. Please note that the list of interventions is not exhaustive. While the data is based on theoretical figures, it provides a valuable insight into the decarbonisation trajectory

Select the location

MEYRIN

PREVESSIN

Operational carbon saving to 2024
Baseline year 2017
-7.7%

Operational carbon saving by 2027
Baseline year 2017
-61.7%

Cost of interventions to 2024
Baseline year 2017
CHF 35.6M

Cost of interventions to 2027
Baseline year 2017
CHF 192.4M

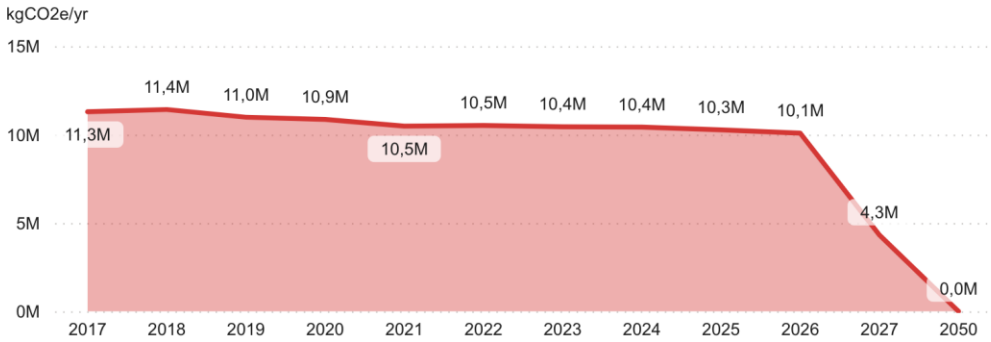
Operational carbon saved per yr to 2024
kgCO2e, Baseline year 2017
868,848

Operational carbon saved per yr to 2027
kgCO2e, Baseline year 2017
6,972,547

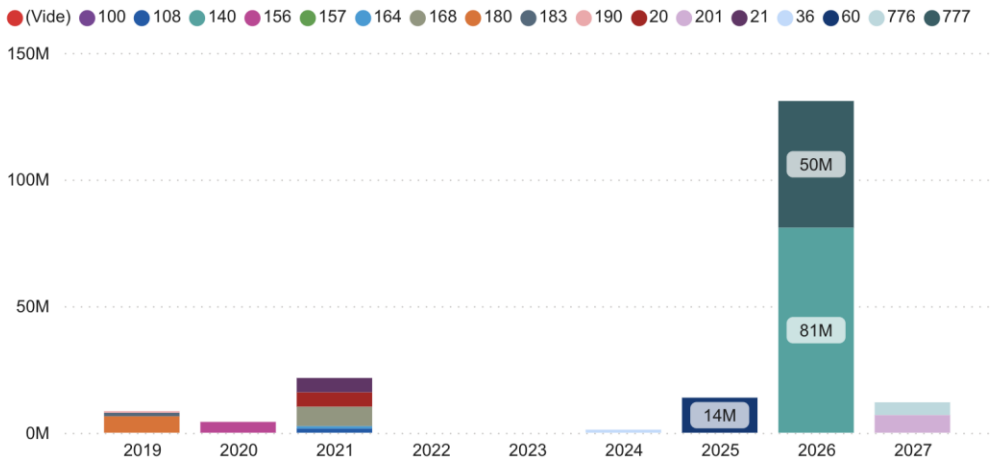
Useable m2 (2024)
527,473

No. of buildings (2024)
475

Operational heating carbon reduction trajectory



Cost of interventions (CHF)



