NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

Climate City Contract

2030 Climate Neutrality Action Plan

leuven

LEUVEN 2030

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Summary

This first version of the Action Plan, a living document that we intend to amend and enrich along the way, is the product of engagement with a broad set of collaborators, both within and beyond city hall. The process by which it came to life was orchestrated by the city and Leuven 2030 (Box 1). Five highlights from the Action Plan are presented below:

1. **Baseline emissions** are estimated at 457.000 tons. The vast majority of these emissions stem from energy use in buildings. Subtracting emissions reduced through offsetting (approx. 15 per cent) and emissions reductions embedded in existing strategies (approx. 6 per cent) yields an **emissions gap** of approx. 336.000 tons;

2. The **pathways to climate neutrality** presented in Module B-1 describe how this emissions gap could be closed. They are described both quantitatively, through estimates of the emissions impact of different action clusters, and qualitatively, by connecting interventions to a sequence of early and later outcomes. The pathways form the backbone of the portfolio of actions presented in Module B-2;

3. The **portfolio** is the heart of the Action Plan. It is composed of 71 actions designed to break through systemic barriers and catalyze action aligned to the pathways laid out in Module B-1. This first iteration of the portfolio has the potential to deliver at least 30.000 tons of emissions reductions and likely far more, as not all portfolio actions have yet been quantified. While this falls short of full climate neutrality, scaling the portfolio up is expected to bridge the gap. The portfolio includes eight actions that explore how such upscaling could be achieved;

4. Complementing the portfolio are 16 **enabling actions** designed to help enable implementation of the portfolio. These are presented in Modules C-1 and C-2 and chiefly aimed at improving collaboration both within and beyond city hall (organizational and governance innovations) and at fostering a more inclusive, just transition (social and other innovations);

5. Implementation of the Action Plan will be supported by a process of **portfolio management**. This will enable the iterative development of the portfolio in response to new insights and circumstances. Progress will be tracked and documented, and presented in an updated version of the Action Plan every two years.

Box 1: Leuven 2030

Leuven 2030 is a platform established in 2013 by the city and more than 50 other founding members to support and enable stakeholders to take climate action. Six stakeholder groups (citizens, civil society, companies, knowledge institutions, the city and its agencies, and public and semi-public institutions) are formally represented in Leuven 2030's decision-making bodies and periodically convened to develop and align strategy.

Leuven 2030 in the Action Plan:

- Leuven 2030's model and history: Module A-3.3
- Leuven 2030's role in the CCC process: Work Process
- Leuven 2030's enabling interventions: Module C-1 and Module C-2

1 Introduction

The Action Plan is one of three parts that together form the Climate City Contract (CCC). It sits alongside the Investment Plan and the Commitments, and is closely interlinked with both: The cost scenarios outlined in the Investment Plan build on top of the portfolio of actions presented in the Action Plan, and those same actions provide the basis for the city and stakeholder commitments collected in the CCC. All three components of the CCC are thus aligned and oriented in the same direction.

Leuven dedicated itself to the creation of the CCC, and is dedicated to the Mission as a whole, because it believes that the Mission has the potential to catalyze action at a pace and scale as yet unseen in Leuven. This potential resides in a number of features of the CCC:

- The portfolio of actions, which sets out in greater detail than before the interventions needed to achieve systemic change, and further clarifies roles and responsibilities;
- The Investment Plan, which opens up novel pathways towards unlocking investment at scale and creates an opportunity to engage more deeply with the financial sector;
- The formalization of commitments, which creates greater transparency and accountability.

Taken together, these components could usher in a new phase in Leuven's climate efforts, and begin to deliver deep and abiding emissions cuts.

In charting this path forward, the CCC builds on what has come before. Leuven's history of climate action reaches back more than two decades, and is defined by an ongoing commitment to collaboration. This commitment is expressed in Leuven 2030, a platform created to enable structural cooperation towards climate neutrality. A key milestone was achieved in 2019, when Leuven 2030 presented the Roadmap, a document co-designed with stakeholders that lays out a path to a climate-neutral and resilient Leuven. This was followed by a process of moving the Roadmap into implementation.

The CCC draws on this earlier work in several ways:

- The process of implementing the Roadmap gave rise to a set of breakthrough projects – a loose portfolio managed by Leuven 2030 and aimed at catalyzing action across a wide range of stakeholders. This collection of projects went through several iterations and provided content and inspiration for the portfolio developed for the Action Plan;

- Roadmap activity deepened stakeholder engagement. This helped strengthen relationships and set the stage for engagement with stakeholders within the Mission;

- The Roadmap helped form a broad consensus around the need for an ambitious transition. The cover page bears the signatures of 15 key stakeholders, lending their support to the Roadmap. The CCC aims to move a step further, and match this broad commitment to commitments at the level of individual actions.

The impact of developing the CCC has been profound: the Mission has become a focal point – a frame around which we have organized and that has recontextualized many of our ongoing and planned actions. While the work that accompanied the development of the CCC (further mobilizing stakeholders, building commitment, developing an investment plan) was work that we believe we needed to do in any case, the Mission provided a coherent framework, a timeline, and a powerful momentum for us to align to.

There is a tension at the heart of the Mission. On the one hand, there's its towering ambition: climate neutrality by 2030. On the other hand, the realization that such a goal is, for most cities, out of reach. It is a tension we have sought to navigate as best we could, both accepting that we are unlikely to achieve the Mission's full ambition and not letting that undercut or hollow out its spirit and imagination. "We reach for the moon but are happy to land among the stars."

2 Work Process

The process of developing the Action Plan is presented along the stages of the Climate Transition Map.

Building a Strong Mandate

Governing the Mission

A first step in the CCC process consisted of setting up a governance structure to steward the development and delivery of the CCC. This developed organically at first and then solidified around three components:

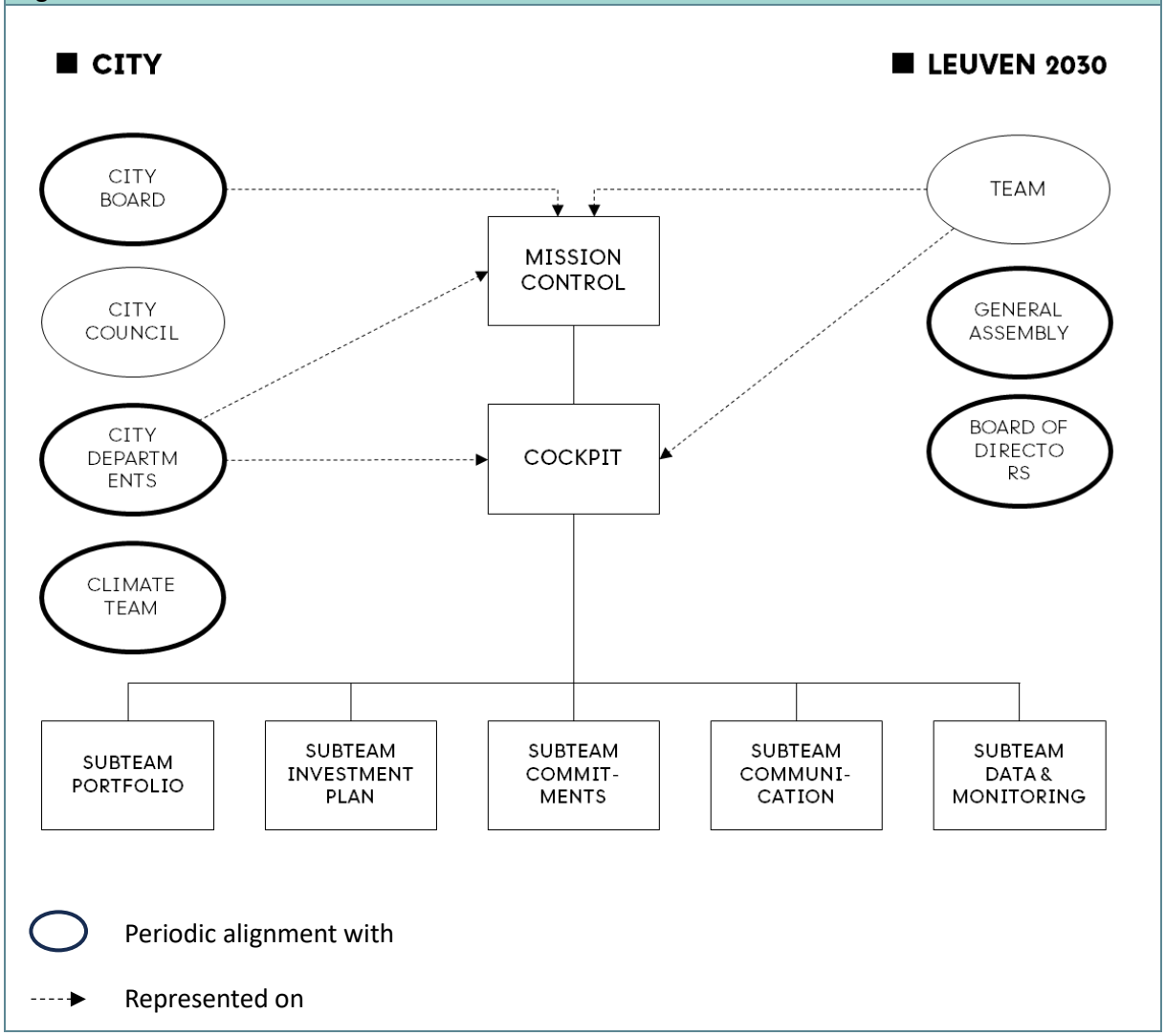
- ***Mission Control***: A recurring high-level meeting to track Mission progress and develop overall Mission strategy, presided over by the Mission Manager and attended by the mayor, two deputy mayors, high-ranking administrative staff, and the director of Leuven 2030;
- ***Mission Cockpit***: A team composed of the Mission Manager, department heads, and staff from Leuven 2030, entrusted with supervising the CCC process and orienting to implementation;
- ***Subteams***: A set of teams dedicated to the operational development of the CCC:
    - ***Subteam Portfolio***: Entrusted with developing the portfolio and the other components of the Action Plan
    - ***Subteam Data & Monitoring***: Entrusted with collecting, interpreting, and presenting the data for the emissions baseline and gap
    - ***Subteam Investment Plan***
    - ***Subteam Commitments***
    - ***Subteam Communication***

Table 1: Mission Governance

	Mission Control	Mission Cockpit	Subteams
Mandate	Track Mission progress and set overall strategy	Supervise the CCC process and orient to implementation	Operational delivery of the CCC
Composition	<u>City of Leuven</u> • Mayor • Deputy Mayor of Mobility & Climate • Deputy Mayor of Public Works & Youth Affairs • General Director • Mission Manager • High-ranking administrative staff <u>Leuven 2030</u> • Director	<u>City of Leuven</u> • Mission Manager • Director of Spatial Development • Head of the Mobility Department • Head of the Public Works Department • Head of the Sustainability Department <u>Leuven 2030</u> • Director • Staff	Team-dependent
Frequency	Once every month	Once every three weeks	Team-dependent

As depicted in Figure 1, these new structures remained closely aligned to existing governance structures: on the city side, to the city board (the city's executive body) and to formal and informal structures within the administration (including the city's cross-departmental climate team), and on the ecosystem side, to Leuven 2030's General Assembly and Board of Directors (the former includes all members of Leuven 2030, the latter is a set of representatives elected by the General Assembly).

Figure 1: Mission Governance



Developing a Shared Understanding

In parallel with building out a suitable governance structure, a core team of city and Leuven 2030 staff, which would later become Subteam Portfolio, invested in developing a common understanding of the Mission and its implementation in Leuven. This resulted in a set of principles collectively referred to as the Mission Compass:

- The Mission is a means to an end, not an end in itself. For the Mission to be successful in Leuven, it must be adapted to the local context;
- We embrace the Mission's spirit of innovation and experimentation and are open to engaging in new and potentially challenging ways of thinking and acting;

- "We reach for the moon but are happy to land among the stars." We acknowledge the need for ambition but are mindful of capacity;
- The city of Leuven and Leuven 2030 take part in the Mission as equal partners, each from its unique vantage point.

Also emerging out of these discussions was a sense that the most important part of the "Leuven version" of the Climate City Contract was the portfolio of actions. Sitting at the heart of the Action Plan, the portfolio was seen as having the greatest potential to act as a catalyst and as being most aligned to the appetite for implementation and tangible, short-term impact in Leuven. Consequently, much of our capacity over the yearlong process to develop the CCC was dedicated to the design and composition of the portfolio.

Building Broad Support

Early on, the Leuven team began a concerted and sustained effort to build support for the Mission, both within city government and beyond. This work proceeded along three tracks:

- Within city government, we pursued engagement at all levels:
    - At the political level, we engaged with city leadership through the periodic Mission Control meetings attended by the mayor and two deputy mayors;
    - At the administrative level, we engaged with senior management through the Mission Control and Mission Cockpit and through pre-existing venues for discussion such as the periodic meeting of directors (DOL);
    - Also at the administrative level, we engaged with city staff more broadly, for example through the widely attended meetings of the city's cross-departmental climate team, convened roughly every six months, and through a special half-day workshop dedicated to the Mission.

- Within the local ecosystem, we engaged with stakeholders through the decision-making bodies of Leuven 2030 and through a series of collective and bilateral co-design sessions:
    - We engaged with Leuven 2030's ***Board of Directors*** on a monthly basis. The board seats representatives from all six stakeholder groups represented in Leuven 2030 (citizens, civil society, companies, knowledge institutions, the city and its agencies, and other public institutions) and provided strategic direction along every step of the CCC process;
    - We engaged with Leuven 2030's ***General Assembly*** every six months, the rhythm at which it is convened. These meetings enabled a fuller range of Leuven 2030's members to track Mission activities and offer input;
    - Beyond Leuven 2030's formal structures, we engaged with stakeholders through ***collective co-design sessions***, the purpose of which was to surface and develop potential portfolio actions. One example is the event hosted by Leuven 2030 in the fall of 2022, which convened stakeholders across the public and private sector around a range of topics, including energy, built environment, mobility, circular economy, finance, and social justice;
    - We also engaged with stakeholders through ***bilateral sessions*** aimed at surfacing portfolio actions and securing commitments. These stakeholders include, but are not limited to, KU Leuven, UZ Leuven, imec, AB InBev, BENEO-Remy, AGSL, Zorg Leuven, Fluvius, the Province of Flemish Brabant, C-Valley, EcoWerf, Dijledal, ION, and Wienerberger;

- With regards to other governments, we engaged with policymakers at multiple levels:
    - We spoke at a hearing hosted by a commission of the ***Flemish Parliament*** on the topic of local climate policy. We shared our experience and offered thoughts on how Flemish policy could further support and enable local action;
    - We participated in a panel at a symposium co-hosted by the ***Flemish Department of Economy, Science, and Innovation*** on EU Missions and mission-driven policy in Flanders;
    - We partnered with other Flemish cities and the platform for Flemish cities to draft a joint climate memorandum addressed to the ***Flemish Government*** for the upcoming elections;
    - We hosted ***Federal Minister of Climate, the Environment, Sustainable Development and Green Deal Zakia Khattabi*** and ***Federal Minister of Development Cooperation and Major Cities Caroline Gennez*** and spoke with them about the EU Mission and the potential role of the national government;
    - We hosted a ***delegation of EU policymakers*** for an exchange on strengthening synergies within EU institutions and aligning EU services to cities' needs, against the background of Leuven's experience with EU initiatives.

Understanding the System

This section summarizes the approach taken in each of the modules associated with this phase of the Climate Transition Map:

- ***Module A-1: Greenhouse Gas Emissions Baseline Inventory***
  - The scope of our emissions inventory was set in consultation with Mission Control, the Mission Cockpit, and emissions experts (see Annex I, Scoping Note). Scope 3 emissions are partially included (waste and construction materials) and our intention is to more fully map and include Scope 3 emissions in future iterations of the CCC;
  - Emissions data were drawn from a variety of sources, with most data coming from the inventories published annually by the Flemish Institute for Technological Research (VITO).

- ***Module A-2: Current Policies and Strategies Assessment***
  - The list and description of policies was completed through desk research and input from city staff;
  - The assessment was crafted with input from experts and practitioners, predominantly within the city administration, and with input from city leadership.

- ***Module A-3: Systemic Barriers and Opportunities to 2030 Climate Neutrality***
  - Our understanding of systemic barriers was shaped by a combination of pre-existing knowledge and insights surfaced over the course of the CCC process:
    - A key source of information was the knowledge base built up over three years by the program facilitators enlisted by Leuven 2030 to support implementation of the Roadmap;
    - Additional insights came from discussions with practitioners and experts held as part of the CCC process. These informed the design of our portfolio of actions and were incorporated into the overview of systemic barriers presented in Module A-3;
    - EIT Climate-KIC's Deep Demonstration of Healthy, Clean Cities immersed us in the practice of systems innovation. This is described in greater detail in Module A-3.3.

- ***Module B-1: Climate Neutrality Scenarios and Impact Pathways***
  - A first step in building our pathway to climate neutrality consisted of mapping actions contained within existing plans and strategies, including the Roadmap and the Sustainable Energy & Climate Action Plan (SECAP). We compiled these actions in a unifying framework, organized them in clusters, and within each cluster estimated the potential for emissions reduction. This enabled us to determine the relative weight of actions and grasp the scale of reduction needed to achieve climate neutrality by 2030;
  - Alongside this quantitative approach we built out our impact framework by articulating our interventions and identifying associated levers of change and early and late outcomes. This occurred in close interaction with the portfolio-design process and in consultation with experts and practitioners active in each emissions domain, both within and beyond city hall. As part of this process, we selected suitable indicators to go along with the outcomes and impacts identified, drawing on both the indicator set provided by NetZeroCities and independently defined indicators.

Co-Designing a Portfolio

Given the central importance attached by the Leuven team to the portfolio of actions, developing the portfolio occupied the largest part of our time. We operated along two tracks:

- Along a ***bottom-up*** track we focused on mapping existing activities within both the city and the wider ecosystem. On the city side, this entailed convening experts in each of the Mission's five emissions domains and reviewing ongoing and planned actions. On the ecosystem side, we drew on material produced by Leuven 2030's program facilitators; we also gathered information through new and mostly bilateral conversations with key stakeholders.

  Using existing efforts as a point of departure for our portfolio was a deliberate choice, premised on the idea that meeting people where they are and acknowledging the value of their day-to-day activities would be an effective way of building a mandate for more far-reaching, Mission-aligned work. We were also intentional about framing the Mission not as an external workstream further stretching capacity but rather as something to be woven into and enriching ongoing work.

- Along a ***top-down*** track we approached the portfolio from a more outcome-oriented perspective, using the emissions reductions established in our pathway to climate neutrality as a guide to portfolio composition. This approach enabled us to assess potential portfolio actions against the larger emissions cuts required in each domain and subset of actions, as well as to identify gaps in the landscape of our current activity.

The interaction between these two tracks gradually gave rise to the portfolio of actions as presented in Module B-2.

To assess the portfolio potential of actions we used the notion of a **breakthrough project**: in order to qualify for the portfolio, an action had to address (and have the potential to break through) at least one systemic barrier. It also needed to connect into the impact pathways outlined in Module B-1 (and thus contribute to creating a large direct or indirect impact) and come on top of existing action. While we strove to stay true to these principles, we sometimes adopted a more pragmatic posture to create buy-in or traction with stakeholders.

