



# Towards a sustainable campus

*SCE environmental achievements, initiatives, and Services*

*Fred Magnin, Cedric Garino*

# Campus development

## B. 777 New built project

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



# B.36 – Energy performance Renovation



# B.864/865 Landscape parking

- Planting of 210 trees
- Rainwater infiltration and retention system improvements
- Installation of 3,300 m<sup>2</sup> of cellular paving for parking spaces.
- Creation of 3,000 m<sup>2</sup> of flower meadow, including 1,300 m<sup>2</sup> 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 HEATING PLANT MEYRIN B200

- **Heating plant configuration:**

- 3 boilers, 15 MW each (existing).
- 1 heat pump 6 MW.
- Space for future heat pump.

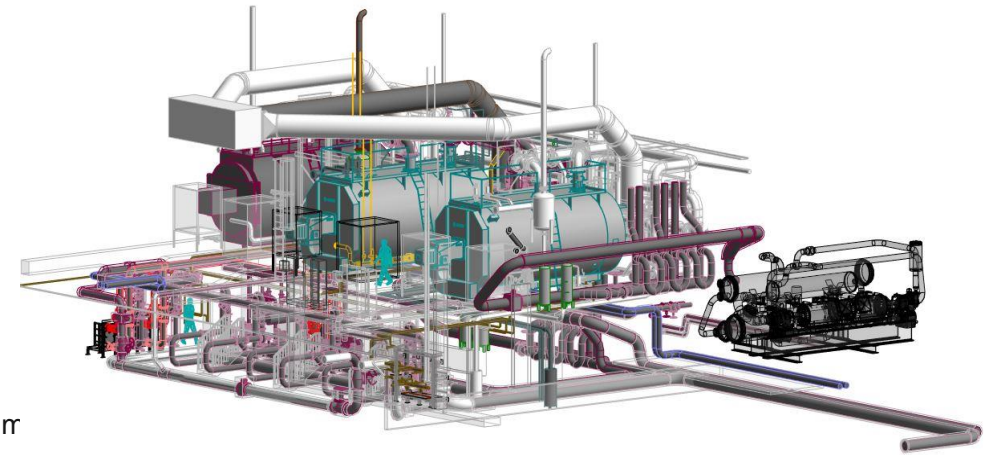
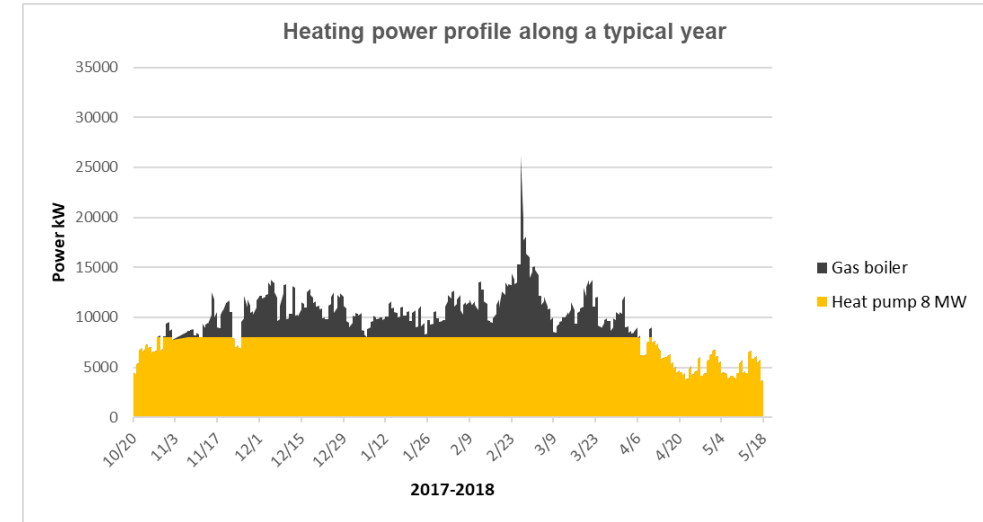
- **Objectives:**

Basic data\*

1 m <sup>3</sup> gaz	11.4 kWh	2.337 kg CO <sub>2</sub>
1 kWh gaz		0,205 kg CO <sub>2</sub>
1 kWh elec		0,0221 kg CO <sub>2</sub>
1 l diesel		2,5 kg CO <sub>2</sub>

- 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 tonsCO<sub>2</sub>).**
- Total consumption 2027: **17.6 GWh gas + 15.4 GWh elec.**
- Total consumption 2027: **3600 tonsCO<sub>2</sub> gas + 340 tonsCO<sub>2</sub> elec.**