Regenerative Environment and Social Programme

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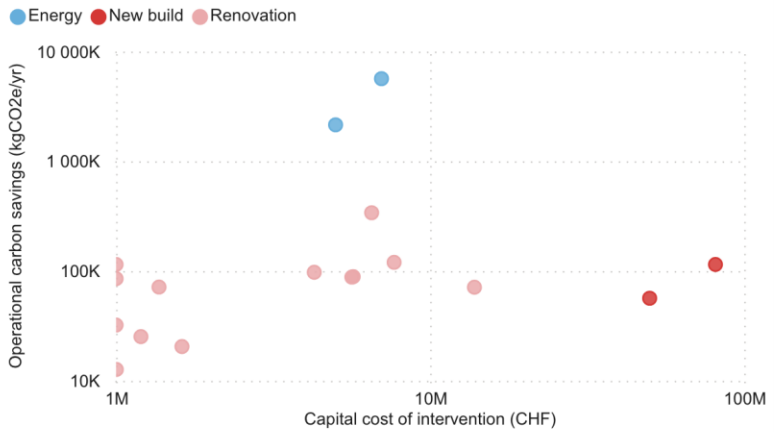
CERN Campus Regenerative Environment & Social Programme (RESP)

The interventions to 2024 and future planned interventions are displayed, detailing the capital carbon impacts and operational heating carbon emissions saved.

Intervention

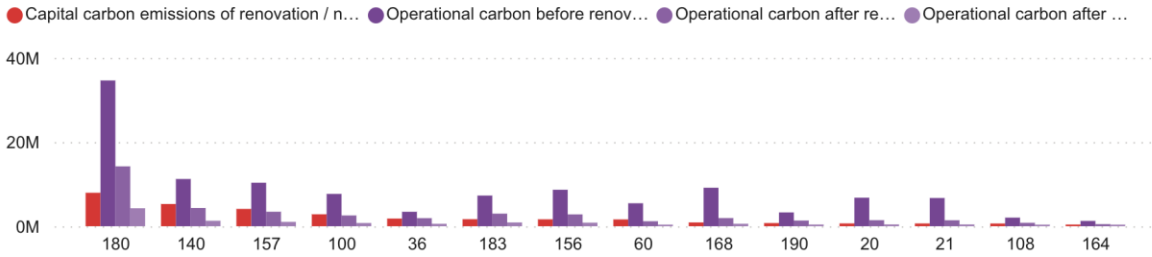
Building no.	Year	Type of intervention	Location	Description of intervention
100	2026	Renovation	MEYRIN	Global renovation: envelope, electrical network, lights and HVAC , asbestos & lead removal
108	2021	Renovation	MEYRIN	Global renovation: envelope, electrical network, lights and HVAC , asbestos & lead removal
140	2026	New Build	MEYRIN	Office-lab building
155	2026	Demolished	MEYRIN	Buildings to be demolished following

Capital cost for intervention and operational carbon savings



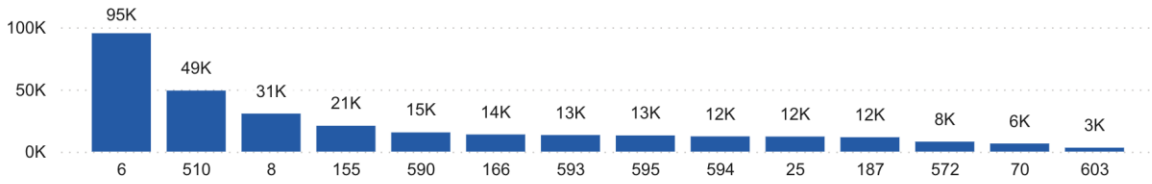
Capital and operational heating carbon emissions

kgCO2e



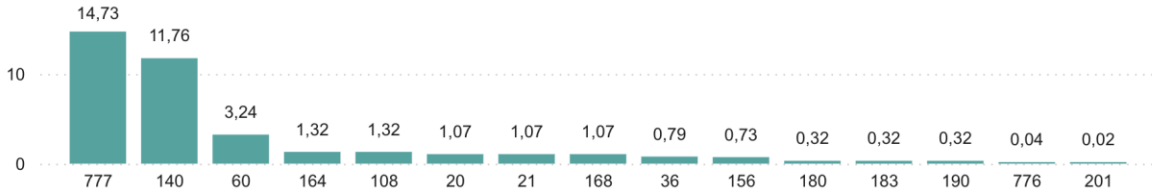
Operational heating carbon emissions saved from demolition

kgCO2e/yr



Capital cost per kg of operational heating carbon emissions saved

CHF/kgCO2e



Regenerative Environment and Social Programme

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CERN Campus Regenerative Environment & Social Programme (RESP)

Project impacts

The Holistic Impact Framework (HIF) provides a process for including carbon, environmental and social impacts in decision making for campus projects on a scale of +3 to -3.