At the portfolio level, we sought to arrive at **a representative set of actions**. The idea of representativity emerged out of our struggle early on to reconcile two seemingly conflicting logics contained within the portfolio concept: on the one hand, a need to cover the full range of emissions associated with climate neutrality by 2030; on the other hand, an understanding of the portfolio as a strategic and thus more narrow set of actions.

We resolved this tension by framing the portfolio as a set of strategically chosen pilot actions that could, if scaled, deliver full climate neutrality. This approach has the benefit of limiting our portfolio to a manageable number of actions while still connecting it to a long-term perspective. It also acknowledges the fact that much of the challenge that lies ahead cannot yet be captured in individual action outlines but will instead surface over time in a process of discovery and experimentation.

The idea of representativity extended into other dimensions of our portfolio. In addition to wanting to design a portfolio that reflected the distribution of emissions, we strove to build a portfolio that was balanced in terms of geography, ecosystem involvement, and the systemic levers that it sought to activate. These were some of the design principles that guided our work, and will continue to guide our work as we move into portfolio management.

Applying to the Pilot Cities Call

Early on in the CCC process, part of the Leuven team was entrusted with developing a proposal for the Call for Pilot Cities. The process of crafting the proposal served as a microcosm of the broader CCC process and contributed to each of the three stages of the Climate Transition Map detailed above:

- ***Building a Strong Mandate***: Developing the proposal familiarized us with some of the principles of the Mission (the focus on systemic barriers, the logic of the impact framework) and gave us confidence that we could apply them in a way that was practical and tailored to our local needs;
- ***Understanding the System***: The process gave us an opportunity to comprehensively map the barriers associated with decarbonizing Leuven's energy systems (the topic of our proposal);
- ***Co-Designing a Portfolio***: That analysis of barriers led directly into the design of the pilot activities. These activities include both activities specific to the domain of energy systems and more general activities with relevance across all emissions domains, and provided early content for our portfolio of actions.

3 Part A – Current State of Climate Action

Module A-1 Greenhouse Gas Emissions Baseline Inventory

A-1.1: Final Energy Use by Source Sectors				
Base Year	2019			
Unit	MWh/year			
	Scope 1	Scope 2	Scope 3	Total
Buildings				
Electricity		636.677		636.677
Heat/Cold	73			73
Natural Gas	903.307			903.307
Liquified Gas	15.318			15.318
Heating Oil	329.536			329.536
Coal	1.670			1.670
Biomass	76.730			76.730
Solar Thermal Energy	1.898			1.898
Geothermal Energy	3.905			3.905
Transport				
Electricity		1.087		1.087
Natural Gas	1.225			1.225
Liquified Gas	469			469
Diesel	180.076			180.076
Gasoline	64.769			64.769
Biofuel	14.931			14.931
Industrial Process and Product Use (IPPU)				
Electricity		120.401		120.401
Natural Gas	115.458			115.458
Liquified Gas	2.496			2.496
Heating Oil	26.159			26.159
Coal	2			2
Biomass	4.270			4.270
Agricultural, Forestry and Land Use (AFOLU)				
Electricity		1.267		1.267
Natural Gas	707			707
Liquified Gas	45			45
Heating Oil	4.317			4.317
Coal	322			322
Unidentified				
Electricity		9.511		9.511
Natural Gas	35.070			35.070

A-1.1: Remarks	
Source	2019-24062_LEUVEN_nulmeting_zonder_snelwegen_lok EFE.xlsx
Buildings	Residential (huishoudens) + non-residential (tertiair) + public lighting (openbare verlichting)
Transport	Private (particulier), commercial (commercieel) and public transport (openbaar vervoer) Tab data: Wegtransport/Snelwegen column D set to 0
Industrial Process and Product Use	Industrie (niet-ETS)
Agricultural, Forestry and Land Use	Landbouw

A-1.2: Emission Factors Applied						
Unit				Tons/MWh		
IPCC (2006)						
Primary Energy/ Energy Source	Carbon Dioxide (CO_2)	Methane (CH_4)	Nitrous Oxide (N_2O)	F-Gases (Hydrofluorocarbons and Perfluorocarbons)	Sulphur Hexafluoride (SF_6)	Nitrogen Trifluoride (NF_3)
Electricity	0,062					
Heat/Cold	0,235					
Natural Gas	0,202					
Liquified Gas	0,227					
Heating Oil	0,267					
Diesel	0,267					
Benzine	0,249					
Coal	0,354					
Biomass	0					
Biofuel	0					
Solar Thermal Energy	0					
Geothermal Energy	0					

A-1.2: Remarks	
CO_2 equivalent	A CO_2 equivalent (CO_2e) is a unit of measurement that is used to standardize the climate effects of various greenhouse gases
Source	2019-24062_LEUVEN_nulmeting_zonder snelwegen_lok EFE.xlsx[1]
Emission Factors	Tab EF Brandstof + EF ele_warmte

Calculation Emissions Factor Electricity 2019		
Total Electricity Use	768.943	MWh
Local Electricity Production	20.993	MWh
Purchase of Green Electricity[2]	532.600	MWh
National Emissions Factor Grid Power	0,2210	Ton CO_2e/MWh
CO_2 Emissions Due to Local Electricity Production	12	Ton
CO_2 Emissions Due to Production of Green Electricity	0	Ton
Local Emissions Factor Electricity	**0,0619**	**Ton CO_2e/MWh**

[1] https://www.vlaanderen.be/lokaal-energie-en-klimaatbeleid/burgemeestersconvenant
[2] https://dashboard.vreg.be/report/Lokale%20statistieken.html

As both future heat production and future modes of transportation will be based more and more on electricity as the main energy carrier (for example with heat pumps and electric vehicles), it is important to **reduce its emissions factor to zero** as much as possible. This can be done by **encouraging more households and organizations to purchase green electricity** with guarantees of origin. An even more important lever is to **dramatically increase local production of electricity**.

A-1.3: Activity by Source Sectors			
Base Year		2019	
Unit		Tons CO_2-eq/year	
	Scope 1	Scope 2	Scope 3
Buildings			
Households	153.339	8.581	
Tertiary Sector	121.201	30.522	
Public Lighting		313	
Transport			
Private and Commercial Transport	58.814	46	
Public Transport	5.748	21	
Waste			
Residual Waste from Households			10.748
Residual Waste from Businesses			37.115
Industrial Process and Product Use (IPPU)			
Industry (Non-ETS)	30.874	7.454	
Agricultural, Forestry and Land Use (AFOLU)			
Agriculture	1.420		
Carbon Sink Forestry	-12.000		
CH_4 Digestion	808		
CH_4 Manure Storage	98		
N_2O Manure Storage	170		
N_2O Soil	2.150		
Unidentified	7.084	589	

A-1.3: Remarks	
Data partners IPPU	Confidential
Non-energy emissions	There is no comprehensive list of non-energy emissions sources in Leuven. This information can only be collected by querying the network.
Agricultural, Forestry and Land Use	Tab Landbouw in the spreadsheet 2019-24062_LEUVEN_nulmeting_zonder snelwegen_lok EFE
Waste	This is the sum of 10,7 kTon CO_2 for household residual waste incineration (EcoWerf figures) supplemented by 37,1 kTon CO_2 for business waste incineration. For the latter, Flemish figures were used and extrapolated to Leuven size based on the number of companies. Source: Afvalcijfers_Leuven_2022.xlsx.
Forestry	Calculated in 2013: -12 kTon CO_2

A-1.4: GHG Emissions by Source Sectors				
Base Year	2019			
Unit	Tons CO_2-eq/year			
	Scope 1	Scope 2	Scope 3	Total
Buildings	274.540	39.416		313.956
Energy	*274.540*	*39.416*		
Non-Energy	*0*	*0*		
Transport	64.562	67		64.629
Waste			47.864	47.864
Industrial Process and Product Use (IPPU)	30.874	7.454		38.328
Energy	*30.874*	*7.454*		
Non-Energy	*0*	*0*		
Agricultural, Forestry and Land Use (AFOLU)	-7.354	78		-7.275
Energy	*1.420*	*78*		
Non-Energy	*-8.774*	*0*		
Unidentified (Not Included in Total)	(7.084)	(589)		(7.673)
Total	362.622	47.015	47.864	457.501

A-1.4: Remarks	
Source Energy-Related GHG	2019-24062_LEUVEN_nulmeting_zonder snelwegen_lok EFE.xlsx Tab data: Wegtransport/Snelwegen column D set to 0
Source Non-Energy-Related GHG	Table A.1-3

A-1.5: Graphics and Charts

This section presents five charts to illustrate the state of play of Leuven's emissions reduction challenge.

Figure 2: Total Energy Consumption (2019, MWh, %)

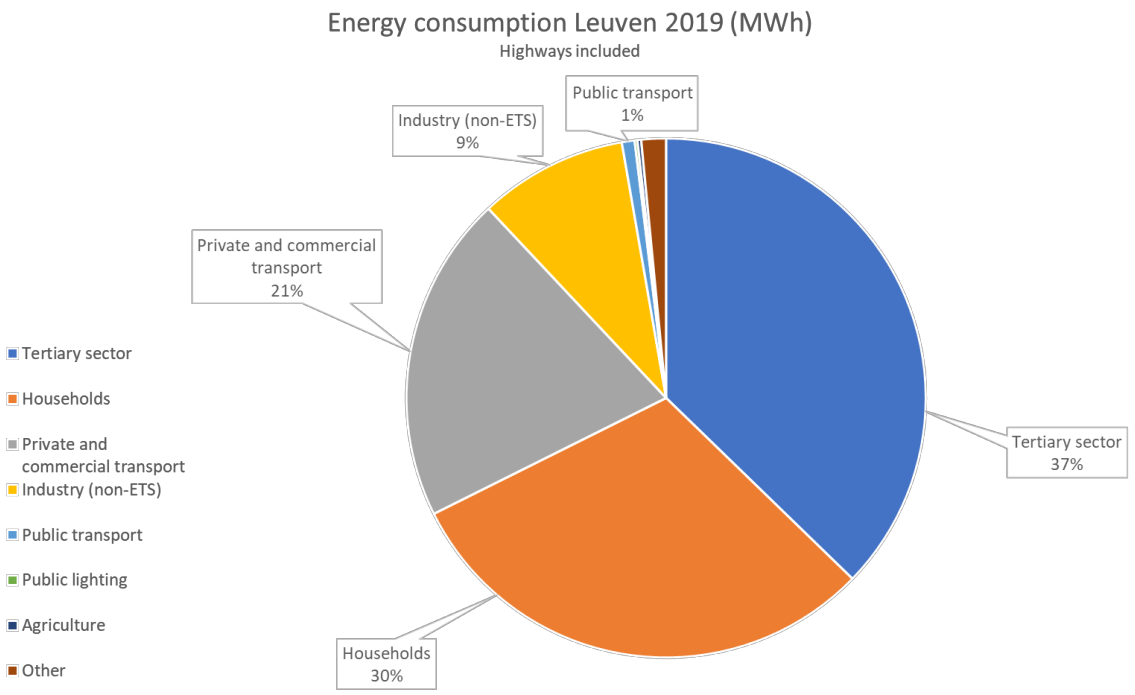


Figure 2 illustrates how the built environment accounts for over 60 per cent of total energy consumption in Leuven. Within this built environment, non-households (in blue) represent a little over half of all consumption, while households (in orange) account for the remainder.

In third position sits personal and commercial transport (in grey), accounting for a little under a quarter of total energy consumption. (Note: Approximately half of the distance traveled on Leuven territory is traveled on supralocal roads, and thus out of the circle of control of the local level. As noted further below, these emissions are excluded from our scope.)

More modestly, in fourth position, sits (non-ETS) industry (in yellow).

Rounding out the chart are public transport, public lighting, and agriculture – modest consumers compared to the first four highlighted sectors. A small part of our energy consumption remains unattributed for now.

Figure 3: Total Energy Consumption by Energy Source (2019, MWh)

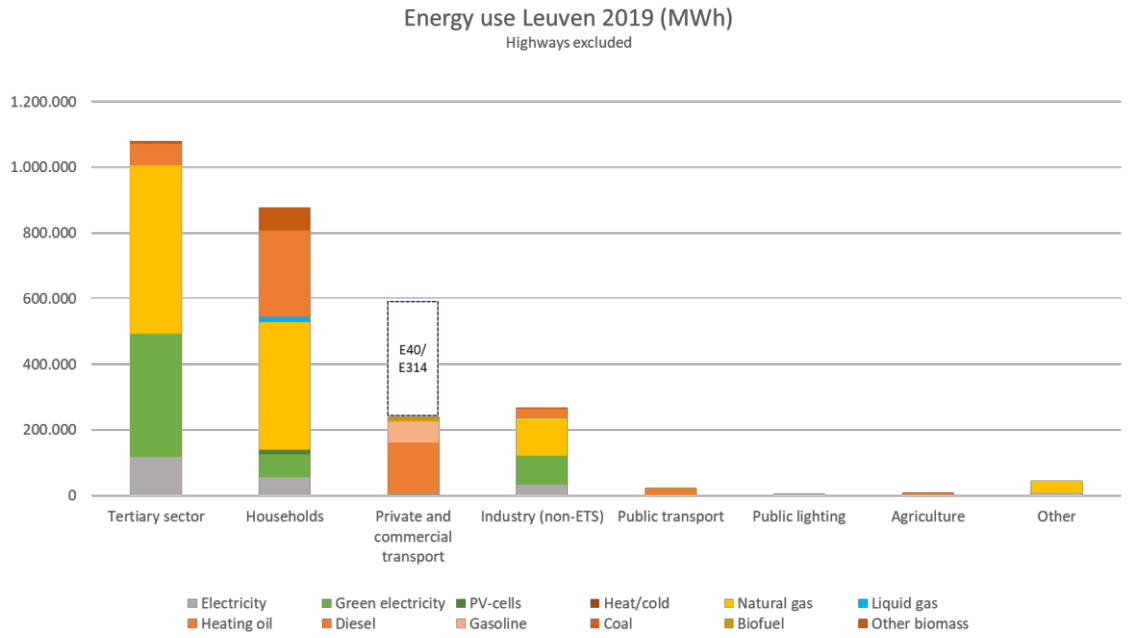


Figure 3 highlights the types of energy sources represented in each of the sectors noted above.

The dominant fuel for the built environment in the tertiary sector is natural gas (in yellow, first bar from the left), followed closely by electricity, of which a strikingly large share is delivered through 'green electricity contracts' (in green, same bar). The emissions reduction challenge within this sector is undeniably the rapid phasing out of gas. The opportunity is to accelerate the already encouraging electrification of this sector's energy needs.

Also for the built environment of households, the dominant fuel is gas (in yellow, second bar from the left), this time closely followed by fuel oil, a more aggressive fuel than gas when it comes to climate-disturbing emissions. The potential for electrification of the residential building stock is huge, as is the challenge to get this done.

As for individual and commercial transport, the dominant energy fuel is diesel (in orange, third bar from the left), followed by gasoline. The electrification of fleets urgently requires acceleration.

Non-ETS industry (fourth bar from the left) will need to further focus on phasing out gas through electrification, and switching from grey to green electricity.

Figure 4: Greenhouse Gas Emissions (Scope 1 and 2, 2019, Ton CO_2-eq)

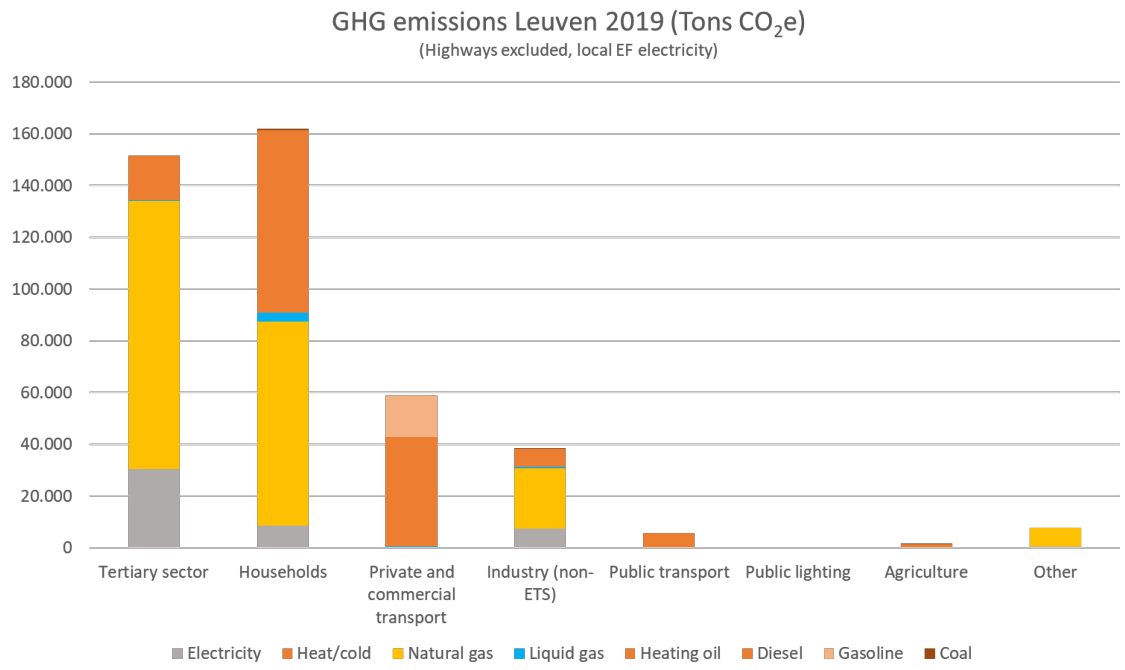


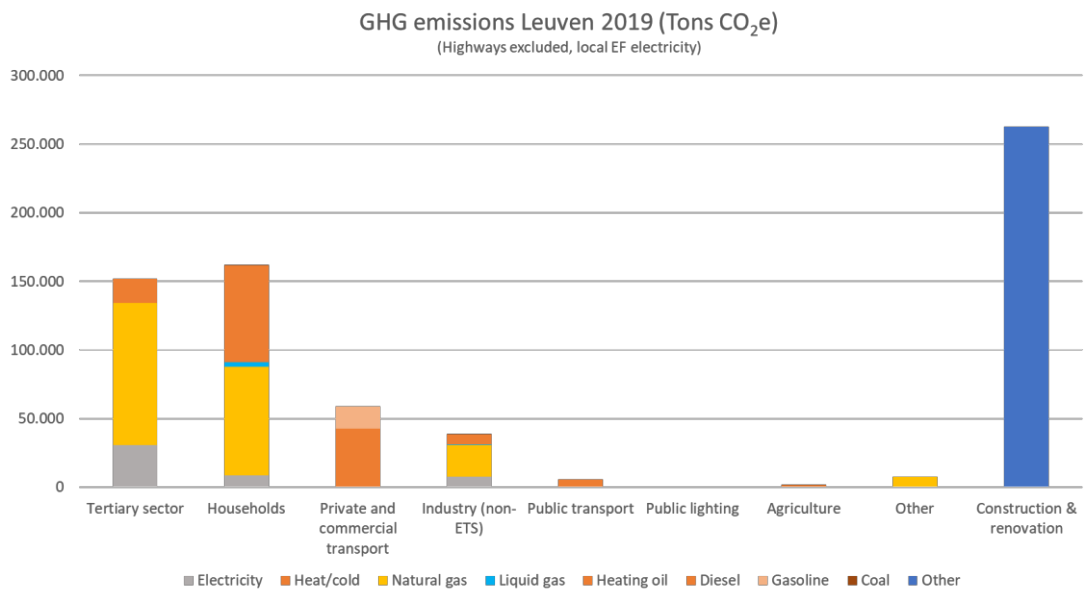
Figure 4 translates the energy consumption per sector into their respective shares in Leuven's total emissions (Scope 1 and 2).