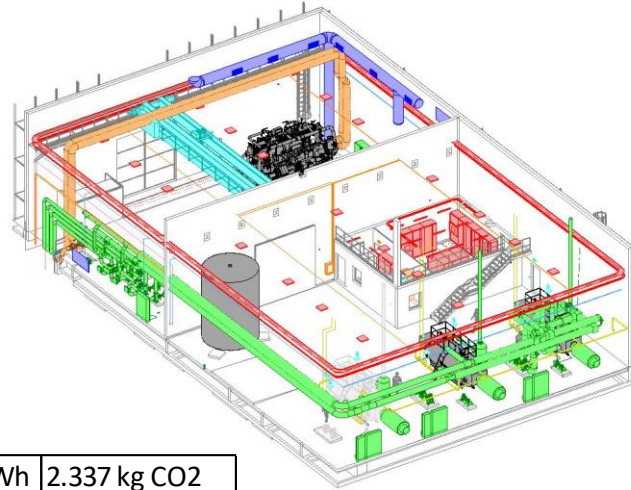
\* The ratio for the gas 0.205kgCO<sub>2</sub>/kWh could increase due to important part of the GNL gas in the European gas m



# NEW HEATING PLANT PREVESSIN B776

- **Heating plant configuration:**

- 2 boilers, 2MW and 4MW boiler Gas&Fuel
- 1 heat pump 2 MW.
- Space for future heat pump.



- **Objectives:**

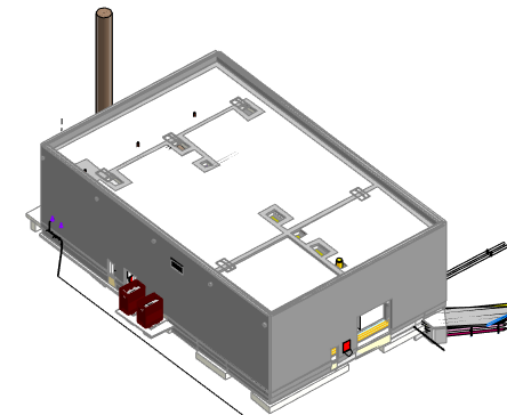
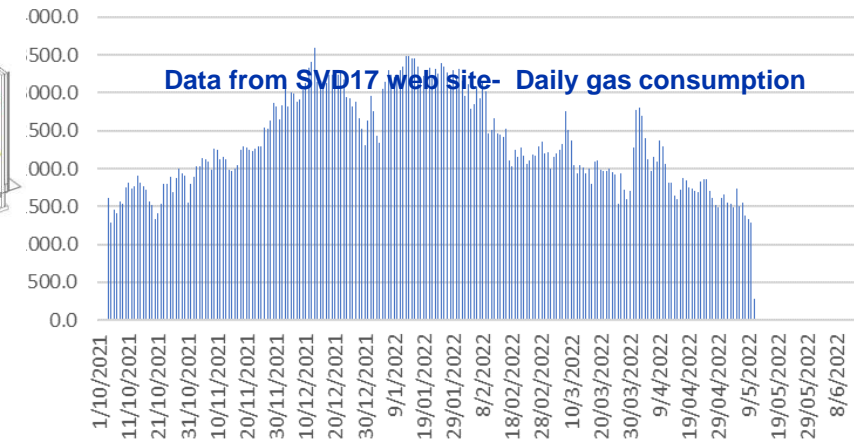
- Basis: winter 2021-2022
- Flexibility with gas boilers.
- 1 heat pump 2 MW heating capacity (1.6 MW evaporator = IT load).
- Total gas consumption 2021-2022: **12.337 GWh gas (2529 tonsCO2).**
- Total consumption 2027: **1.46 GWh gas + 3.66 GWh elec.**
- Total consumption 2027: **299.3 tonsCO2 gas + 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
1l diesel		2,5 kg CO2

Heat pump = 80%

Daily Heating power Average [kW]



\* 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.

# Life Cycle Assessment

# Life cycle analysis

5 enjeux sont envisagés<sup>1</sup> et donc 5 indicateurs d'ACV sont associés



**Enjeu** : réduction des impacts sur le changement climatique  
**Méthode** : IPCC 100y 2021  
**Unité** : kgCO<sub>2</sub>e



**Enjeu** : réduction des consommations d'eau  
**Méthode** : AWARE (Available WAter REMaining)  
**Unité** : m<sup>3</sup>