Select a project or domain to compare scores for the Carbon, Environmental and Social

Project

Tout

Domain

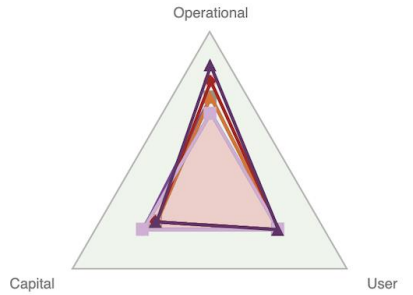
Tout

Key

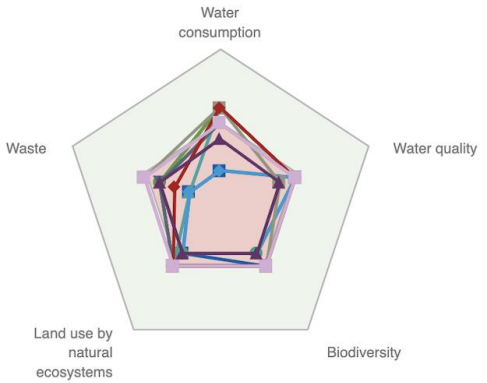
- Score - B100 consolidation
- Score - B108-164 consolidation
- Score - B140
- Score - B3150
- Score - B36 consolidation
- Score - B60 consolidation
- Score - B777
- Score - Green parking Prevessin
- Score - Insulation of B20-21-168
- Score - Insulation of building 180-183
- Score - Light replacement campaign
- Score - Meyrin heating plant

1/2

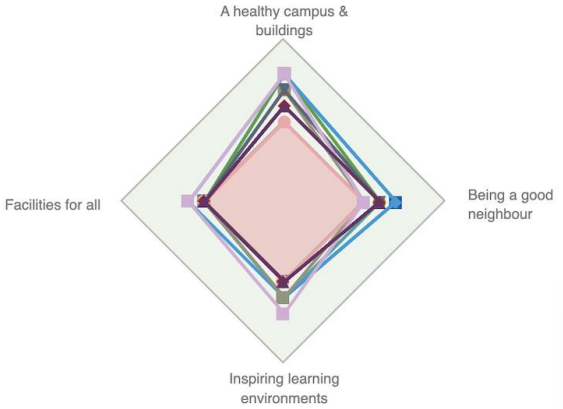
Carbon impact



Environmental impact



Social impact



Regenerative Environment and Social Programme

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CERN Campus Regenerative Environment & Social Programme (RESP)

Campus impacts

The chart to the right details the campus level impact over time.

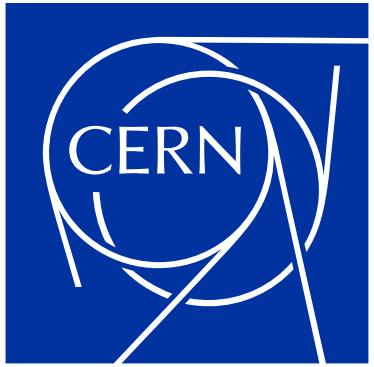
- Social index starts negative, due to the "time honoured" buildings.

- 2027: Heating plants result in an improvement of the carbon index, but the index remains negative because overall the campus is still emitting.

- 2040: the ambition for carbon is to be close to "net zero". At a campus level this is zero impact, positive impact would require the campus to be sequestering.

- Completion of the 2040 masterplan results in a positive social impact at campus-level.

Campus-level impact over time



home.cern