Not surprisingly, the relative shares depicted here are similar to those in the charts presenting energy consumption patterns.

Within Scope 1 and 2 emissions, the energy consumption of the built environment accounts for by far the largest contribution to Leuven's emissions (first two bars from the left).

In the third bar from the left, depicting transport emissions, the emissions originating from the two highways passing through Leuven (E40 and E314) are excluded, as these fall outside of local jurisdiction.

Figure 5: Greenhouse Gas Emissions (Scope 1, 2, and 3, 2019, Ton CO_2-eq)



Emissions associated with materials use in our built environment (both new construction and renovation) are estimated to be roughly equal in size to Scope 1 and Scope 2 emissions combined. This highlights the striking impact of Scope 3 emissions, and the need to increasingly fold these emissions into our climate efforts. This is further demonstrated by the fact that Scope 3 emissions associated with food consumption, not depicted here, are estimated to match those associated with materials use, placing them in pole position for inclusion in future versions of the Climate City Contract.

Figure 6: Evolution in Greenhouse Gas Emissions (Scope 1 and 2, 2011-2021, Ton CO_2-eq)

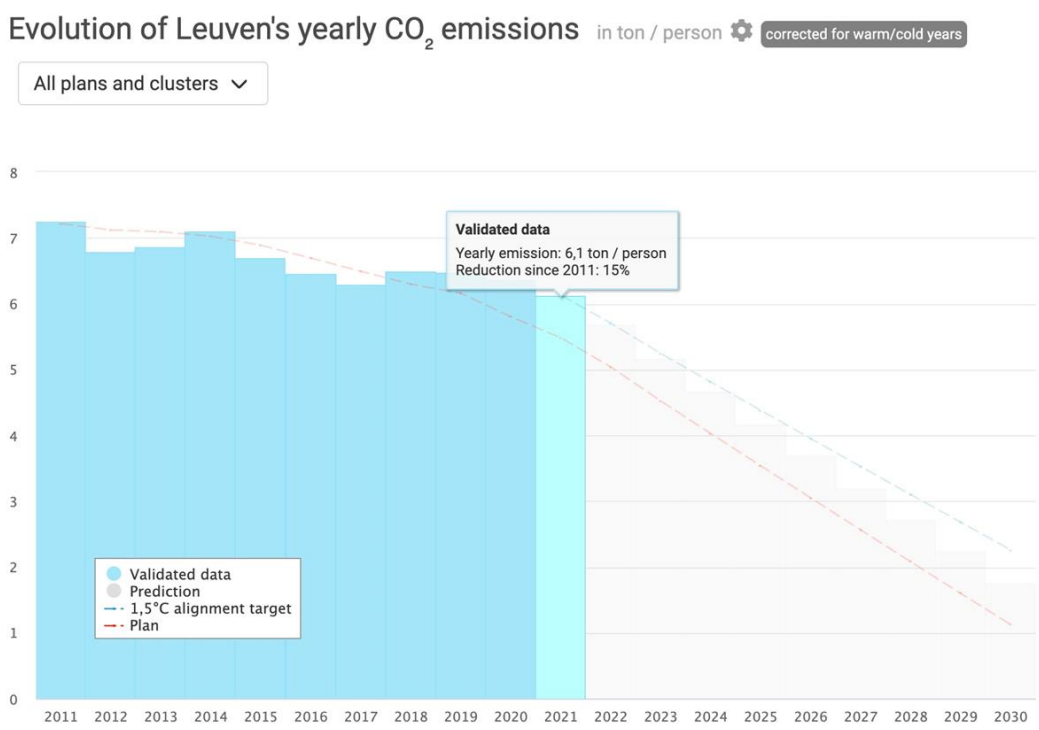


Figure 6 presents the overall evolution of per-capita emissions in Leuven between 2011 and 2021.

Although the chart shows a steady reduction in these emissions, a radical shift towards net-zero, away from fossil fuels, has yet to emerge. We believe the Mission, and its cohort of climate-ambitious cities, could prove to be a strong lever for this urgent acceleration to materialize in the coming years.

Note: The CCC updates our reference year from 2011 to 2019, the most recent pre-corona year.

A-1.6: Description and Assessment of GHG Baseline Inventory

Figure 7: Evolution in Total Energy Consumption (MWh, 2011-2021)

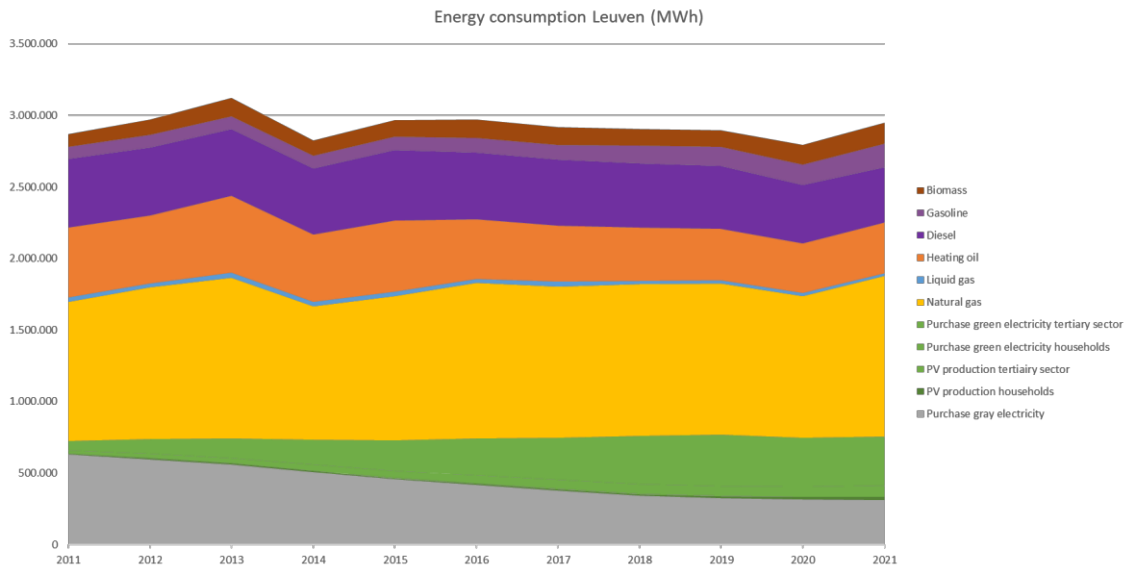


Figure 6 reprises the bars from Figure 3 and places them in time.

At the top, in brown, we find the use of biomass. This bar represents how much heating is done with wood and pellets in Leuven, partly coming from old installations, partly related to conversions of gas installations to biomass installations.

Below that, we find the two main fuel types for mobility, namely gasoline and diesel. In recent years, the Flemish car fleet has started to move away from diesel in favor of gasoline and electricity. This trend will undoubtedly continue and accelerate in the coming years.

As noted under Figure 4, emissions originating from the two highways traversing Leuven are excluded from our scope. Therefore approximately half of all energy consumption presented here in light and dark purple is not factored into this Climate City Contract.

The use of fuel oil, shown in orange, is noticeably smaller than that of natural gas (in yellow). Nevertheless, it remains substantial enough to add focus on accelerating its phase-out. After all, fuel oil has a higher emissions factor (CO_2 emissions/kWh) than the other energy forms.

A small light blue stream shows how much liquid gas is still used for heating in Leuven. Better known as an LPG tank in the front- or backyard. The minor share of this energy form in total energy consumption over the past 10 years makes its phasing out less of a priority.

The large yellow fuel stream in the middle immediately catches the eye. It shows the consumption of natural gas in households, along with all large buildings and in industrial applications, excluding the energy consumption of our (limited) ETS industry (*). Given its size, this should remain one of the main focus areas of current and future climate action. As demonstrated under A-1.5, the consumption of natural gas in Leuven is predominantly related to our built environment. If we were to add the energy consumption impact of our materials use linked to our built environment (new

construction and renovation), this share of energy consumption would increase dramatically. All the more reason to add this part of Scope 3 impact to the Scope 1 and 2 approach of our CCC.

Below that in light green, we see the purchase of electricity that took place in Leuven within a "green electricity" contract. This has increased sharply over the years and Leuven performs particularly well here compared to other Flemish municipalities. This awareness supported our choice to work with a local emissions factor for our electricity consumption, instead of with a regional, national, or European parameter. This more accurately reflects our local situation and provides the right triggers for further conversions towards green electricity contracts, alongside investments in local production of renewable energy (the dark green line).

Below in grey we see the purchase of "grey electricity."

Between the light green and the grey lines, a thin line of dark green is noticeable. This is the amount of electricity generated locally. That is, on the territory of Leuven by means of solar panels. This small amount represented less than 1 per cent of Leuven's total energy consumption in 2020. In 2021 and 2022, however, we know that plenty of solar panels were added, so we can expect this share to increase in future versions of this chart.

(*) Part of the activities of both AB InBev and UZ Leuven (the university hospital)

Module A-2 Current Policies and Strategies Assessment

A-2.1: List of Relevant Policies, Strategies and Regulations	
Name & Title	Description & Relevance
Sustainable Energy and Climate Action Plan	A plan submitted to the Covenant of Mayors that commits the city to an emissions reduction of 55% by 2030. The plan identifies necessary measures, estimates associated emissions reductions, and outlines six priority actions.
Climate Action Plan 2020-2025	A plan aligned to the Sustainable Energy and Climate Action Plan that defines actions across 10 domains, identifies action owners, and establishes time frames for implementation
Roadmap 2025 · 2035 · 2050	A co-created roadmap to climate neutrality by 2050, formally endorsed by 15 key stakeholders and outlining actions across 10 thematic and three cross-cutting programs (including Scope 3 emissions)
District Energy Strategy	A strategy that maps the potential for renewable energy production in Leuven and outlines district-level transition scenarios
Cycling Plan	A plan to increase cycling in the city
Zero-Emission Mobility Plan	A plan to enable the deployment of charging infrastructure and advance the transition to zero-emission mobility
Rainwater Plan	A plan for the drainage, storage, and use of rainwater
Drought Plan	A plan to manage drought and the availability of water
(Draft) Greening Plan	A plan to preserve, manage, and expand the city's green spaces
Municipal Nature Development Plan (GNOP)	A plan that guides the preservation and enhancement of natural infrastructure
Circular Leuven	A strategy to advance the circular economy in Leuven along five dimensions (entrepreneurship, construction, repair and reuse, consumption, and policy)
Spatial Structure Plan (RSP)	A framework for land use in Leuven
Policy Plan Groundbreaking Leuven	A policy plan for the 2019-2025 period that outlines a set of 10 priorities and associated actions
Building Ordinance	A set of rules governing construction in Leuven
Parking Ordinance	A set of rules governing parking in Leuven
Climate Policy Plan 2040	A strategy for achieving a climate-neutral and resilient province by 2040
Climate Action Programme 2020-2025	A set of objectives and actions to advance the transition to a climate-neutral and resilient province by 2040
Spatial Policy Plan	A vision for land use in the province
Regionet Leuven	A vision for sustainable mobility and land use in the Leuven region
Planning Ordinance on Impermeable Surfaces	A set of rules governing impermeable surfaces

Energy and Climate Plan 2021-2030	A plan presenting existing and planned measures across ESR sectors (transport, buildings, agriculture, small industry, and waste), with a goal to reduce emissions by 40% by 2030 (compared to 2005)
Climate Strategy 2050	A long-term climate strategy that sets a goal of reducing emissions by 85% by 2050 (compared to 2005)
Long-Term Renovation Strategy for Buildings 2050	A long-term strategy for building renovations that aims to reduce building emissions by more than 80% by 2050 (compared to 2020)
Renovation Pact	A multi-stakeholder partnership led by the Flemish Government to increase the renovation rate of the Flemish building stock
Local Energy and Climate Pact	A partnership between the Flemish Government and local authorities to support action across four areas: greening, energy, mobility, and water
Climate Adaptation Plan 2030	A plan to adapt Flanders to the short- and long-term effects of climate change through six overarching strategies and 14 actions
Solar Plan 2025	A plan to increase installed solar capacity in Flanders to 6,7 GW by 2030
Wind Plan 2025	A plan to increase installed wind capacity in Flanders to 2,5 GW by 2030
Heating Plan 2025	A plan to advance the transition to green heat
Flexibility Plan 2025	A plan to increase the flexibility of the electricity grid to accommodate the growth in renewable energy
Mobility Vision 2040	A vision for mobility in Flanders that sets policy priorities and proposes a goal of cutting all transport emissions by 2050
(Draft) Regional Mobility Plan Leuven	A plan at the level of the Leuven transport region that will serve as the basis for an integrated investment program
Rainwater Ordinance	A set of rules governing rainwater collection and storage
Spatial Policy Plan	A set of strategic goals for land use in Flanders
Circular Flanders in 2050	A vision for circular economy in Flanders
Vision 2050	A long-term strategy for Flanders rooted in seven transition priorities
Energy Regulation of 19 November 2010, Articles 9.1.2 to 9.1.12	A set of standards for energy performance in new buildings, including a requirement to derive a minimum share of energy from renewable sources
Energy Regulation of 19 November 2010, Articles 9.1.15 to 9.1.16	A set of standards for building renovations
Energy Regulation of 19 November 2010, Articles 9.3.1 to 9.3.2	A rule requiring all non-residential units to meet specific standards for energy performance within five years of sale or other forms of transfer
Energy and Climate Plan 2021-2030	An integrated energy and climate plan, drawn up and submitted to the European Commission in compliance with the EU's Governance Regulation

Long-Term Strategy	A long-term climate strategy, drawn up and submitted to the European Commission in compliance with the EU's Governance Regulation
Net-Zero or Growth? How Belgium Can Have Both	A report outlining a pathway to net-zero emissions
Adaptation Strategy 2017-2020	An adaptation strategy for the 2017-2020 period
In 2050: A Strategic Federal Long-Term Vision for Sustainable Development	A long-term vision for sustainable development defined across 55 goals
Action Plan Circular Economy 2021-2024	An action plan for the circular economy outlining six goals and 31 measures
Koninklijk Besluit tot Regeling der Luchtvaart	A federal decree that governs, along with Circulaire GDF-03, the construction of wind turbines near airports
European Green Deal	A blueprint for transforming Europe into the first climate-neutral continent by 2050
European Climate Pact	An initiative aimed at collecting pledges and inspiring climate action across a wide range of communities
EU Covenant of Mayors for Climate & Energy	An initiative that brings together local governments committed to reducing emissions by 55 per cent by 2030, strengthening resilience, and reporting on progress
EU Emissions Trading System (ETS)	A system that caps emissions and distributes tradable emissions allowances in targeted sectors

Color	Level
	City of Leuven
	Province of Flemish Brabant
	Region of Flanders
	Kingdom of Belgium
	European Union

A-2.2: Description and Assessment of Policies

DESCRIPTION OF POLICIES

Local Policy

A key document guiding local policy is the city's **Policy Plan 2020-2025**. Drafted at the outset of the city board's current term, the plan sets priorities and defines actions across 10 themes, several of which relate directly to the city's climate policy. It is best understood as a framework that provides an overall direction and is developed in more detail in separate, domain-specific plans.

The city's main climate plan is its **Climate Action Plan 2020-2025**. This plan defines actions across 10 domains and links them to action owners. It also defines ambition levels, time frames, and progress indicators. It is an important touchstone for the city's climate efforts and is fully aligned with the city's **Sustainable Energy and Climate Action Plan (SECAP)**. The difference between the two plans is that the city's Climate Action Plan goes into greater detail than the SECAP and is more implementation-forward.

Complementing these plans is the **Roadmap to a Climate-Neutral Leuven**. Drawn up by Leuven 2030 and some 60 local experts and practitioners (including city and university staff), the Roadmap lays out a path to climate neutrality across 10 thematic and three cross-cutting programs. Unlike the city's plans, the Roadmap is explicitly conceived from the perspective of the city's entire ecosystem of actors. It recognizes that the city's actions alone will not be enough to reach climate neutrality and that action across the full spectrum of stakeholders is needed.

The Roadmap, like the city's climate plans, was written with a view towards climate neutrality by 2050. Leuven's selection to the Mission moves this target up by two decades, necessitating the accelerated implementation of existing plans and the formulation of new actions, an effort that the Action Plan initiates.

In addition to these overarching plans, the city has several **sectoral plans and strategies** in place that contribute to its net-zero ambition. Spanning energy, built environment, mobility, spatial planning, adaptation, and circular economy, these plans are too numerous to discuss here, but they are listed in Module A-2.1 and touched on, in some cases, in the assessment that follows below.

Regional Policy

Belgium is a federal state. Many of the powers associated with climate action sit at the Flemish level, making the Flemish Government a key player in the climate landscape. The Flemish Government has set a target of reducing emissions by 40 per cent by 2030, with a long-term goal of reducing emissions by 85 per cent by 2050. As at the local level, it has translated its overarching goals into multiple sectoral strategies and plans, spanning the usual domains: energy, industry, transport, built environment, agriculture, adaptation, and circular economy.

A notable initiative is the **Local Energy and Climate Pact**, a partnership between Flanders and local authorities that offers cities and municipalities technical and financial support in exchange for committing to concrete goals. Examples of such goals include achieving a 40 per cent reduction in emissions from municipal buildings by 2030, building 1,5 charging stations for every 100 inhabitants by 2030, and planting one extra tree per inhabitant by 2030. The Local Energy and Climate Pact is a framework that structures much of the interaction between the Flemish Government and the city.

National Policy

Climate policy at the federal level is guided by the **National Energy and Climate Plan 2021-2030**. Prompted by the EU's Governance Regulation, which requires Member States to develop and submit integrated climate and energy plans, the plan outlines a strategy along the five dimensions of the Energy Union: decarbonization, energy security, energy efficiency, the internal energy market, and research, innovation, and competitiveness. Long-term strategy is set by the **Belgian Long-Term Strategy**, which aims for a climate-neutral Belgium by 2050, in line with the EU's climate goals.

The Federal Government has comparatively few powers in the realm of climate action, although this should not be overstated. The Federal Government is responsible for the security of energy supply, nuclear power, offshore wind energy, and parts of the fiscal policy pertaining to energy. It is also responsible for the national railways and sets emissions standards for vehicles (largely adapted from EU standards) and some of the fiscal policy relating to transport, including fuel taxes and taxes on company cars. Recent reforms provide for the elimination of the tax benefit for non-electric company cars starting from 2027, from which point forward only electric company cars will be tax-deductible.