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



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

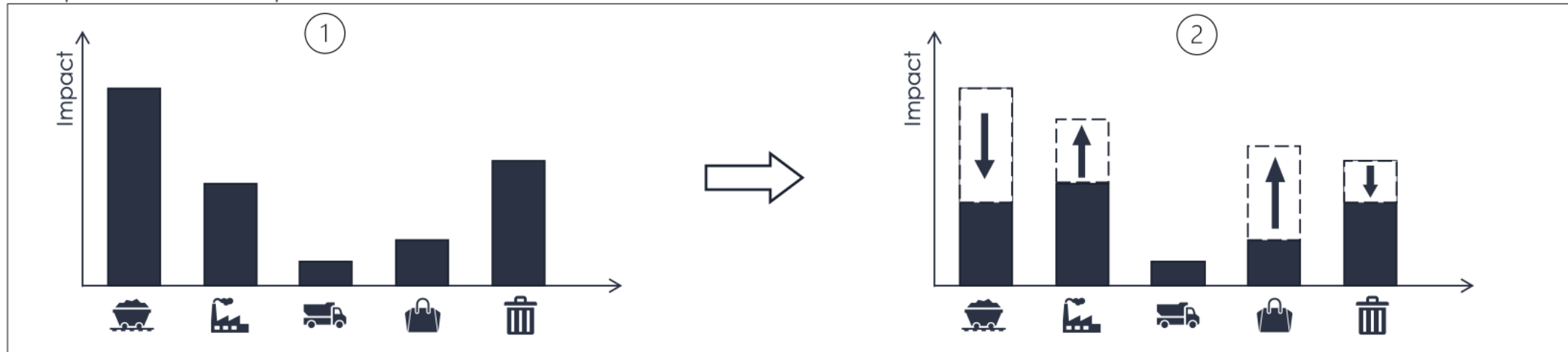
# Life cycle analysis

	PUR	Mineral wool	Woodfibre	Cotton	Cellulose	Hempcrete
 CO <sub>2</sub>	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 (cont.)

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## CERN Campus Regenerative Environment & Social Programme (RESP)

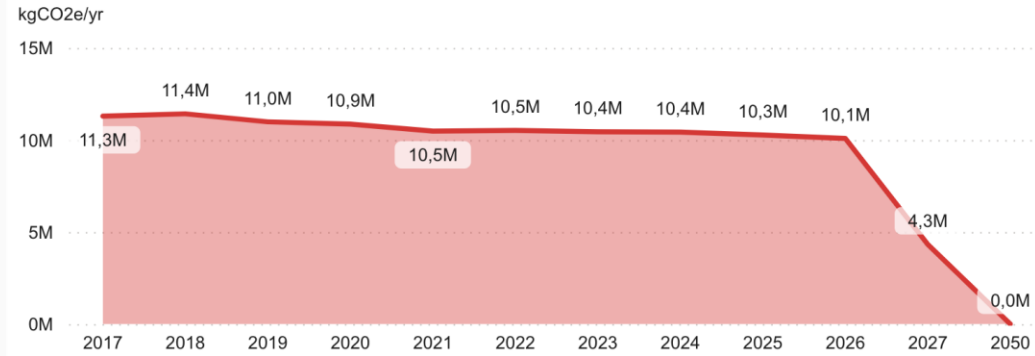
### Overview

This dashboard summarises the decarbonisation progress of CERN's tertiary buildings across Meyrin and Preveessin 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.

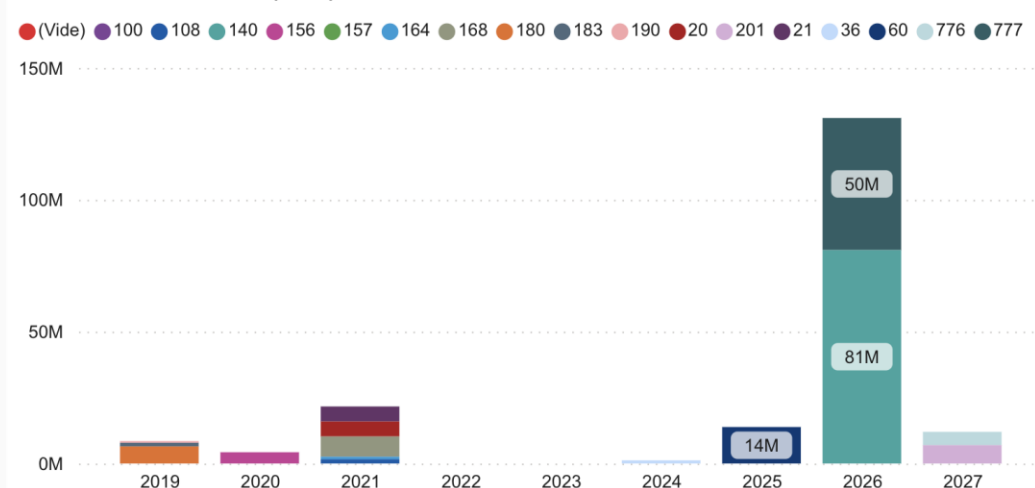
Select the location

- MEYRIN
- PREVESSIN

### Operational heating carbon reduction trajectory



### Cost of interventions (CHF)



#### 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**

# Regenerative Environment and Social Programme (cont.)

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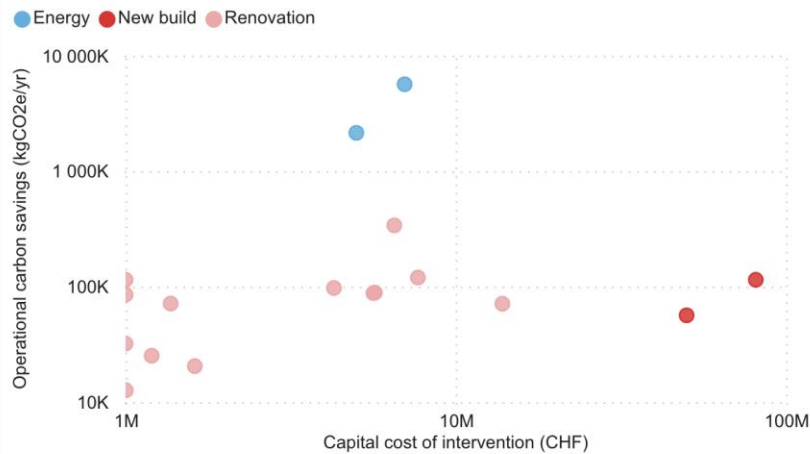
## CERN Campus Regenerative Environment & Social Programme (RESP)