Table 1: Division of Powers Between the National Level and the Regional Level[3]

	Federal Government	**Regions**
Environment	• Coordination of international policy (including climate policy) • Product policy (e.g., product standards and associated criminal sanctions) • Marine environmental policy	• Air and soil protection • Preservation and protection of nature • Protection and distribution of water
Energy	Matters whose technical and economic indivisibility requires a national approach: • Studies on the future of energy • The nuclear fuel cycle • The production of energy, including offshore energy • Large infrastructure for the supply and storage of energy • Energy transport • The policy on end prices for energy for consumers, including social pricing policy • The energy efficiency of federal buildings • Aspects of fiscal policy (VAT, excise taxes, etc.)	• The distribution and local transport of electricity via networks with a nominal voltage lower than or equal to 70.000 volts • Distribution rates (gas and electricity) • The public distribution of gas • The use of mining gas and blast-furnace gas • The grids for the distribution of heat • The valorization of spoil tips • New energy sources, with the exception of those associated with nuclear energy • The recovery of energy by industry and other users • Rational energy use
Transport	• The national airports and railways • Fuel taxes • Technical standards for vehicles	• Motorways, navigable waterways, ports, regional airports • Public transportation and school transportation • Taxes on vehicles

[3] Adapted from: https://klimaat.be/klimaatbeleid/belgisch/nationaal/bevoegdheden.

EU Policy

The European Union is an active and influential policy actor in the field of climate action. The **European Green Deal** helped forge a strong consensus around the target of net-zero by 2050, and the suite of legislative and regulatory proposals adopted to bring the Green Deal to life are affecting national and regional policy on multiple fronts. EU ambition has filtered through to the local level, most notably via the **Covenant of Mayors**, which has motivated the city to set a target of reducing emissions by 55 per cent by 2030, and the **Mission for Climate-Neutral and Smart Cities**, which has moved that target up to full climate neutrality (an emissions reduction of at least 80 per cent) by 2030. EU policy also affects local action via the **Emissions Trading System**, which caps emissions from two operators in Leuven (AB InBev and UZ Leuven), and the diverse set of funding programs from which Leuven has benefited (including Horizon Europe, Interreg, and LIFE).

ASSESSMENT OF POLICIES

Local Policy: Overall Assessment

Reviewing the local policy landscape and the state of climate action in Leuven, several observations can be made.

First, emissions have come down, but they have not come down fast enough. Between 2011 and 2020, emissions fell by an estimated 8 per cent. This places Leuven level with other Flemish cities, which have all followed a similar trajectory. While it is true that Leuven's emissions have not risen despite continued economic and demographic growth, much remains to be done for us to start truly bending the curve.

A second observation is that the city has set high ambitions, but that so far implementation has lagged behind. This is the result of a combination of factors. One is the lack of a sufficiently supportive policy environment. Here the Flemish Government, in particular, could do more to adopt policies and regulations that move the net-zero transition forward. Another factor is a lack of resources. Resource constraints mean that an increase in ambition cannot always be met with an increase in personnel or investment, a reality that has been exacerbated by inflation and the energy crisis. Several other factors, including political constraints, likely contribute to the implementation gap.

A third and final observation is that there is a growing awareness of the need to further engage in far-reaching cross-silo cooperation, both within city hall and beyond. To help close the implementation gap, climate must – and can – be woven into a wide range of policy domains. Within the city administration, this would mean further mainstreaming climate action across departments and supporting and enabling cross-departmental collaboration, a goal that the city will pursue as part of its activities in the Pilot Cities Programme.

Within the wider city ecosystem, too, there is a need to further align actors and catalyze collective action. While Leuven already has a relatively mature governance model in place, as reflected in Leuven 2030, a platform for structural cooperation established to accelerate the net-zero transition, there is a growing sense that the time has come for stakeholders to move beyond broad promises and towards concrete commitments and implementation. Leuven's Climate City Contract is intended to be a meaningful step in this direction, and the start of an iterative approach that progressively ratchets up ambition and accountability.

Insights into the city's climate policy can also be found in an external audit carried out as part of the European Energy Award (EEA), a certification scheme that evaluates and grades local authorities on their energy and climate efforts. The report, issued in 2021, awards Leuven 306 out of a possible 476 points. It notes as Leuven's strengths:

- The quality of the city's Climate Action Plan 2020-2025, and the cross-departmental approach to its development and execution;
- The city's spatial policy and its vision of urban development;
- The city's steps towards sustainable urban mobility, including implementation of its plan to curb car travel in the city center;
- The city's efforts to engage with its community of stakeholders, in particular through Leuven 2030.

The report identifies three actions to further elevate the city's climate efforts:

- Matching the city's high ambitions with increased capacity and training of personnel;
- Expanding efforts to decarbonize municipal buildings;
- Improving monitoring and evaluation systems.

Local Policy: Assessment by Emissions Domain

Energy Systems

A major focus in this domain is the decarbonization of **heating systems**. Green heat is a relatively new policy domain, and one in which the city's knowledge base is still being developed. A strong foundation has been laid by the city's energy strategy, which maps and assesses the potential of collective green heat across Leuven, and attention is now shifting to the operationalization and implementation of the strategy at a district level. This is the focus of Leuven's activities in the Pilot Cities Programme.

More established is the city's work on renewable **electricity**, the other major component of this emissions domain. Progress here has been made through the city-supported energy cooperative ECoOB, which has so far installed roughly 1.000 kWp of solar capacity, much of it on municipal buildings. The city also has a long-standing advisory service in place that offers financial and technical support to citizens looking to install solar panels or carry out other climate-friendly measures in their homes.

Despite these efforts, the potential for renewable energy in Leuven remains vast: solar capacity in Leuven currently tops out at 41 MW, less than 10 per cent of a total potential of 505 MW. Wind power is not (yet) a viable option: regulation associated with the proximity of Brussels Airport prohibits the placing of wind turbines.

Built Environment

This domain comprises two main dimensions: the renovation of existing buildings and the construction of new (climate-neutral) buildings.

Accelerating the rate of **renovation** has proven exceptionally difficult. Less than 1 per cent of homes are renovated every year, a rate that needs to triple in order to achieve a net-zero housing stock by 2050. While the city offers technical and financial support to help residents renovate, a service it is in the process of scaling up, it holds too few levers to deliver the impact that is needed. As a result, the city is focusing increasing attention on the shift to renewable sources of energy. This is a departure from the Trias Energetica, an approach that holds that efficiency should come before action on the source, and reflects a larger recalibration in the energy field.

Efforts in the non-residential sector have fared better. In 2020, Leuven successfully completed a three-year ELENA project delivering annual emissions savings of four kilotons. The project was set up and led by Leuven 2030, and stimulated over 50 million euro in investment across 24 partners, including the city. Emissions from municipal buildings have steadily declined, yet ramping up the pace of renovation has proven difficult. This is partly the result of a steady flow of projects requiring the city's short-term attention (for example projects to restore building safety), delaying action on renovation, and partly the result of a shortage in qualified technical personnel.

In addition to reducing emissions from existing buildings, it is critical to avoid an uptick in emissions from **new buildings**. Several major urban developments are expected to be completed over the coming years, including the construction of a new arts venue and adjoining park in the city center and the development of a new science park. While the level of ambition in terms of sustainability has typically been set on a per-project basis, a formal framework to provide for a more uniform approach is in the works and forms part of the portfolio of actions presented in Module B-2.

Mobility & Transport

The city has taken several steps towards sustainable urban mobility. A recent milestone is the introduction of a mobility plan for the city center, which sought to reduce car travel and encourage sustainable modes of transportation. Changes in travel behavior indicate that the plan was successful: following implementation, the number of cyclists in the city center rose by 44 per cent, while the number of cars declined by 19 per cent. Similar plans are now being prepared and rolled out in the city's other boroughs. First in line was Wilsele-Dorp, followed by Kessel-Lo, where a comprehensive participatory process was put in place to solicit input from residents.

Mobility in Leuven is influenced by travel into and out of the city. It therefore has a strong regional component. Regionet Leuven, a project outlining a sweeping vision for the Leuven region, has been active since 2015, advocating for greater density, reduced car dependency, and improved infrastructure for cycling and public transport, yet implementation has lagged behind. A major reason is a dependence on Flemish funds, which are limited and difficult to secure. Tapping into alternative forms of finance is likely needed for this project to gain new traction. Even so, progress continues to be made: The redesign of the ring road, a key component of Regionet, is moving towards implementation. And a redesign of the wider public-transport network, part of the mobility plan for the Leuven transport region, has been decided upon and is set for implementation in 2024-2025.

Perhaps more so than other domains, mobility is an exceptionally sensitive issue, placing constraints on how far, and how fast, policymakers can go.

Nature-Based Solutions & Green Infrastructure

A key dimension in this domain is the preservation and expansion of **large natural infrastructure** such as parks, forests, and nature reserves. The city has developed several policy plans in this area, including the Municipal Nature Development Plan (GNOP) and the Spatial Structure Plan (RSP). These plans, and the actions they have prompted, have contributed to enhancing water quality, biodiversity, and overall ecological conditions. As of 2018, the city is the owner and caretaker of 315 hectares of public green spaces, a figure that has since risen as a result of targeted land purchases.

Another dimension is the **greening of the built environment**. This is achieved through interventions such as the removal of impermeable surfaces, the planting of trees, and the introduction of green walls and green roofs. Such actions have become a prominent feature of public works in Leuven, and are promoted through a campaign called 'Let It Sink In,' which seeks to inform and actively involve citizens. Two European projects, PACT and JUSTNATURE, the former of which is coordinated by the city, have helped elevate the city's efforts, bringing in extra capacity and resources for investment. While the city's focus has traditionally been on public spaces, this is gradually changing to include private spaces, which make up a large percentage of sealed surfaces in Leuven. The city's campaigns and projects have helped improve public awareness and support of NBS, an important condition for continued action.

A notable challenge in this domain is that nature-based solutions can be in tension with other spatial needs, such as mobility infrastructure and urban development. Striking the right balance between such competing claims is a delicate matter, and an intrinsically political one. A closely related challenge is that there is a need for greater strategic direction: the implementation of nature-based solutions should be more firmly embedded in a long-term strategy, guided by clear ambitions. This would enable a more goal-oriented approach and help to resolve conflicts that may arise with other policy goals.

Waste & Circularity

Waste management is a well-established area of activity for local government. Leuven performs well here, producing significantly less waste per person per year than Flanders as a whole. While local waste policy focuses on household waste, there is a growing awareness of the need to also tackle waste from businesses. This is an area where local policymakers have fewer levers at their disposal.

Circular economy is a newer policy domain. It is also a more complex one, owing to its more wide-ranging and systemic approach. In relatively short order, Leuven has established a robust practice around circularity, helped along by two European projects, Pop-Machina and SHAREPAIR. A key focus area identified in the 'Circular Leuven' strategy is circular construction. The city has helped set up a 'materials bank' that recovers and redistributes used construction materials, and that is in the process of developing a strategy to begin delivering impact at scale. Here, as in its overall approach to circularity, the city has opted for a multi-stakeholder approach, partnering with such actors as the university, the hospital, and waste manager EcoWerf to achieve a greater impact.

Local Policy: Assessment by Systemic Lever

Technology & Infrastructure

- Infrastructure is a natural part of action in all emissions domains; as the owner and steward of much of the city's public infrastructure, the city is uniquely positioned to either itself execute or contract out changes to its physical structures. Similarly, the university, KU Leuven, owns large swaths of the city's building stock, creating opportunities for action at scale;
- Leuven is home to a vibrant high-tech community; there is some overlap with climate goals (see, for example, the university's work on solar hydrogen panels or the activities of university-linked start-ups such as EXTRAQT, which develops aquathermal energy solutions) and there is potential for further alignment;
- Leuven has a strong track record in climate-linked citizen science; it is one of the ways in which the city seeks to involve citizens in its net-zero efforts.

Governance & Policy

- A strong practice of collaborative governance has been established through Leuven 2030;
- Engagement with stakeholders has not yet catalyzed the kind of collective action needed to achieve climate neutrality;
- Working with stakeholders to help them define concrete commitments and report publicly on progress offers an opportunity to increase accountability and scale up action. The Mission and the Climate City Contract create a promising context for this work;
- Engagement with higher policy levels is sporadic; a structural dialogue, framed within the Mission, is intended to be established as part of the city's activities in the Pilot Cities Programme.

Social Innovation

- School 2030 is a citywide initiative that offers tailored support and uses a whole-school approach to help Leuven's schools take action towards climate neutrality;
- The city is in the process of setting up a youth climate council to support and enable young citizens to structurally engage with the city and other stakeholders on climate policy;
- Citizens can contribute directly to Leuven's energy transition by investing in ECoOB, a local energy cooperative that deploys solar power and green heat;
- The city partnered with a range of local and non-local organizations to establish a Community Land Trust, an innovative ownership model designed to improve access to affordable housing.

Democracy & Participation

- Participation is a feature of nearly all city-led activities with an impact on citizens and life in the city;
- In addition to long-running programs such as Kom op voor je wijk (Stand Up for Your Neighborhood), which supports residents to take joint action in various ways, the city is experimenting with novel forms of participation, including citizens' assemblies;
- The city and Leuven 2030 are dedicated to fostering a just transition, and have sought to weave this dimension into the Action Plan. An overview of just-transition actions is presented in Module A-3.3.

Finance & Funding

- Partnerships with Material Economics, Bankers Without Boundaries, and Bright Wolves have increased the city's knowledge on climate finance over the past few years;
- Mobilizing (private) finance at scale remains a challenge; success has come more easily in the realms of grant funding and cooperative funding;
- As part of its participation in the Pilot Cities Programme, the city will investigate the feasibility of setting up a municipal energy company to help catalyze investment;
- The city and Leuven 2030 are exploring the possibility of creating a blended-finance fund linked to the portfolio of actions presented in Module B-2. This is discussed in greater detail in the Investment Note attached to the Investment Plan.

Learning & Capabilities

- While learning occurs organically throughout the city's climate activities, the city does not yet have a structured learning process in place;
- The city will engage in a structured learning process as part of its activities in the Pilot Cities Programme, potentially marking the start of a wider practice of learning;
- Improved monitoring systems are being put in place, strengthening the foundation for evaluation and learning;
- The Leuven 2030 Urban Lab, a structural partnership with the city's knowledge institutions, creates opportunities for learning by connecting practitioners to researchers.

Regional Policy

As noted in the section describing the work process, the Leuven team is preparing, together with other Flemish cities, a climate memorandum addressed to the Flemish Government. This memorandum includes an assessment of regional policy as well as policy recommendations and is expected to be finalized in the latter half of 2023.

Given the importance of the Flemish policy level, a deliberate effort was made over the course of the CCC process to develop a dialogue. The Leuven team engaged with platforms that could act as an intermediary for such a dialogue (including VVSG, the association of Flemish cities and municipalities, and Kenniscentrum Vlaamse Steden) and interacted with the cabinets of the Flemish Minister for Home Affairs, the Flemish Minister for Environment and Energy, and the Flemish Minister for Mobility and Public Works. This process is ongoing and will be carried over into the phase following submission of the CCC.

Federal Policy

The Leuven team is in contact with the Federal Government and has identified several actions that the federal level could take to support Leuven and the other Belgian Mission cities:

- Involve the Belgian Mission cities in the update of the National Energy and Climate Plan, and seek to increase the plan's ambition and synergies with the Mission;
- Utilize the upcoming EU presidency to advance national and sub-national climate action, and shine a light on the importance of achieving a just transition;
- Pursue finance innovation, with a possible focus on greening investment at the federal level, supporting pension funds to move to more sustainable investment, unlocking citizens' savings, and exploring finance models beyond existing paradigms (e.g., stewardship).

EU Policy

There are a number of areas where increased efforts at the EU level could boost action at the local level, and help cities deliver on the promise of the Mission:

- Supporting cities to catalyze investment – a top priority;
- Direct financial support, as engaging in the experimental and pioneering work of the Mission requires sustained, long-term funding apart from traditional, competitive calls for proposals;
- Active outreach to the regional and national level, where many of the most impactful levers of action sit;
- Convening cities for targeted and structural exchanges, and actively exploring the creation of a multi-city renovation fund and other potential supralocal solutions;
- Placing the cost of inaction far closer to the center of the climate debate, and supporting cities to express and monetize the value of co-benefits;
- Creating maximum visibility around the Mission cities and their efforts – this can help build local credibility and motivate stakeholders to engage in the Mission.

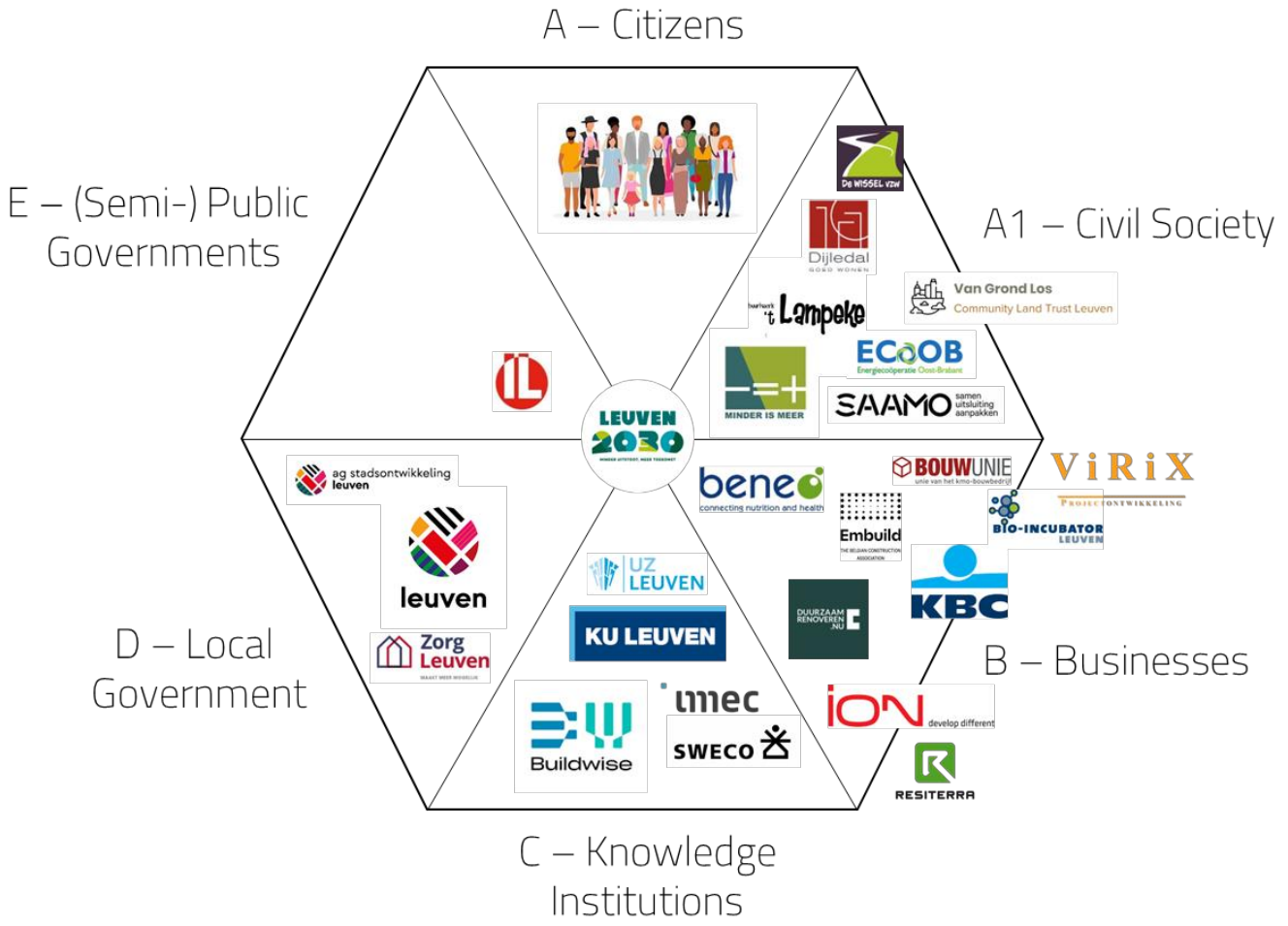
A-2.3: Emissions Gap										
	Baseline Emissions		Residual Emissions / Offsetting[1]		Baseline Emissions Reduction Target[2]		Emissions Reductions in Existing Strategies[3]		Emissions Gap (To Be Addressed by Action Plan)[4]	
	(absolute)	(%)	(absolute)	(%)	(absolute)	(%)	(absolute)	(%)	(absolute)	(%)
Buildings	313.956	69	-47.093	15	266.862	69	-13.124	-5	253.738	69
Transport	64.629	14	-9.694	15	54.935	14	2.060	4	56.995	16
Waste	47.864	10	-7.180	15	40.684	10	-7.397	-18	33.287	9
Industrial Process and Product Use (IPPU)	38.328	8	-5.749	15	32.579	8	-3.865	-12	28.714	8
Agricultural, Forestry and Land Use (AFOLU)	-7.275	-2	0	0	-7.275	-2	0	0	-7.275	-2
Total	457.501	100	-69.717	15	387.785	100	-22.327	-6	365.458	

[1] Residual emissions represent the emissions that cannot be reduced through climate action and are being offset. Residual emission may amount to a maximum of 20 % of all emissions, as stated in the Mission Info Kit.
[2] Baseline reduction target = Baseline emissions – residual emissions.
[3] Emission reductions planned for in existing action planning and strategies should be quantified per sector.
[4] Emissions gap = Baseline emission reduction target – Emissions reduction in existing scenarios.

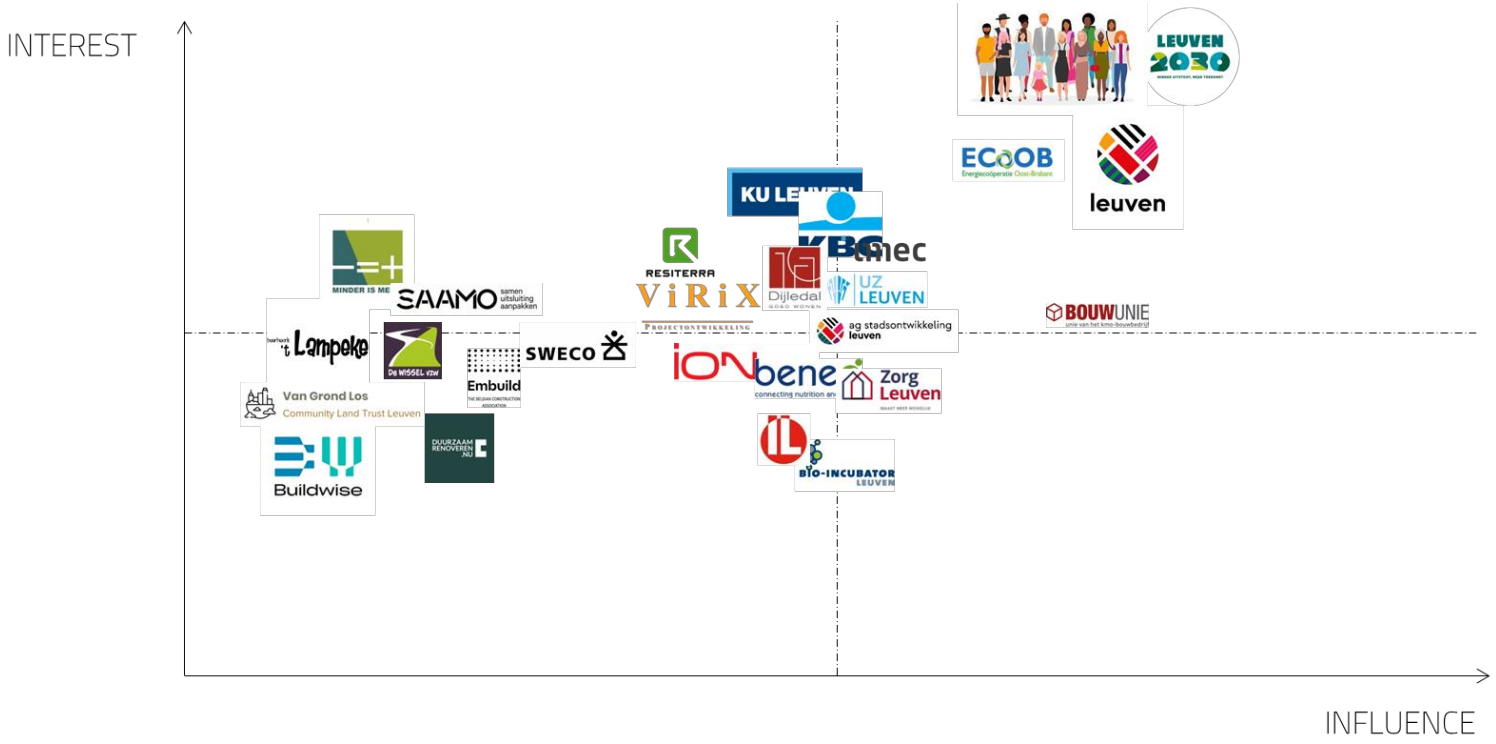
Module A-3 Systemic Barriers and Opportunities to 2030 Climate Neutrality