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

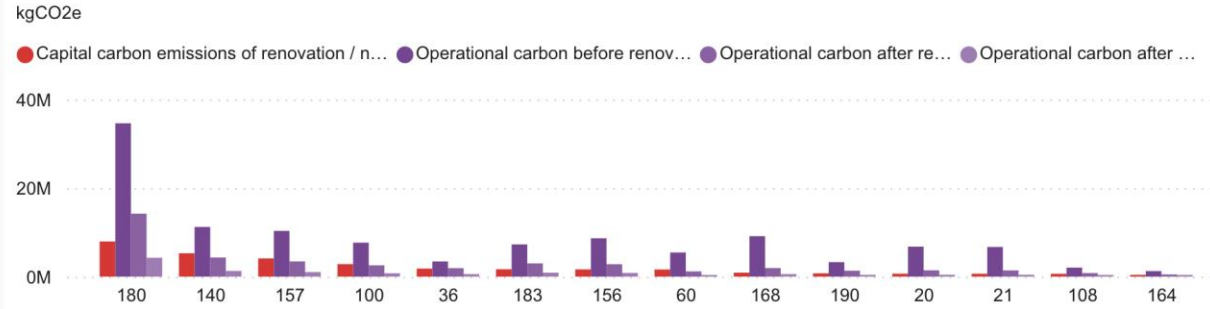
### Intervention

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

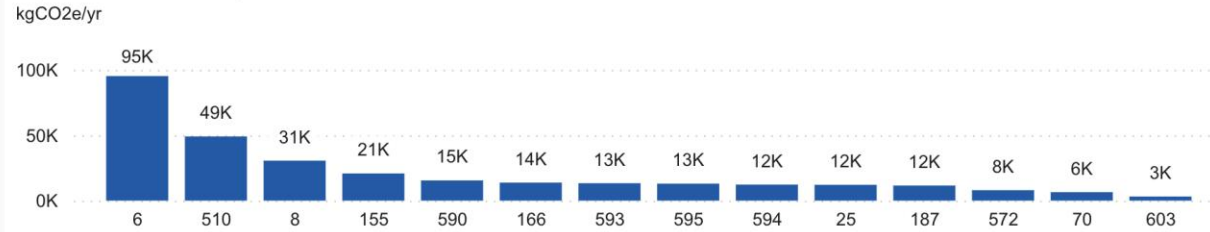
### Capital cost for intervention and operational carbon savings



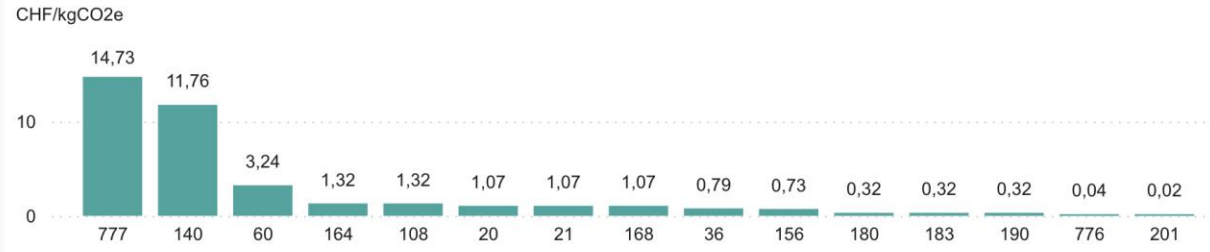
### Capital and operational heating carbon emissions



### Operational heating carbon emissions saved from demolition



### Capital cost per kg of operational heating carbon emissions saved



# Regenerative Environment and Social Programme (cont.)

DRAFT\_v5

## 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

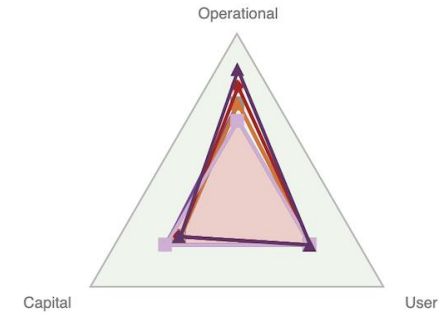
#### Domain

Tout

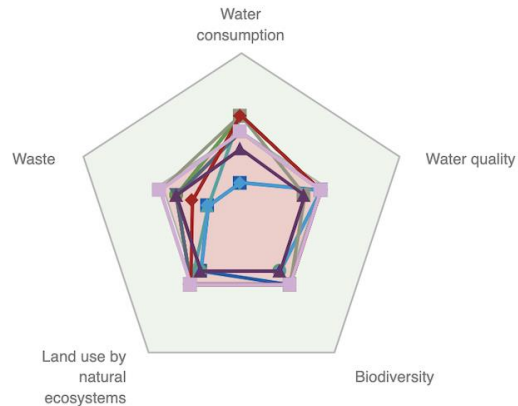
#### Key

- Score - B100 consolidation
- Score - B108-164 consolidation
- Score - B140
- Score - B3150
- Score - B36 consolidation
- Score - B60 consolidation
- Score - B777
- Score - Green parking Preveessin
- Score - Insulation of B20-21-168
- Score - Insulation of building 180-183
- Score - Light replacement campaign
- Score - Meyrin heating plant
- Score - Outdoor meditation social seats
- ▲ 1/2 ▼

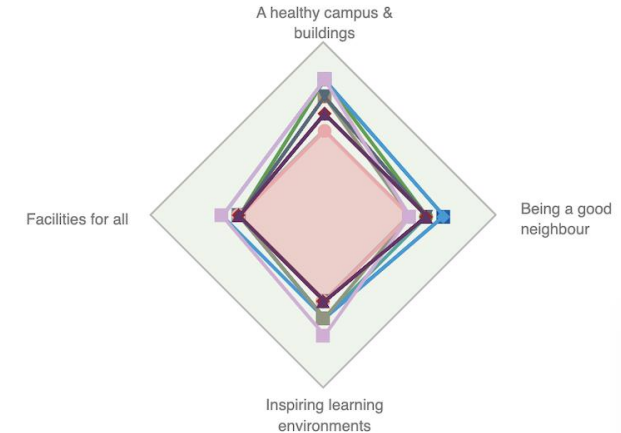
### Carbon impact



### Environmental impact



### Social impact



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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.

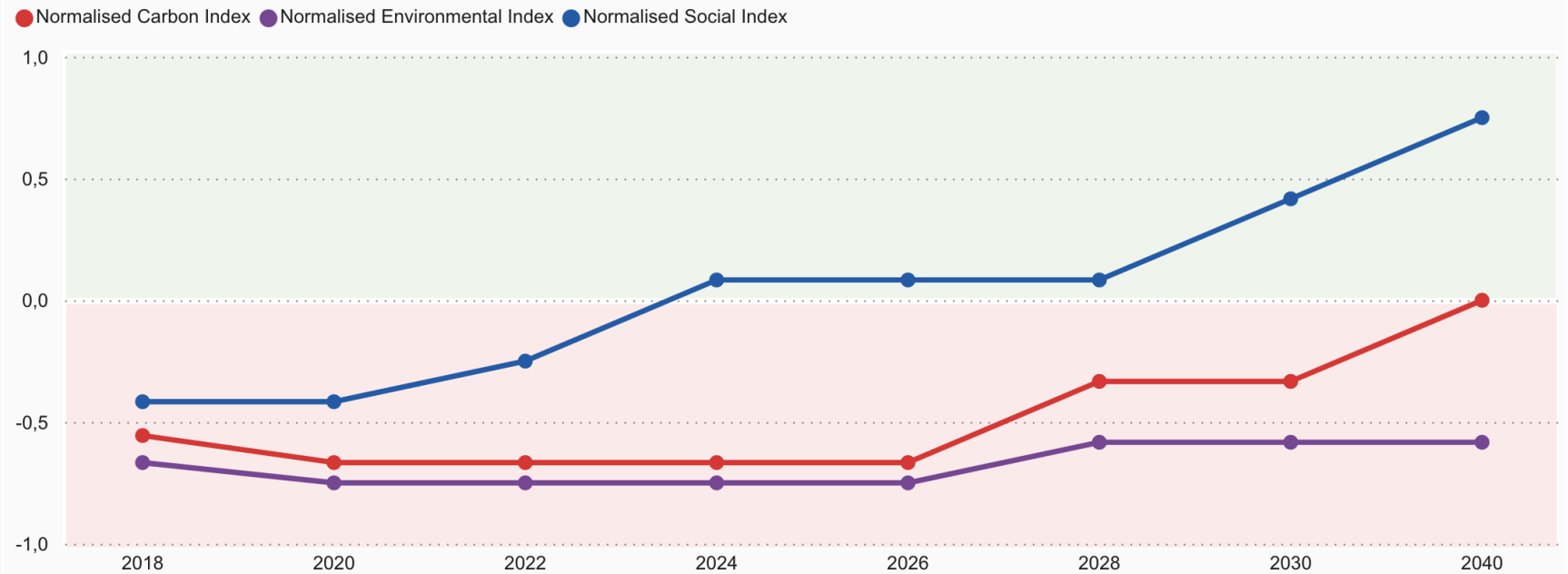
- Social index starts negative, due to the "time honoured" buildings.