A-3.1: Systems and Stakeholder Mapping

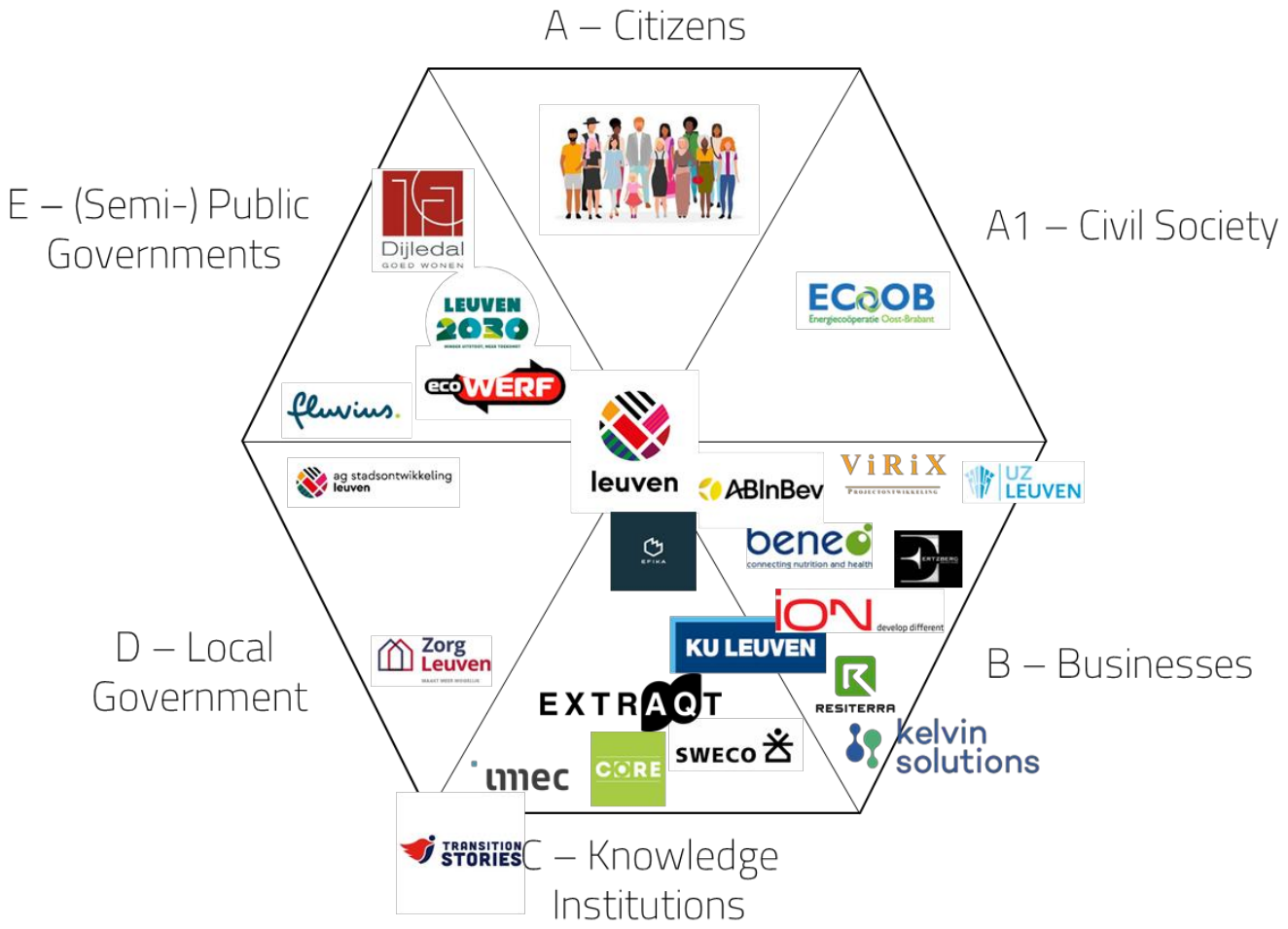
Emissions Domain Built Environment



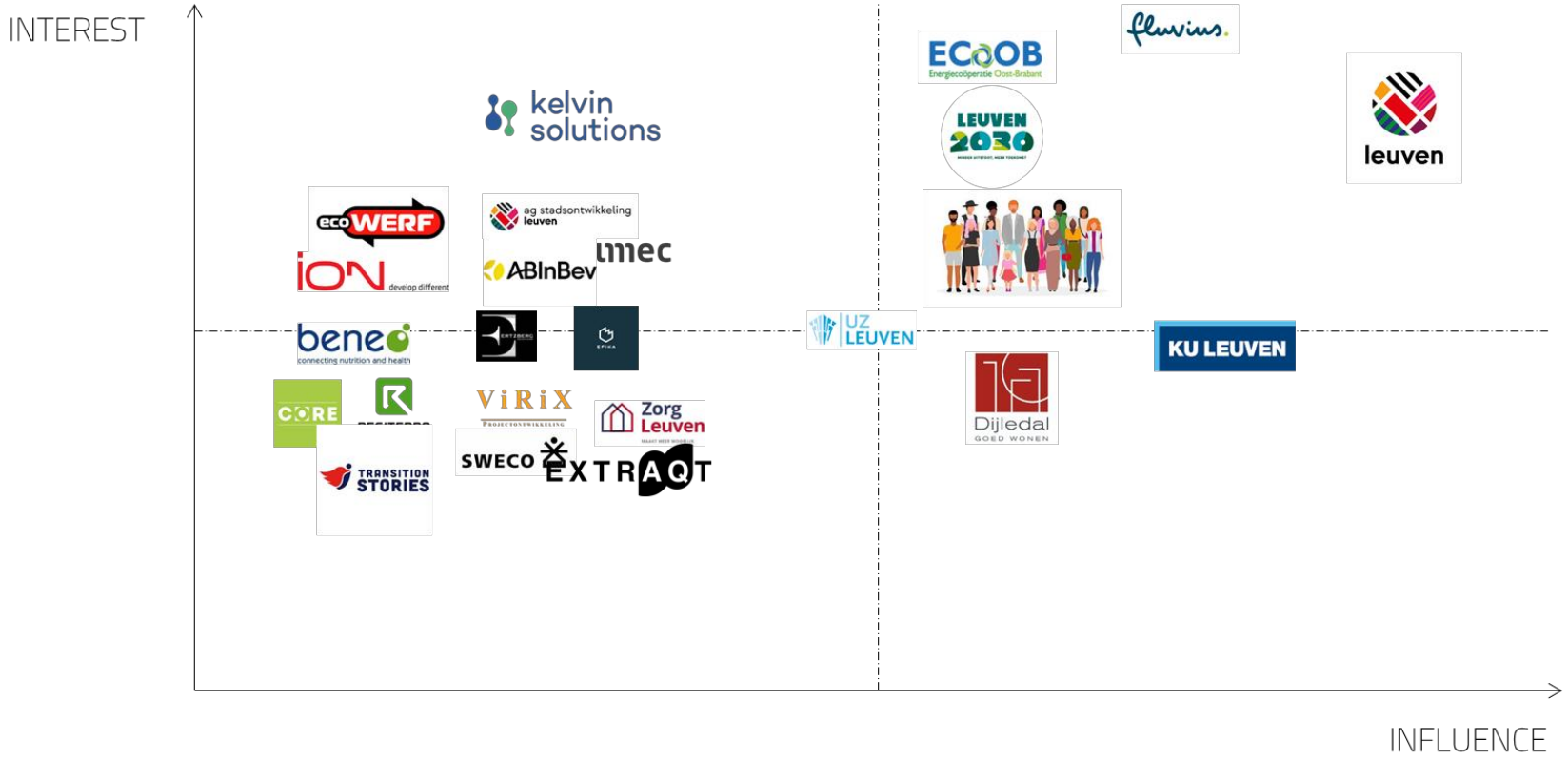
Emissions Domain Built Environment



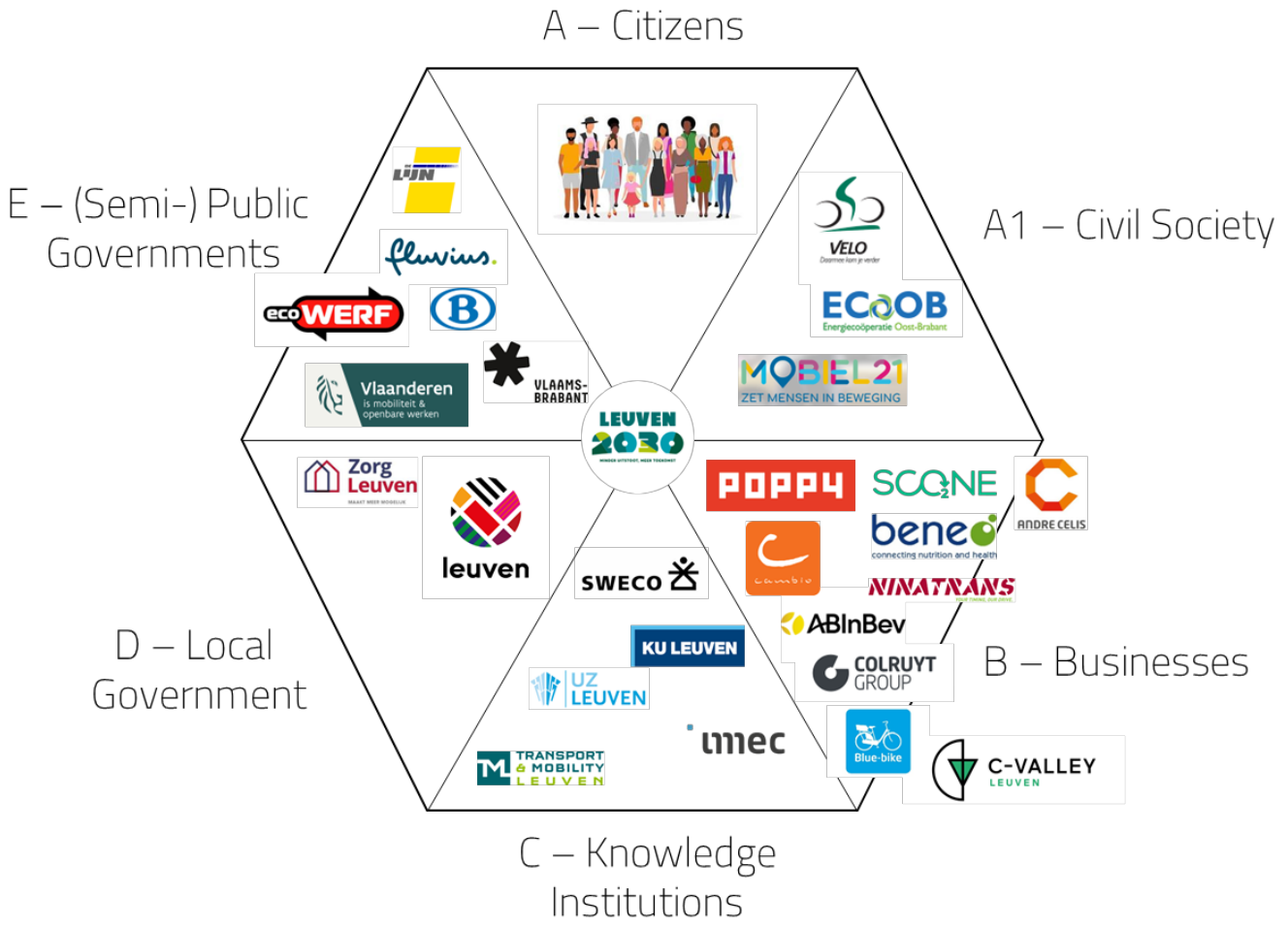
Emissions Domain Energy Systems



Emissions Domain Energy Systems

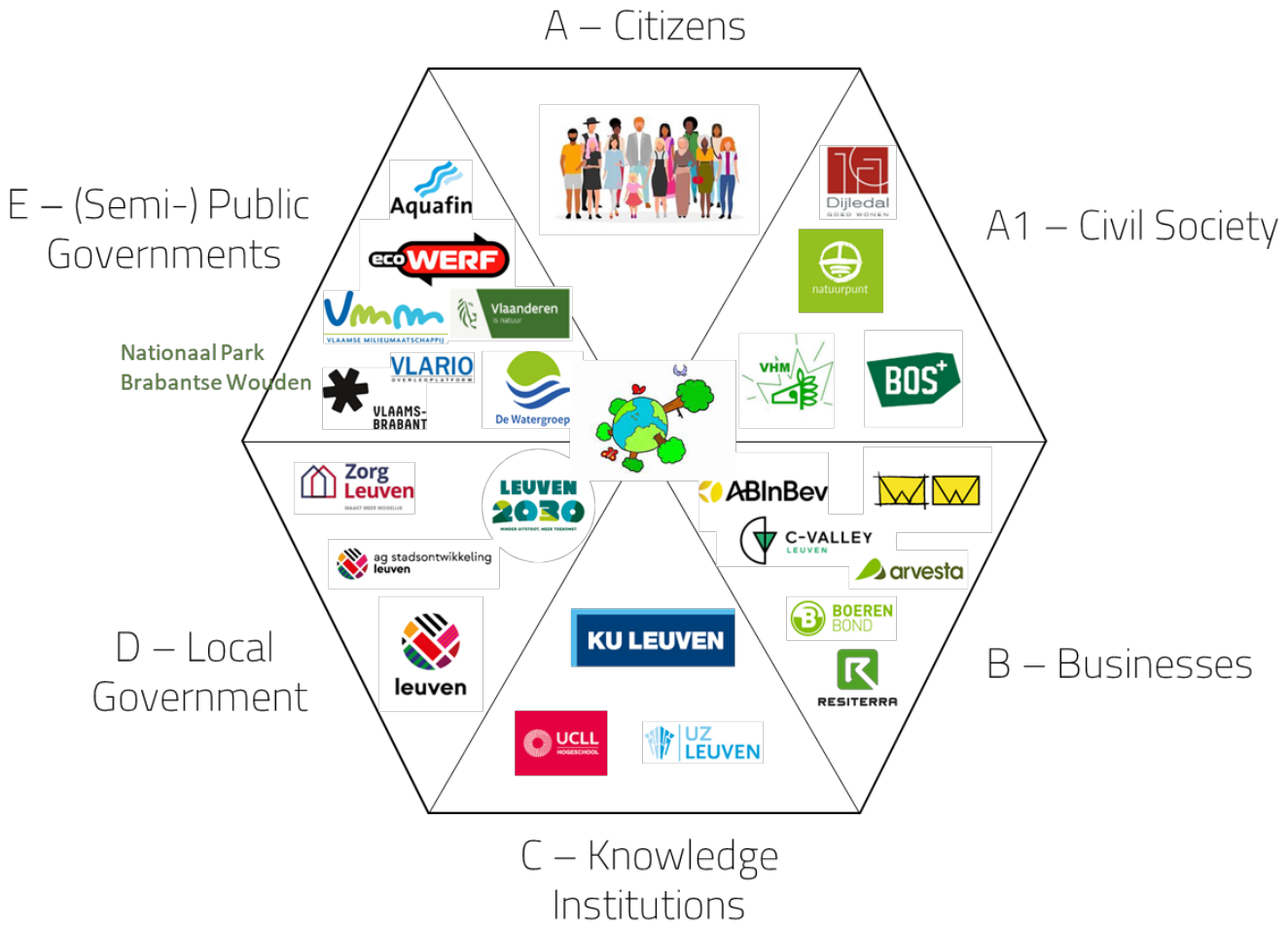


Emissions Domain Mobility & Transport



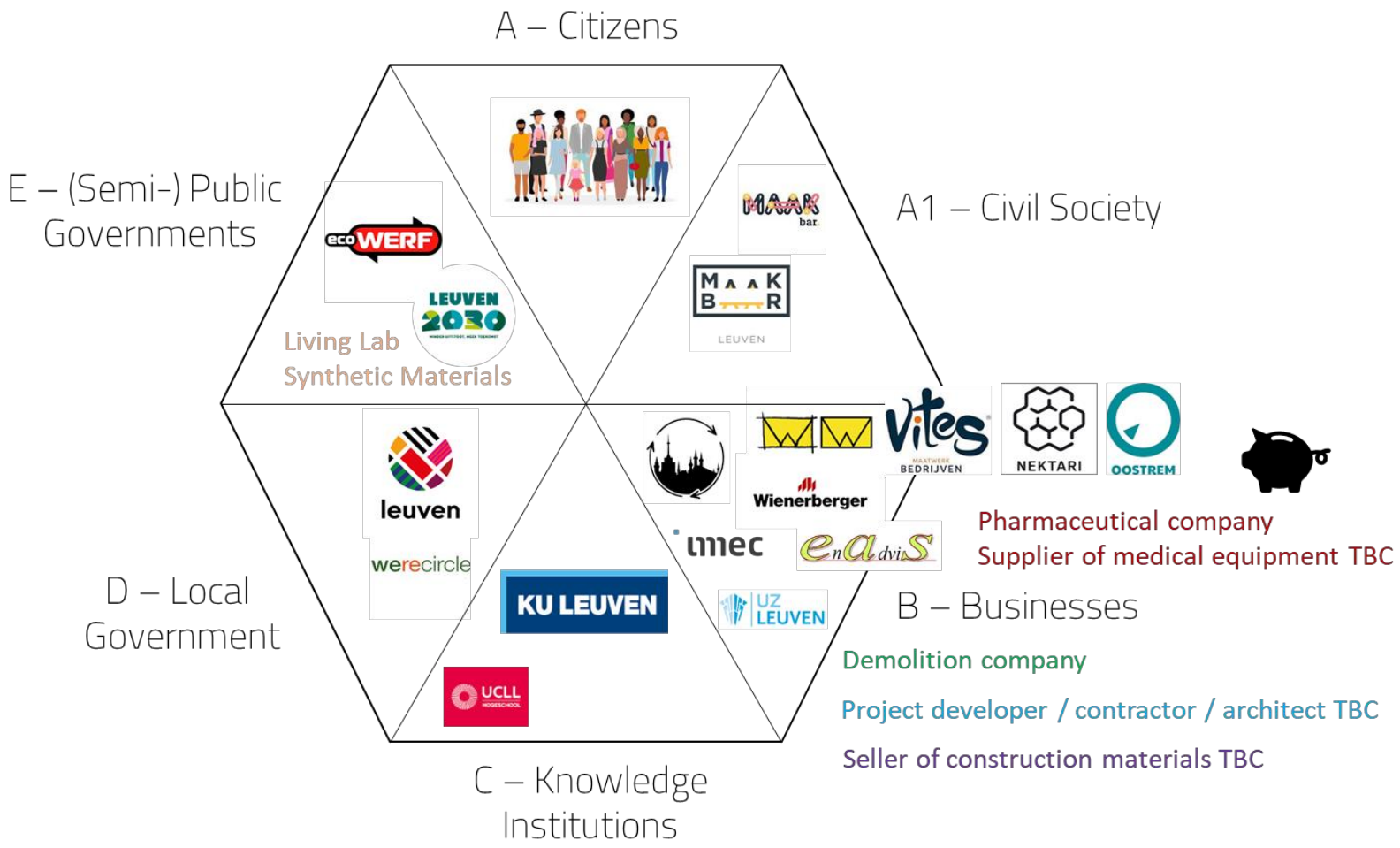
Emissions Domain Mobility & Transport

Emissions Domain Green Infrastructure & Nature-Based Solutions



Emissions Domain Green Infrastructure & Nature-Based Solutions

Emissions Domain Waste & Circularity



Emissions Domain Waste & Circularity

A-3.2: Description of Systemic Barriers and Opportunities – Textual Elements

Energy Systems	
Barrier	**Description**
Silos and a fragmentation of responsibilities	Implementing the city's energy strategy requires efforts across a range of city departments. The city has a cross-departmental climate team in place but opportunities remain to increase its mandate and effectiveness.
A knowledge gap	Decarbonizing heating is a relatively new policy domain. There are few established practices or processes to guide policymaking here, and there is, both within city hall and more generally, a knowledge gap.
A disconnect between strategy and implementation	The city has so far struggled to move its energy strategy into implementation. Among other factors, this can be attributed to the knowledge gap, a lack of operational capacity, and the technical complexity associated with sustainable energy systems.
A lack of enabling policy	There is a lack of higher-level enabling policy. Fiscal and pricing policy continues to work against a shift away from fossil fuels. There is no regulatory framework in place for green heat, resulting in a vacuum that creates uncertainty and delays action. Regulation associated with the proximity of Brussels Airport impedes the deployment of wind power in Leuven.
A lack of distributed leadership	The success of the city's energy strategy depends in part on the efforts of large energy consumers. Large consumers can contribute by transitioning their buildings away from natural gas at an accelerated pace or by oversizing their green heating systems to supply excess heat to the surrounding areas. So far, this has not happened at the scale that is needed to meet the city's ambition.
High upfront costs and a lack of experience with capital and investment planning	Decarbonizing Leuven's heating systems requires significant upfront investment, potentially as much as €500 million. Meeting this capital need will likely require a blend of public and private capital. The city has no vehicle in place with which to prepare and deliver such large-scale blended finance and has limited experience with capital and investment planning. Another complication is that there is no strong business model.
Scale and complexity	Moving the city's centuries-old building stock from natural gas to green heat at the pace and scale required to achieve net-zero emissions by 2030 calls for the initiation and implementation of 20 to 30 place-based transition projects in a span of less than eight years. Moreover, those projects will intersect with activity in other domains, adding complexity.
Access to data	The city's energy strategy relies exclusively on public data. This has produced a clear picture of household consumption but a fuzzy one for large consumers.

Built Environment	
Barrier	**Description**
Individual/fragmented ownership	The pace of renovation depends on the decisions of thousands of individual residents/households. This presents a barrier to scalability.
Willingness to renovate	The prospect of a lengthy and complicated process involving multiple contractors and potentially requiring temporary relocation decreases people's willingness to renovate.
Finance	There is little return on investment for renovation. Energy savings are typically insufficient to recoup the initial investment. Half of all homeowners cannot afford a deep renovation. In the rental market, split incentive presents a barrier.
A labor and materials shortage	Action is delayed as a result of a labor shortage in the construction sector and the rising cost and scarcity of materials.
A lack of enabling policy	Higher-level policy is insufficiently supportive. There is little appetite to explore novel approaches in finance (e.g., on-tax or on-bill financing) and regulation (e.g., regulatory sandboxes). There are few legal/regulatory requirements to renovate. Fiscal incentives continue to favor fossil fuels.
Need for a tailored approach	Not all interventions are possible in every type of building. There is often a need to balance renovation with other aspects (e.g., architectural heritage), necessitating a customized approach.
Capacity	There is a lack of capacity to renovate municipal buildings at the pace and scale needed to meet Mission objectives.

Mobility & Transport	
Barrier	**Description**
Capacity	There is a lack of capacity both to develop new infrastructure and to maintain and operate mobility systems. With advances in technology and data-driven approaches, there is also a need to continue to invest in capabilities and know-how.
Inter-municipal cooperation	Approaches to mobility and transport diverge across municipalities in the Leuven region.
Car culture	Private car ownership occupies a prominent place in society. Among other things, this is reflected in the large volume of available parking spaces. Turning this around will require a significant mindshift.
A lack of enabling policy	Higher-level fiscal policy favors car use and long-distance travel (e.g., company cars as a weapon in the war for talent).
Regulation	The local parking regulation sets high parking minimums and is due for an update.
Effectiveness of public transport	There is lack of passenger capacity in public transport. Travel times are long and punctuality is an issue. Higher-level policy choices have not demonstrated the level of ambition that is needed to elevate public transport.
Finance	Transport agencies (e.g., De Lijn, NMBS) lack the resources to deliver needed improvements in public transport.
Public support	Interventions to advance the modal shift, such as the elimination of parking spaces, can provoke resistance.
Sprawl	Inaction at the regulatory level, coupled with the widespread availability of land for new construction outside of urban areas, has continued the trend of sprawl, increasing car dependency.
Urban freight distribution	City logistics are highly fragmented and vehicles use only part of their load factor when delivering goods. There is a need to consolidate deliveries and shift to sustainable modes of transportation.
Accessibility and inclusion	Sustainable modes of transportation may present physical and financial barriers as well as barriers relating to digitalization. There is a need for closer study and a dedicated effort to address such issues and ensure that the modal shift is inclusive.

Nature-Based Solutions & Green Infrastructure	
Barrier	**Description**
Competing spatial needs	There is a need to assess and balance competing spatial needs (nature, agriculture, built environment) to deliver maximum climate benefits. One important principle is the preservation of open spaces.
Public support	Ambitious interventions such as the elimination of parking spaces in favor of natural infrastructure can meet with resistance from the public.
Finance	Implementing and maintaining NBS at scale requires resources that transcend municipal budgets. Stakeholders also lack (or do not allocate) the resources to implement NBS. There is a need to explore alternative sources of finance and novel solutions such as blended finance.
Silos and a fragmentation of responsibilities	Both within and beyond city hall, there is a need for a more integrated approach to NBS. Opportunities for NBS in both public and private spaces should be systematically detected and incorporated into actions.
Policy	The city does not yet have an integrated strategy for adaptation in place. Such a strategy could help guide policymaking by setting a consistent level of ambition and defining clear objectives.
Access to data	There are opportunities for a more data-driven approach to NBS.
Inter-municipal cooperation	Expanding and strengthening nature in the broader Leuven region requires coordination and alignment with other municipalities.
Capacity	Capacity constraints limit the pace and scale of action.

Waste & Circularity	
Barrier	**Description**
Financial sustainability	Achieving financial sustainability requires further business and product development on secondary material flows. A sustainable financial model is vital for scaling circular initiatives up.
Availability and volume	A key condition for a sustainable business case is a stable inflow and minimum volume of secondary materials.
Infrastructure and logistics	Collecting, storing, and distributing materials requires infrastructure and logistics. There is a need to further investigate the optimal organization of flows and the interaction between the local and the supra-local level.
Integration across policy domains and sectors	Mainstreaming circularity requires a dedicated effort and further buy-in across policy domains and sectors. One example of mainstreaming at the local level is the integration of circularity in procurement policy.
Certification	There is a need for common frameworks to assess and certify the circularity of products and materials.
Regulation	Local government holds few levers to tackle waste from businesses.
Data	Mapping Scope 3 emissions is challenging.
Capacity	A capacity gap places limits on the pace and scale of action.

A-3.3: Description or Visualisation of Participatory Model for the City Climate Neutrality – Textual and Visual Elements

Leuven has dedicated itself to placing cooperation and participation at the heart of its climate approach. This reflects a commitment to shared governance that the city strives to apply more broadly, including in such policy domains as education (Samen Onderwijs Maken), health care (Zorg Leuven), and economic development (Leuven MindGate). In climate, it is a commitment that has inspired the creation of Leuven 2030, a platform for structural cooperation tasked with accelerating the transition to climate neutrality.

LEUVEN 2030

Leuven 2030's origins trace back to the beginning of 2013, when the city partnered with the university to produce a scientific report charting a path to a climate-neutral Leuven. Among other things, the report recommended the set-up of a multi-stakeholder initiative to support and enable the transition. By the fall of 2013, such an initiative had been created, co-founded by the city and more than 50 other stakeholders.

Leuven 2030's model is intrinsically participatory. **Six stakeholder groups** are represented in its decision-making bodies: citizens, civil society, companies, knowledge institutions, the city and its agencies, and public and semi-public institutions. Each category is given formal representation and holds the same amount of votes. As such, when stakeholders meet to develop strategy and define actions, they do so on equal footing. Funding for Leuven 2030 comes mainly from its members and supports a team of approx. eight people to oversee daily operations.

A major milestone achieved by Leuven 2030 and its community of stakeholders is the **Roadmap**. Completed in 2019 and building on the insights presented in the scientific report, the Roadmap sets out, in greater detail than before, what it will take for Leuven to become climate-neutral. It is a comprehensive document structured into 13 programs and 80 action clusters, and the product of co-creation with 60 local experts and practitioners. The Roadmap represents a shared vision for climate neutrality and was formally signed by 15 key stakeholders.

Four years on, the Roadmap remains a leading framework for climate action in Leuven. In the intervening period, Leuven 2030 supported **implementation** of the Roadmap by recruiting a team of 17 'program facilitators' drawn from different organizations and entrusted with mobilizing action within each of the Roadmap's 13 programs. The diverse make-up of this team, with members coming from the public and the private sector alike, again reflects Leuven's commitment to participatory governance.

The program facilitators, working closely with key stakeholders, focused on defining and helping to initiate 'breakthrough projects': projects that could break through structural barriers and deliver a significant impact towards climate neutrality. This work helped set the agenda and provided strategic entry points into Roadmap implementation. As detailed in a previous section, the concept of breakthrough projects was carried over into the Mission and the design of the portfolio of actions.

The work of the program facilitators coincided and intersected with Leuven's participation in EIT Climate-KIC's **Deep Demonstration of Healthy, Clean Cities**. Leuven joined the program in the fall of 2019 and worked with EIT Climate-KIC and its partners to design and execute a set of strategic experiments aimed at unlocking systems transformation. This experience, and the broader process of

program facilitation, served as an important precursor to the Mission: it gave the Leuven team a greater understanding of systems innovation, introduced the concept of designing and managing a portfolio, and further aligned stakeholders to the goal of climate neutrality.

While the team of program facilitators was disbanded at the start of 2023, chiefly due to a lack of resources, stakeholder engagement remains at the very center of Leuven 2030. Future efforts will focus on continuing to build trust and a sense of collective purpose and on using public commitments to create greater **transparency and accountability**. This is described in more detail in the Commitments section of the CCC.

Figure 8: Leuven 2030 – Membership Categories

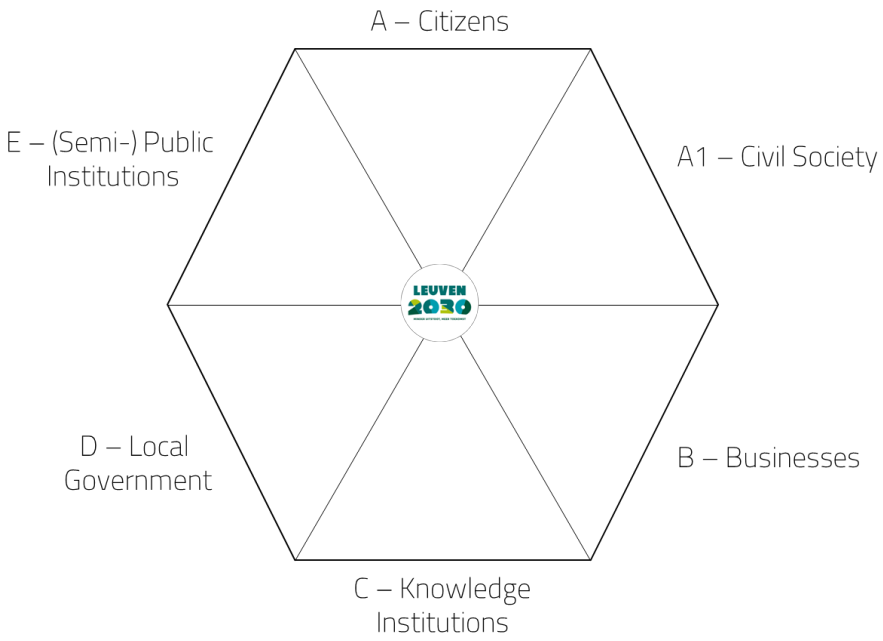
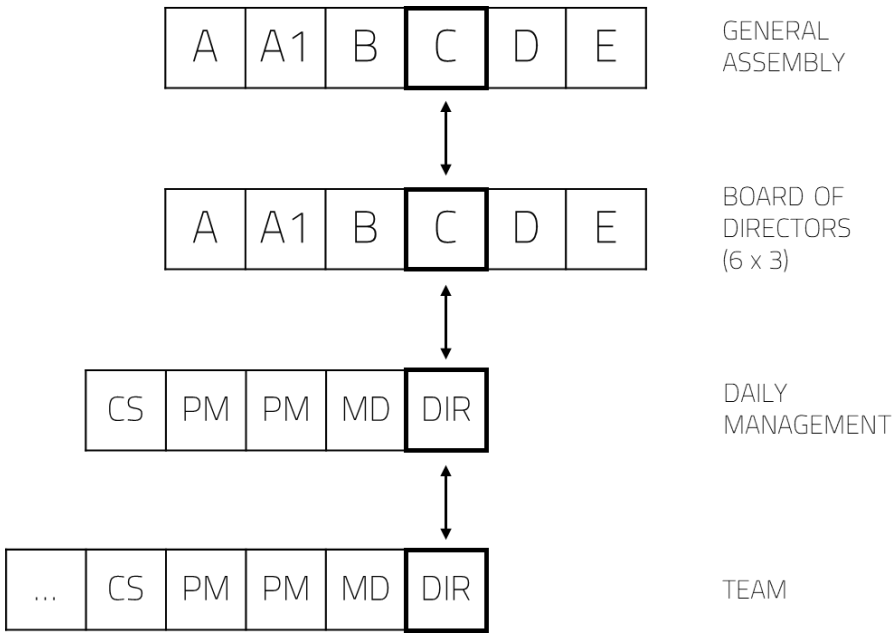


Figure 9: Leuven 2030 – Organizational Chart



C Category C currently holds the presidency

The Board of Directors is composed of three representatives from each stakeholder category, making for a total of 18 board members.