- 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



# CAMPUS SERVICES

E-Twingo purchases for the Car Sharing Service	New Contract set up for the E-bike Sharing Service & improvement of sharing stations	Set up of the solar chargers for personal E-bikes	MOV'ICI integration at CERN & communication campaigns	7 E-Partners purchased CSA & Mobility fleet renewal
				

## Recap Mobility Evolution

2016 - 2019	~12% Fleet reduction
2019	Survey and Mobility Action Plan
Q2 2022	Savings proposal & eco-transition thanks to <b>25% fleet reduction</b> , endorsed by ED; expected savings included in the MTP
Q4 2022	Mobility Survey and Action Plan (input to Environmental Report 21-22)
Q3 2023	Fleet reduction implementation proposals; ED gives green light to develop a working model
Q4 2023	ED supports the development of a large car sharing <b>fleet managed centrally</b> (accountability for savings and fulfilment of mobility needs)  ED approves CEPS 2030 environmental objectives, which include: <b>25% fleet reduction &amp; 50% of EVs in CERN's car fleet</b>
Today	For ED information: Updated Mobility Plan Car fleet reduction implementation (impact awareness)

30/04/2024

SCE

## Proposal for the award of a contract for the provision of transport services for the CERN community

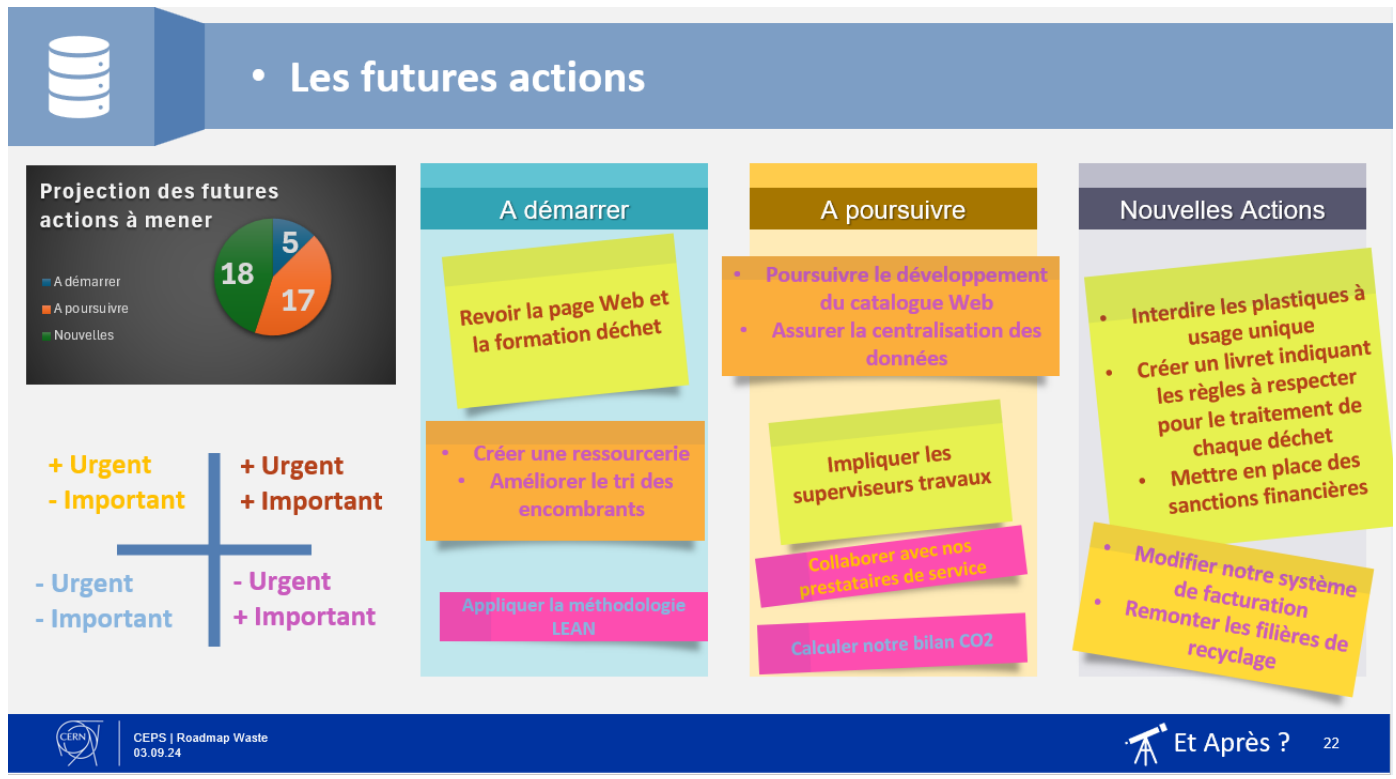
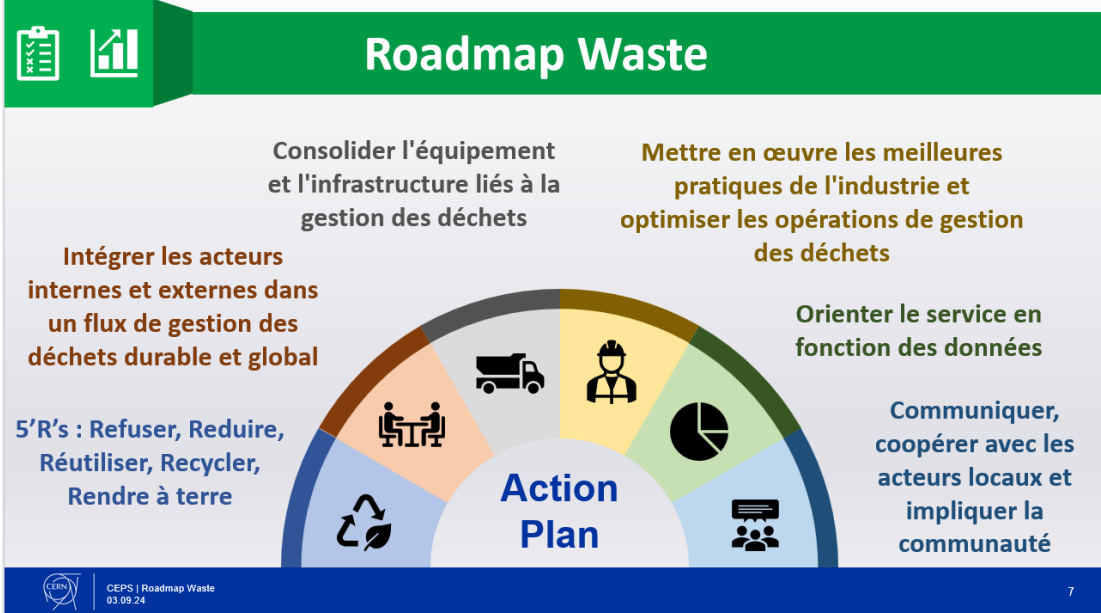
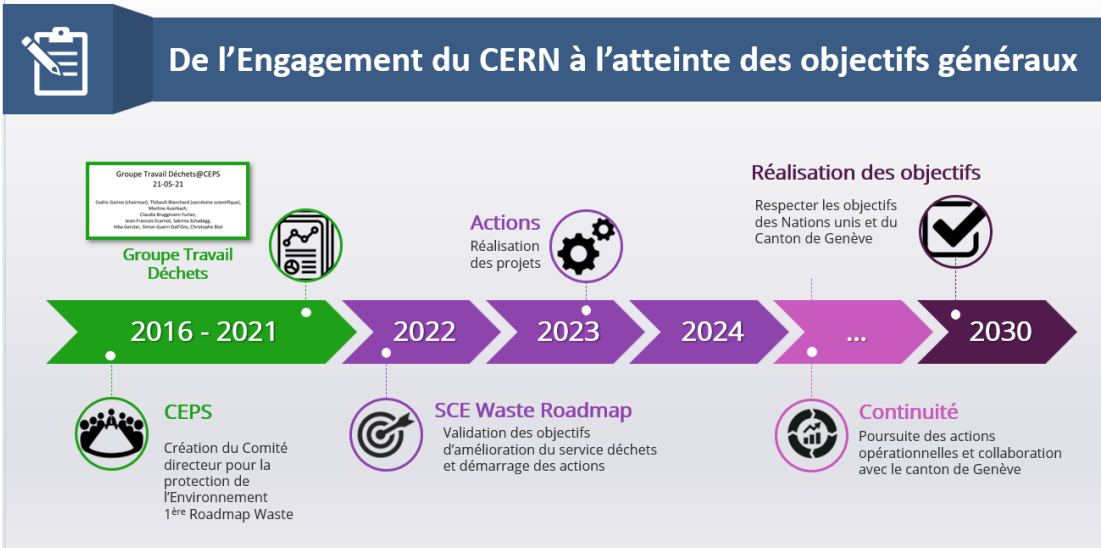
### Scope