DIR = Director
MD = Managing Director
PM = Process Manager
PM = Process Manager
CS = Communications Strategist

CITY OF LEUVEN

Beyond engagement through Leuven 2030, the city engages with stakeholders, particularly citizens, as part of its own activities. The city has a department devoted to citizen engagement, and its activities range from participation at the street or neighborhood level to participation citywide. Many of these activities are climate-connected, and thus form part of the fabric of climate governance in Leuven:

- ***Kom op voor je wijk*** ('Stand Up for Your Neighborhood'): A long-running program that offers grants to neighborhoods for a range of activities, including climate actions such as the implementation of nature-based solutions or shared-mobility services;
- ***Hier dringt het door*** ('Let It Sink In'): A call inviting the public to submit locations fit for depaving. A total of 143 locations were submitted, eight of which were selected for implementation;
- ***Leuven, maak het mee*** ('Leuven, Co-Create'): A public call for ideas launched at the start of the city board's current term of office. Of the more than 2.200 ideas submitted, many revolved around climate-related topics such as mobility or greening and were adapted into the city's plans;
- ***Vorm 3010*** ('Form 3010'): A large-scale participation and co-creation campaign to shape a new mobility plan for the borough of Kessel-Lo, undertaken as part of Leuven's participation in EIT Climate-KIC's Deep Demonstration of Healthy, Clean Cities;
- …

JUST TRANSITION

The city of Leuven and Leuven 2030 are firmly committed to fostering **an inclusive transition**. Social justice is one of the core principles articulated in Leuven 2030's three-year strategy and it is one of the 10 guiding principles presented to stakeholders as part of the CCC process. While considered vital to Leuven's climate approach from the start, it is a topic that has recently gained new traction, in part thanks to renewed attention from within Leuven 2030's Board of Directors.

There are several dimensions to just-transition activity in Leuven:

- ***Within Leuven 2030***, the just-transition perspective is represented by two members of the Board of Directors who work directly with marginalized communities. They bring this perspective into the boardroom and have been active in engaging with and educating the wider network. One example is the event hosted by Leuven 2030 in early 2023 to share and discuss established and emerging practices at the intersection of climate action and social justice. Social justice is one of 80 project clusters defined in Leuven 2030's Roadmap and, as previously noted, a core principle of Leuven 2030's 2023-2025 strategy;
- ***Within the ecosystem itself***, there are several ongoing just-transition initiatives, including:
    - Minder Is Meer, a nonprofit spun out of Leuven 2030 dedicated to supporting and enabling low-income and vulnerable residents to renovate their homes;
    - Energiesnoeiers, a team of advisors who help low-income residents cut energy costs;
    - Fietstaxi, a 'bicycle cab' that offers free and sustainable transportation to residents with reduced access to mobility services;
- ***Within the Climate City Contract***, just transition recurs throughout the CCC's three components:

- Several actions included in the Action Plan relate directly to social justice. An overview is presented in the table below. As part of the portfolio-design process, Leuven 2030 convened a set of experts to assess the portfolio through a just-transition lens. This served to further solidify the social-justice dimension of the portfolio;
- Social justice is one of the 10 guiding principles presented to and endorsed by stakeholders as part of the Commitments pillar of the CCC. The principle states that social justice is an indispensable part of the net-zero transition and that portfolio actions should strive to deliver at least 15 per cent of their benefits (e.g., access to green heat, access to shared-mobility services) to people belonging to marginalized communities;
- As part of the Investment Plan, we are investigating the feasibility of setting up a fund that draws investment to a combination of profitable and non-profitable actions, thereby avoiding cherry picking and creating funding opportunities for just-transition activities.

Table 3: Just Transition in the Action Plan

Action	Module	Description
Zonnebouwers+	B-2	An action aimed at providing affordable solar power to low-income residents and combating energy poverty
Leuven Energy Company	B-2	An action investigating the possibility of establishing a municipal vehicle dedicated to stewarding investment in the energy transition and extending benefits to vulnerable communities
Collective Renovation Program Large Building Owners	B-2	An action to support and enable large-building owners to renovate their building stock at an accelerated pace; one focal point is social housing
Property-Linked Finance	B-2	An action designed to enable low-income residents to finance home renovation by linking debt not to the individual but to the building
Mobility for All	B-2	An action aimed at increasing the affordability of and access to mobility services (for example through third-party financing), thereby reducing transport poverty
Inclusive Language	C-2	An action to develop and deploy tailored language to more closely involve marginalized communities in the transition
Social Justice	C-2	An umbrella action dedicated to embedding social justice more structurally across climate activity

4 Part B – Pathways towards Climate Neutrality by 2030

Module B-1 Climate Neutrality Scenarios and Impact Pathways

Module B-1 outlines the major strategic pathways towards climate neutrality that have been identified for Leuven. The goal is not to encompass every feasible route but to zero in on the primary pathways that a city with a high level of ambition and finite resources can adopt. Preserving focus and clarity was a guiding principle in the development of all modules included in Part B.

The **pathways** explore the main strategic directions in each of the five emissions domains where rapid progress could and should be achieved to accelerate the transition to net-zero emissions. The CO_2 impact of the different pathways was established in a high-level calculation, which proved helpful in determining priorities and focal points. This top-down CO_2 calculation also provided the structural basis for the portfolio of actions presented in Module B-2.

As noted in a previous section, the **portfolio** brings together two compatible logics. There's the top-down approach, which identified the major avenues of action and provided the portfolio structure of 'clusters' and 'programs,' with associated CO_2 impacts. And there's the bottom-up approach, which populated this structure with 'breakthrough projects' sourced from the Leuven ecosystem or newly conceived based on the strategic needs established in the top-down analysis.

A **breakthrough project** is a project that achieves a significant impact on CO_2 emissions or delivers substantial indirect impacts. They are projects that can often achieve sustainability gains across different emissions domains. Many of them also have the advantage of a positive momentum and committed key stakeholders, therefore a breakthrough seems achievable in the relatively short term. The projects can be place-based or thematic and always tackle (multiple) systemic barriers or push (multiple) systemic levers. This results in the activation of a diverse set of stakeholders within the ecosystem.

For many of the approx. 70 breakthrough projects, the CO_2 impact has been calculated. However, it is virtually impossible to define every single concrete action or project needed to bridge the emissions gap at the city level. Adding up all the CO_2 reductions of the individual actions in the portfolio would fall short of achieving the full CO_2 reduction established in the top-down assessment. Therefore, an **upscaling logic** was constructed to complement the set of breakthrough projects by devising a strategy to scale the impact from these projects.

To firmly establish this logic, upscaling strategies were drafted and added to the portfolio as separate action outlines. These strategies were introduced where the need was most apparent, particularly in cases where promising and impactful projects represent merely the initial steps, necessitating swift and substantial expansion in the short term. This approach aims to harness the full breakthrough potential arising from these projects while reflecting on the most persistent barriers and uncertainties that could hinder swift upscaling. Often, identified barriers are of a financial nature and are therefore further elucidated in the Investment Plan.

In the years ahead, additional breakthrough projects are expected to be incorporated into the portfolio. By pursuing upscaling strategies and tracking the effectiveness of this current set of breakthrough projects, new interventions can be identified, initiated, and carried through in a deliberate and focused manner.

B-1.1: Impact Pathways

The impact pathways for all emissions domains are presented in Annex II.

B-1.2: Description of Impact Pathways – Textual and Visual Elements

ENERGY SYSTEMS

1. Green Electricity

ES – 1.1: To meet the tightened climate targets, a rapid scale-up of local PV production is needed from about 21 GWh/y to about 100 GWh/y. Small-scale PV on individual houses is already being rapidly deployed but action is needed to activate the large Leuven rooftops as well. Through a series of pilot projects, barriers are being identified (electricity distribution network limitations, structural condition of the roof, investment cost, insurance issues due to fire risk, ...). These barriers will be addressed, for instance by further exploring and developing the possibilities of third-party financing, in order to activate all large roofs for PV as soon as possible. The Leuven Climate House can play an accelerating role here by providing targeted advice. Besides tackling these barriers, a tightened legal framework for new buildings (e.g. via local building regulations) will be established to ensure that the full PV potential of new buildings is used. In the rapid upscaling of Leuven PV, maximum efforts are made to open up investment opportunities to citizens. Disadvantaged groups are not forgotten in this process either. Various possible formats to allow these groups to reap the benefits of the transition are being examined for this purpose, in consultation with local energy cooperative ECoOB.

ES – 1.2: Construction of wind turbines has traditionally not been possible on Leuven territory because of the potential interference with air traffic radars near Zaventem and Beauvechain airports. However, due to technological improvements in radar systems on the market, it is believed that it should be possible to relax this legislation in a controlled way to allow for wind turbines on Leuven soil in a completely safe way. This decision has to be made at the Flemish level, so the initial focus here is on lobbying and further analysis to establish the most suitable locations for wind turbines. This way, after adapting the legislation in question, the construction of at least five large wind turbines can be started in the short term. If this route does remain legally unfeasible in the future, the city will look into the feasibility of wind turbines on city-owned land outside the territory.

ES – 1.3: A relatively densely populated area like Leuven will never be able to fully meet its own electricity demand through local production of renewable energy. The share of green power contracts is already very high today and will increase further in the future through information and awareness campaigns. Additionally, where large-scale collective green heat is applied, or large-scale charging infrastructure is constructed, the city will investigate with the players involved how this large, new electricity demand can be met with entirely green electricity. To help ensure a sufficient supply of green power contracts, the city is actively seeking participation in renewable energy projects outside the territory, for example in offshore wind.

2. Large-Scale Collective Green Heat

ES – 2.1: The deployment of large-scale collective green heat has a very large CO_2 reduction potential and is therefore an extremely important pillar within this CCC. Large-scale collective green heat is an interesting solution in very large parts of the Leuven territory, where the heat demand density is high, and where sources such as aquathermia, geothermia or riothermia are accessible in certain locations

only, and therefore have to be distributed to the surrounding area. In those locations, there is a choice between individual heating solutions (e.g., individual air-sourced heat pumps) or distributing green heat from soil or water from the locations where it is accessible, for example within a distance of a few hundred meters from the Dijle river. Deploying these large-scale collective green heat projects can be driven by a few types of “momentum”. Large-scale urban development projects where a sustainable heat source is tapped into provide a first possibility. These projects offer an opportunity to oversize the local heat system and distribute the extra green heat and cold to the surrounding area. Large-scale (collective) renovation projects can have a similar leverage effect. Furthermore, public works such as road reconstruction offer opportunities to simultaneously build heat networks with limited additional costs. Finally, the presence of waste heat can also carry significant momentum. After all, waste heat that can readily be harvested can lead to a very favorable business case.

To deploy large-scale collective green heat at the required scale and pace, well-documented and streamlined processes are needed. The city is working on a tightened legal framework for new buildings that very clearly sets out expectations to developers, including guidelines for (mandatory) feasibility studies and a smooth bridge to potential parties for third-party financing (TPF) and management of the (oversized) collective heat systems. Within the city's internal operations, work is in full swing to further integrate different services, in order to, for example, smoothly detect opportunities for the construction of district heating networks in public works, or to address potential conflicts between heat-infrastructure construction and conservation of heritage. This will also streamline permitting for such projects.

To smoothly detect and capitalize on the aforementioned momentum, a number of overarching actions are needed. The Leuven heat strategy will be refined into so-called "Neighborhood Heating Plans." These provide a clear strategic vision of the optimal heat solution per neighborhood and are regularly updated. To include the very significant impact of larger consumers, a city-wide “dynamic opportunity map” will also be created and maintained. Combined with the vibrant learning network of major players formed around renovation and green heat, this will be used to initiate collaborations. The financial feasibility of collective green heat projects is strongly linked to how quickly all affected homes and buildings are connected. A thorough communication campaign on heat networks and green heat is therefore needed to make citizens and companies aware of the advantages (complete service provided, stable energy bills) and thus give them enough confidence to join. The Climate House supports these efforts through targeted campaigns and advisory services to make the buildings in question connection-ready through renovation.

A number of large-scale collective green heat projects will be readily picked up by existing market players, such as ESCOs, due to a clear, positive business case. Yet a lot of projects that are badly needed from a sustainability point of view will be too technically or financially uncertain to get off the ground via this traditional route. In these cases, the city is exploring the possible role of a Leuven Energy Company that can help coordinate and even co-finance these projects. The precise role of the Leuven Energy Company can vary from project to project depending on the needs (analysis, coordination, advice, financing, management, ...). This energy company should not be limited to the less profitable projects but is an important lever to ensure a sufficiently fast and, above all, sufficiently inclusive heat transition. The role this energy company could play in a broader steward-owned climate fund, as discussed in the Investment Plan, is being explored.

3. Energy Efficiency and Renewable Energy in Industrial Processes and Buildings

ES – 3.1: As a network organization, Leuven 2030 plays a crucial role in bringing together all major Leuven players, including quite a few industrial parties. Not only does Leuven 2030 provide a platform to communicate and inspire each other, it is also the starting point for more concrete networks, such as the collective renovation and green heat program proposed in this CCC. Through the Leuven Climate Contract, the very numerous sustainable projects in the industrial sector are given extra visibility, and commitments and support for accelerated action in the sector are consolidated.

A significant part of Leuven's industry is concentrated in the Research Park in Haasrode. In the short term, an integrated heat vision for the entire area will be drawn up via a heat-potential screening. This will bring the players involved closer together and consolidate the potential of collective green heat or exchange of residual heat. By providing more clarity on opportunities for possible collaborations, spurring exchanges of data, and increasing general stakeholder support, the climate transition can be accelerated not only with regards to heat and cold, but also with regards to climate adaptation, green mobility, circular material flows, etc. The insights gained and innovations rolled out in this project will be extrapolated to other industrial players.

BUILT ENVIRONMENT

1. Renovation and Retrofitting of Residential Buildings

BE – 1.1: The main pillar of the Trias Energetica is reducing energy consumption. Changing behavior and switching to more economical appliances can achieve a considerable CO_2 reduction in both Scope 1 (less heating and cooling) and Scope 2 (lower electricity consumption of appliances, lighting, etc.). This reduction will be driven by the Climate House, a subsidiary of the city of Leuven, which within its remit initiates and supports information and awareness-raising campaigns to make citizens more energy-conscious.

BE – 1.2: A crucial task of the Leuven Climate House is to provide targeted renovation advice to citizens. Particular attention is paid to developing an appropriate offer for disadvantaged groups, who may not be activated with advice alone. A rapid scale-up of operations should show a rapidly growing number of citizens the way to the right renovation interventions, available subsidies, a reliable network in the building sector, and smooth applications for the necessary permits. Besides including vulnerable groups in the transition, efforts are also made to remove barriers for tenants and landlords, who are traditionally less inclined to renovate due to a "split incentive."

To further boost the renovation rate of (individual) homes, we are investigating under what preconditions and on what scale collective renovation can be an accelerator. This is being explored in pilot neighborhood Ter Elst, where a transition towards a fossil-free neighborhood has already been initiated. The conclusions regarding the appropriate scale level, respect for heritage, optimal heating solution in terms of heat demand density, participation, opportunities for linking with mobility, circularity, climate adaptation, etc., will be meticulously documented and used to start up similar trajectories in other neighborhoods, supported by the Climate House.

BE – 1.3: Collective housing such as apartment buildings offers opportunities to make large sustainability gains with a more limited number of interventions. Because they represent a large heat demand in one location, apartment buildings are hotspots around which collective green heating and cooling solutions often provide a sensible course of action. However, the accelerated renovation of flats is no sinecure, as the residents must jointly make the decision to renovate, a decision that comes with technical complexity and large financial investments. Therefore, a pilot project on renovation will be set up with a number of enthusiastic syndicates and homeowners associations. This aims to be a test trajectory that further focuses on the needs and barriers in this context, so that they can be addressed in a tailor-made renovation guidance offer for apartment buildings. This will be strongly pursued within the Pilot Cities Programme in which Leuven participates. In that context, an energy orchestrator will be appointed who will bring together all stakeholders involved, as well as an energy consultant who will help develop the renovation offer specifically for flats on a detailed technical level. In this way, within a few years, the majority of Leuven's collective housing stock will be renovated in an accelerated manner, with residents receiving maximum care and guidance via the developed renovation path for apartment buildings.

BE – 1.4: One part of the residential building stock that deserves special attention is social housing, where residents usually belong to disadvantaged groups. It is essential that they too can benefit from the lower energy bills and improved living and housing quality that come with renovation. As the budgets for renovation at SHM Dijledal are not sufficient to accelerate thorough energy renovation of the entire building stock, a targeted innovation trajectory towards more innovative financing will be set up. Besides the financial aspect, solutions are also being explored for practical problems such as the complexity of moving residents when renovating and the challenge to continuously provide

sufficient (growing) housing capacity. The solutions to these challenges are not clear today, but are being investigated with priority, as accelerating the renovation of social housing offers a great opportunity to make the Leuven climate transition more inclusive.

2. **Renovation and Retrofitting of Non-Residential Buildings**

BE – 2.1: The most significant lever being tapped to accelerate renovation within the non-residential building stock is the vibrant and engaged ecosystem of Leuven stakeholders, brought together and represented by Leuven 2030. From this solid foundation, a collective renovation and green heat program is initiated. Starting with a pilot group of major Leuven stakeholders, this program will be gradually expanded. Participants in the program explicitly express the ambition to make their own building stock fossil-free as soon as possible. The aim of the program is not only to exchange expertise and knowledge and inspire each other, but also to work together where it adds value for the parties involved. An additional and potentially interesting avenue explored within the Investment Plan is the aggregation of multiple projects when seeking financing. In this context, the city is looking at the possible role of a Leuven steward-owned climate fund. Through such a vehicle, more profitable projects or low-risk projects can be leveraged to get projects with greater complexity or risk, or without guaranteed (high) returns funded.

As the concrete barriers and levers with regard to renovation can still vary greatly per subsector, the program can gradually develop tailored guidance for, for instance, public buildings such as schools, for the hospitality industry, for retail, etc.