#### Improvement

- Regular shuttle service operated by 100% electric shuttles, significantly reducing CO<sub>2</sub> emissions and contributing to a cleaner and more sustainable environment
- Optimization of shuttle timetables to ensure better alignment with passenger needs, minimize waiting times, and maximize operational efficiency
- Buses will be equipped with a passenger counting application to monitor occupancy levels in real-time, optimize route planning, and improve overall service
- Accessibility for disabled persons
- Contract Coordinator on site: Improvement of daily management (communication with drivers, last minute requests, feedback)



# Waste roadmap (CEPS Nov. 24)



# Waste management and cleaning

## Standardisation and extension of sorting instructions

Restaurants, cafeterias, vending machines, etc...



## Reorganization of metal bin management

Withdraw of unused and mixed bins  
Identification and signage of permanent bins



## Sorting bins implementation

Public area and office buildings – more than 50 sorting bins deployed



## Opération de nettoyage : plus d'1 tonne de déchets collectés à Prévessin

2024-04-19



Spring Clean-up Week Results

En accord avec le département SY, le groupe SCE-SSC a récemment entrepris un nettoyage de printemps sur les quelques 18 000 m<sup>2</sup> des bâtiments 864, 865 et 866 à Prévessin. L'objectif était de libérer de l'espace et de dégager les couloirs et les sous-sols encombrés par du matériel inutilisé.

Les résultats de cette opération sont très satisfaisants : plus d'1 tonne de déchets ont été collectés ! Parmi ceux-ci, différents types de déchets ont été triés et répertoriés : 840 kg d'encombrants, 214 kg d'appareils électroniques, 107 kg de matériel informatique et 19 kg de câbles. Si vos locaux sont aussi encombrés et que vous avez du matériel informatique et du mobilier que vous n'utilisez plus, n'hésitez pas à contacter [cern.dechets@cern.ch](mailto:cern.dechets@cern.ch) qui vous proposera une solution.

Bravo à tous ceux qui ont contribué à la réussite de cette grande opération de nettoyage !

## Ozonated water system replacing the use of chemical products for cleaning

2024-03-22



UPDATE

**OZONATED**

WATER SYSTEM

Respecting water may begin with not polluting it. This is the reason why SCE department turned to ozonated water as a sustainable alternative to traditional cleaning chemicals as of 2022.

Ozone is an inorganic molecule, which kills bacteria, viruses, and parasites and eliminates contaminants. When stabilized, aqueous ozone has the potential to eliminate up to 99.999% of harmful bacteria, surpassing the effectiveness of bleach, and having equivalent or even better effectiveness than many chemical disinfectants on market.

Since 2022, the SSC group, in charge of the cleaning contract, has installed no less than 15 connection points on the CERN site with the support of the team SAM-IN. Buildings 501, 504, 570, 664, 112, 14, 54, 31, 38 and 39 in Meyrin, and 774, 865, 866, 892, 937 in Prévessin, are all equipped with connections to ozonated water machines.

Indeed this ozonated water method brings an environmentally attractive solution that avoids chemical products and, contrary to traditional cleaning agents, does not leave harmful residues that can contaminate water sources. It therefore helps safeguard aquatic ecosystems and protect our natural water resources.

This initiative reaffirms SCE's ecologically conscious and sustainable approach.



## Semaine européenne de réduction des déchets

2023-11-17



## Traitement des déchets de vos plateaux au R1


Savez-vous comment sont traités les déchets de vos plateaux au R1 ? Ils sont revalorisés selon leur nature et répartis en quatre catégories.

2023-03-24




# Circular economy


### Simplified donation with ECO 21 platform



### Online catalogue for 2<sup>nd</sup> hand material



### Electro composter deployed for R3





## Un abri vélo à taux zéro

2024-08-23

## Free compost distribution at CERN

2024-10-18



Composting is a natural, useful and ecological solution to fertilize but also a very interesting solution of waste conversion and transformation.

Restaurant 3 is composting the organic fraction of its waste since last year (article [here](#)), producing a compost of the highest possible quality. With the autumnal plantation period beginning, SCE department has launched a distribution program to enable the CERN Community to benefit from this 10 m<sup>3</sup> natural fertilizer that looks and smells like soil.

If you're eager to enrich your garden soil with high-quality compost, simply express your interest by sending an email to [cern.dechets@cern.ch](mailto:cern.dechets@cern.ch). The distribution will operate on a 'first come, first served' basis, the 24 and 31 October 2024 in B133, between 1:00 PM and 5:00 PM.

Please note that anyone interested shall bring their own container or box (max. 100L/person) to collect the compost.

# Housing & Catering

## Come and spin the sustainable food wheel!

2024-03-08



On Monday 11 and Tuesday 12 March, Novae will propose fun activities at Restaurant 1 and 2, to raise people awareness of the benefits of sustainable food in a recreational and educational manner.

This initiative led by Novae's [Corporate Social Responsibility](#) (CSR) department will include a stand at the entrance of the restaurant 1 and 2, informing people about sustainable food with a particular focus on diversification of protein sources, and will offer a funny game: the sustainable food wheel to discover the 6 principles of a sustainable food around thematic questions.

Sustainable delicacies, such as vegetable peel chips, will be offered to participants, raising awareness of more [responsible eating](#). And a local and zero-waste vegan "dish of the day" will be proposed, with a detailed recipe to encourage people to reproduce it at home. By buying one, you will get one free hot chicory infusion.

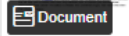
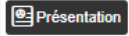
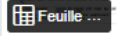

So don't miss the event and make a contribution to turning the wheel of knowledge on Sustainable food!

Novae's events at CERN: [KB0009093](#)

## Sustainability @hotel Meyrin

Créée par Gregoire Mathias, dernière modification par Vincent Gilquin le mars 19, 2024

**Objectif:** réduire l'impact environnemental et s'inscrire dans une optique de conservation et de respect de notre environnement

	Quoi	Qui	Tasks
<b>Eco label certification</b>	Markey survey of existing Swiss eco labels	@ Faezeh Abbasi	 Document  Présentation
	Assessment of current maturity of CERN hotels compared to available labels		 Feuille ... Overview criteria
	Project charter to be certified with one of the label		
<b>Single use plastic</b>	Sanitary kit (gobelets en verre/ brosse à dent en bambou)	Topnet CERN / Topnet	<input checked="" type="checkbox"/> Trouver fournisseur : Hotel Megastore <input checked="" type="checkbox"/> Demander un devis <input type="checkbox"/> Vérifier avec Legal pour achat FR et vente en CH hors taxe : mail du  9 mars 2024
	Distributeurs dans les douches communes au lieu des miniatures dans les TLB, SLB, SWB	Topnet Installation CERN TBC (perceage/ amiante)	

# Conclusion

- Small or big it is always worth it
- Doesn't necessarily cost more
- There is no planet B, but there is a plan A: Act now
- Hope is the seed, sustainability is the harvest



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