While the focus of the collective program is to activate the entire Leuven ecosystem, the city of Leuven itself leads by example here. In the short term, the city is working out an ambitious plan to accelerate the renovation and fossil-free heating of its own building stock. For each building or cluster of buildings, an ambitious trajectory will be mapped out, in which many relevant challenges in the Leuven context will be addressed. These challenges include green heat for heritage buildings, buildings with limited availability of green heat sources in the vicinity, complex relocation movements, etc. Working on these challenges also offers an opportunity to further improve the interaction between the various city services involved.

BE – 2.2: Significant CO_2 reductions can also be achieved in the non-residential sector by focusing on behavioral changes and more fuel-efficient appliances. Campaigns on this topic will also be shaped through the same learning network that is being set up for renovation. Here, too, knowledge and inspiration will be actively exchanged, and cooperation will take place where there is added value, e.g. to use economies of scale from group purchasing.

3. **Climate-Neutral or Climate-Positive New Buildings**

BE – 3.1: New construction projects and urban developments are leveraged as catalysts to provide the surrounding urban fabric with green heating and cooling. To enable urban development projects to adopt this climate-positive catalytic role, the right pilot projects are initiated, in collaboration with engaged key stakeholders. Some of these are already described and elaborated upon in this action plan, such as Wakkerzeelsebaan, Redingensite, and Ruelenspark. When working on these projects, crucial prerequisites for climate-positive new construction are examined together with all involved stakeholders. If nearby residences need to be connected, support and technical renovation assistance must be provided to residents, and public support must be garnered. Additionally, the larger heating/cooling system must be managed and financed, likely by a third party rather than the developer themselves. In the short term, the lessons and successes from these pilot projects will be utilized to initiate similar trajectories.

In addition to the technical and financial research into climate-positive new construction conducted through the pilot projects, this principle is also comprehensively framed and anchored in policy. Further integration of the Leuven heat strategy into detailed Neighborhood Heat Plans will indicate in which neighborhoods climate-positive new construction projects are meaningful. This will be further established in guidelines and legislation for the Leuven area, such as building regulations. This way, the heat strategy is spatially detailed and clearly outlined, and the expectations towards developers are legally well-defined.

MOBILITY & TRANSPORT

MOB – 1.1: A primary pillar of the climate transition within mobility and transport is the encouragement of a sustainable modal shift. Numerous interventions directly or indirectly address this endeavor.

Through a well-considered parking policy, both by the city (public space) and the main key players within the Leuven ecosystem, such as KU Leuven, the number of parking spaces is gradually reduced in line with the pace of the modal shift, and parking is transitioned from on-street to off-street. A direct benefit of this intervention is the availability of space that can be repurposed for climate adaptation, urban greenery, recreation, social interactions, and more. However, this intervention also leads to lower car ownership and usage, prompting people to seek sustainable alternatives. Developing the necessary infrastructure to support these more sustainable modes of transport is described in other pathways but is inherently connected to reducing private car ownership and usage.

In addition to addressing parking policies, efforts are maximized in promoting a shift towards sustainable modes for commuting specifically. Within the Leuven ecosystem, the city collaborates with Leuven 2030 to engage as many major players as possible who are willing to make their mobility policies more sustainable. This can be achieved through awareness campaigns and the offering of a mobility budget as a fiscally appealing alternative to a salary car, for example. This way, employees become sufficiently aware of available alternatives to cars, which will also accelerate the sustainable modal shift on this front.

Finally, the short-term development of shared mobility options is being greatly pushed. Discussions with the relevant players are already ongoing. By providing both station-based and free-floating shared cars and bikes, a balance is sought between providing enough flexibility for citizens (always having a shared vehicle nearby) and sufficient coverage across the entire territory (through proper distribution of station-based shared vehicles) so that certain neighborhoods, such as less densely populated areas or areas with a significant representation of disadvantaged groups, are not left behind.

MOB – 1.2: As described in MOB – 1.1, an efficient parking policy and a shift towards more off-street parking will lead to the liberation of space. In addition to the previously mentioned possibilities that this space offers for climate adaptation, urban greenery to enhance biodiversity and related ecosystem services, recreation, and social interactions, significant economic benefits can also be associated with the additional liberated space. For instance, in locations such as Research Park Haasrode or Science Park Arenberg, freed-up space could be utilized for expanding economic activities or research infrastructure (labs, bio-incubators, office space, etc.).

MOB – 2.1: In conjunction with the sustainable modal shift, the various modes of transportation are being shifted towards green, fossil-free vehicles. This way, the emissions from future mobility in Leuven are further reduced. Alongside the above efforts, there is a strong focus on commitments from major Leuven-based entities to accelerate the electrification of their company car fleets, in addition to offering a mobility budget. The current policy approach is that the deployment of charging infrastructure follows demand (the "pole follows car" principle). In the short term, active discussions are underway with the electricity distribution grid operator Fluvius to align future investments in the distribution grid with Leuven's ambitious climate goals. By mainly providing charging infrastructure where spatially desired parking is available (off-street), this infrastructure deployment can also guide the sustainable modal shift described in pathway MOB – 1.1.

MOB – 2.2: A crucial role is assigned to the rapid and structured deployment and strengthening of bicycle infrastructure and the establishment of a high-quality network of public transport (HQPT-network) in the Leuven region. The ring road around Leuven serves as a multimodal hub that maximally facilitates the movements of cyclists and public-transport users. The necessary projects are expected to be highly challenging in technical, financial, and spatial aspects. Possible and necessary collaborations with neighboring municipalities should not be overlooked. Therefore, a coordinator will be crucial, combined with guaranteed capacity within the city or a subsidiary entity focusing specifically on executing these projects. Within this important strategic pathway, in the initial phase the existing Regionet Leuven, an initiative of the city of Leuven, the province of Flemish Brabant, and Interleuven, is further strengthened in its coordinating role for mobility in the Leuven region. Within this framework, capacity and resources are freed up to execute projects, including associated studies and stakeholder management. After several successfully completed projects, this pathway can gain momentum, leading to increasing interest from neighboring municipalities to build up a structural collaboration on mobility/spatial planning/… This way, the support and visibility of the Leuven climate transition are further enhanced. An important secondary challenge within the further upscaling of public transport is the shortage of depot space and the accelerated electrification, which demands significant investment in charging infrastructure. Regarding the latter, the future charging hubs of public transportation can play a crucial role as energy hubs for a diverse range of charging and energy needs.

MOB – 3.1: As discussed, the deployment of charging infrastructure is a key factor in the electrification of motorized vehicles in Leuven. Charging-infrastructure deployment speed is determined by the market, although the exact locations are strategically chosen as part of Leuven's parking policy. Through coordination with the distribution grid operator Fluvius, it is ensured that the local distribution network is adequately reinforced at strategic locations in a timely manner to facilitate the rollout of charging infrastructure.

MOB – 4.1: Leuven's urban logistics are also being rapidly transitioned to sustainability. Significant progress is already being made towards emission-free urban logistics through individual projects by stakeholders within the Leuven ecosystem. This is apparent in the shift from fossil to fossil-free inland shipping (Beneo-Remy), the electrification of vehicles for waste collection (EcoWerf), and the increasingly wider utilization of bicycle logistics. These pilot projects are gathering knowledge and insights into the main challenges associated with such a transition. Ensuring affordable logistics solutions, operational continuity, compliance with regulations, etc., are important prerequisites here.

The insights acquired are actively shared through the robust network initiated and maintained by Leuven 2030 within the Leuven ecosystem. This network also feeds into the Flemish framework agreement for emission-free urban distribution in which Leuven participates as a research city. More than just knowledge exchange, this network actively seeks potential collaborations. Pooling logistics flows offers opportunities not only for significant sustainability gains but also for financial savings. Additionally, it reduces traffic intensity on the local road network, potentially leading to improved quality of life for the people of Leuven.

Cautious coordination towards pooling logistics flows and establishing city-wide logistics hubs is already underway. The complexity lies in the diverse requirements and practical conditions inherent to certain players or logistics flows (timing, freshness, hygiene, flexibility). In the case of potential collaborations, setting up transparent and consistent consultation moments between stakeholders is a logical initial step to foster mutual trust. Based on this foundation, the first successful practical examples of collaboration will emerge in the short term. These, in turn, will be scaled up to projects

involving other stakeholders and different logistics flows, ultimately resulting in a city-wide sustainable logistics system.

MOB – 5.1: One of the fundamental principles of the Leuven climate transition is that sufficient attention must be given to inclusivity and social justice. Vulnerable groups must be able to fully benefit from the transition and cannot be left behind in (mobility) poverty. Hence, it is crucial to consistently assess new (mobility) policies with a social lens, asking "Who does this measure benefit?" Additionally, efforts are directed toward providing sustainable mobility alternatives for those in vulnerable circumstances.

An important intervention to ensure a successful transition in this aspect as well is the "Everyone Mobile" program. Within this program, the possibility of a mobility budget for vulnerable groups is being explored in the short term. This will be financed through a restructuring of the current third-party payer scheme, supplemented with additional financial resources. This way, the mobility of vulnerable groups is maximally safeguarded during the transition, or even improved through a diverse and effective mobility offering, where vulnerable groups also have sufficient freedom of choice.

NATURE-BASED SOLUTIONS & GREEN INFRASTRUCTURE

Within this emissions domain, the strategic pathways not only focus on reducing Leuven's net CO_2 emissions (mitigation) but also on adapting the territory to a changing climate (adaptation). What is labeled as "co-benefits" in other emissions domains (addressing flood hazards and heat stress, increasing urban greenery and biodiversity, etc.) constitutes an equally important strategic goal here to ensure the quality of life in Leuven.

NBS – 1.1 to NBS – 1.7: To make the entire territory climate-resilient, an integrated approach is needed. This approach is built upon a number of interventions, all of which are essential to achieve the necessary level of adaptation at the right scale and pace. Only if climate adaptation measures are carried out on a sufficiently large scale, while remaining mutually consistent, well-coordinated, and complementary, can the city and its residents fully reap the benefits.

A first important intervention is the development of a Leuven Climate Adaptation Strategy. This will lead to a strong policy anchoring of climate adaptation and Nature-Based Solutions (NBS), clearly identifying priority interventions and areas. The strategy pays adequate attention to the link with the city's spatial characteristics at macro and micro levels. The location of vulnerable institutions, as well as the existing green-blue network at the city level (and gaps that can be addressed), are taken into account. For example, efforts are made to create ventilation corridors and cool, sheltered islands around residential care centers, childcare facilities, schools, etc. The development of this clear, well-founded vision leads to greater support by the public and the city administration and the development of a stronger knowledge base on climate resilience within city services.

To effectively implement the Leuven Climate Adaptation Strategy, a Climate Adaptation Taskforce is established within the city. This taskforce primarily ensures dedicated implementation capacity and resources to select, design, and execute projects related to NBS and climate adaptation. By streamlining operations, certain quick wins can be accelerated in the short term, while more impactful measures, e.g. larger desealing projects, are also realized. Furthermore, the taskforce supports the establishment and strengthening of a learning network on climate adaptation and NBS. By providing design capacity to Leuven partners in this network or directing them to contractors, the threshold for taking action is lowered. Within this network, the taskforce thoroughly documents processes and centrally collects acquired knowledge.

The result of the taskforce in the medium term is the rapid implementation of deliberately selected interventions, e.g. for flood prevention along all Leuven waterways, addressing heat islands, supporting the realization of the water battery to fight drought, as envisaged in the operations of the National Park Brabantse Wouden initiative, further strengthening the urban-regional green-blue network with a focus on planting “future trees” (trees specifically planted to fulfill an important long-term role in improving the city’s climate resilience, therefore receiving sufficient space and care to grow to full maturity and size) and additional greenery, providing special care to preservation of existing trees, … In addition to the establishment of green-blue infrastructure, the taskforce increases support among major players within the Leuven ecosystem, who are structurally involved in its operations.

Citizens can also contribute significantly to a climate-resilient city. For this purpose, a climate adaptation toolkit is created to support and enable citizen engagement. This toolkit informs citizens about the importance of climate adaptation and the possibilities for engaging in NBS, as well as ongoing initiatives that can help them (e.g., Garden Rangers). This not only increases understanding and support for NBS but also activates and empowers citizens to engage in bottom-up efforts on their

own properties. Additionally, the toolkit provides information about synergies with sustainable energy (e.g., solar panels, heat pumps) and rainwater harvesting, thereby spurring sustainability gains across domains in new construction as well as renovation projects. The toolkit also specifies which city services citizens can approach for support on specific climate resilience questions or initiatives. This toolkit becomes a handy guide for internal city services as well, clarifying task allocation and internal processes.

This policy and strategic framework will be especially leveraged to increase ambition in several promising geographical areas, such as the Molenbeek Valley and the inner city of Leuven. These areas hold great potential to engage in NBS, addressing flood risk reduction, drought mitigation, heat stress, biodiversity, and more. An integrated approach is required, in which all stakeholders can participate sufficiently and projects within this area, like the redevelopment of Ruelenspark, strive for synergies as much as possible. These areas represent an opportunity to achieve a significant impact in the short term and also allow room for experimenting with innovative techniques, thus providing valuable feedback to optimize the operations of the taskforce and toolkit.

At a supra-local level, efforts are underway to officially ratify the Brabantse Wouden National Park, of which the Leuven territory is a part. If this recognition is achieved, the city has a role to play in facilitating and supporting the goals set by the Park, such as further developing and integrating the urban-regional green-blue network, promoting nature-inclusive agriculture, and establishing a water battery to counteract drought stress. Leuven itself will reap significant benefits if these goals are achieved. A better water management system upstream of the city will help mitigate the risk of severe flood damage, even though many of the actual interventions occur outside Leuven's territory. In the long term, the National Park can thus become a catalyst for supra-local collaboration on NBS.

To actively monitor and measure the effectiveness of the above interventions, the existing monitoring network is utilized and expanded. Initiatives by external partners, such as Leuven.cool from KU Leuven, go hand in hand with citizen science projects like Curieuzeneuzen. Where necessary, monitoring is reinforced. The taskforce plays a crucial role in identifying monitoring gaps, while at the same time implementing the feedback that the system provides. The toolkit guides citizens to participate in a robust monitoring system through citizen science.

NBS – 2.1: As more and more Nature-Based Solutions (NBS) are implemented in practice and the associated monitoring system is further developed, the city is focusing on the development of a digital twin. This digital twin is initially developed conceptually to define which indicators are most relevant and how the necessary data can be collected at the right spatial and temporal resolution. In the short term, the existing monitoring network will be integrated into the digital twin, and data analysis will evolve from retrospective to predictive, shaping policy choices and clarifying priorities for implementation by the taskforce. In the longer term, the platform can be expanded to incorporate insights from other domains (such as heat demand and potential for district heating networks) to easily detect opportunities for cross-domain integration.

NBS – 3.1: While the primary focus within Nature-Based Solutions (NBS) is on climate resilience rather than climate mitigation, this emission domain can still make a significant contribution to Leuven's transition towards net-zero. Currently, the largest carbon sink on Leuven's territory is Heverleebos. There is considerable potential to enhance the existing green structure in other parts of the territory. By developing a strategic tree plan with a focus on the built environment, existing veteran trees are inventoried alongside candidate future trees. Existing trees will be cherished and protected, as key assets towards more urban biodiversity and climate resilience. Furthermore, interesting locations for planting additional trees are also identified. Over the long term, the

implementation of the plan will result in a robust green network throughout the entire territory. This primarily contributes to higher biodiversity and a more climate-resilient city (cf. above), but limited gains are also expected in terms of additional CO_2 sequestration.

Another interesting avenue that will be explored to increase CO_2 sequestration on Leuven's territory is initiating processes related to carbon farming. Through targeted interventions such as cover crops, reduced tilling, conversion of crop fields to permanent grassland, and agroforestry, carbon farmers can store additional carbon on their land. This approach simultaneously promotes nature-inclusive agriculture that benefits biodiversity, climate adaptation, erosion control, and more.

WASTE & CIRCULARITY

CE – 1.1: Various aspects of a new circular chain for stony fractions within building materials are being explored and fine-tuned. The recovery of these fractions (ceramic fraction, concrete, gypsum) during demolition is first investigated in several pilot projects, while the processing step is being refined through an intensive sorting trial in collaboration with EcoWerf, Vites, and Urban Lab. The intermunicipal environmental company EcoWerf plays a significant role in the pilot phase, contributing to building expertise and exploring the establishment of an Urban Resource Center (URC).

In the subsequent upscaling phase, other players like the Materials Bank will take over the management of the stone-like fractions. An initial recovery on the order of a few hundred tons per year can gradually expand to several thousand to tens of thousands of tons per year based on the knowledge gained from these pilots. Over time, the recovery of these fractions will become more established as a standard practice in demolition, thereby significantly reducing the Scope 3 emissions of buildings. Additionally, this approach leads to decreased reliance on raw materials, job creation, and, after thorough streamlining and professionalization of processes, could potentially result in financial savings.

CE – 1.2: A portion of the reclaimed construction materials will be available for reuse, while the rest will be recycled. Reuse is a higher-level R-strategy with potentially greater sustainability benefits, but it also requires specific and well-optimized processes to control costs and provide sufficient quality assurances. These prerequisites are essential to address the major barrier, which is establishing a market for these products. In the short term, the goal is to achieve reuse of approximately 1.000 tons per year, with a perspective to scale this up to around 8.000 tons per year by 2030.

A key hub for developing these and other material flows is the Leuven Materials Bank. This will be strengthened in the short term with multiple satellite hubs, improving accessibility and capacity for rapid growth. These hubs will be supplied by a collection system that will be scaled up over the coming years to cover the entire city. Although this collection system is currently being developed for a limited number of materials, the structure and accompanying processes can later be applied to other materials as well. The process of conceptualizing, testing, and refining this broad, adaptable framework is explicitly part of the growth trajectory of circularity within the Leuven ecosystem.

CE – 2.1: In addition to the pilot project focused on construction materials, a second pilot trajectory is underway involving approximately 10 identified plastic streams from the UZ Leuven hospital. In the short term, about 200 tons per year are being reclaimed and subjected to quality control measures to enable maximum reuse. This pilot project explores the business case for reclamation and investigates the necessary scale, processing costs, and other factors required to establish a feasible economic model. The project is being further scaled up towards 1.000 tons per year. This expansion involves not only extending the existing streams within Leuven by involving other hospitals and healthcare institutions but also exploring how to increase the scale beyond Leuven and understanding the impact on the business case.

CE – 3.1: Several major innovative players in Leuven have the willingness and potential to act as drivers of circular acceleration. Close collaboration is underway with these players, including UZ Leuven, KU Leuven, the city of Leuven, and imec, in pilot projects within their own building stock. This approach allows the insights gained to be progressively integrated into the asset management of these players. They can not only recover materials through the demolition of existing buildings,

feeding the circular market, but also potentially become significant buyers of circular materials through their renovation or new construction projects.

The involvement of the city also entails embedding circular principles in permitting policies and sustainability frameworks for new construction, in consultation with these players and based on the insights gained.

These major stakeholders in Leuven are also engaged in the collective renovation program, as explained under Built Environment. The learning network established there is well-suited for sharing insights from circular projects and exploring opportunities for collaboration through complementary material flows.

CE – 3.2: In addition to the collective renovation program, which mainly involves major Leuven stakeholders, several existing initiatives aimed primarily at citizens are being tapped into. It is essential to bring circular thinking onto the radar of citizens, so they can incorporate it into their own construction projects. Alongside the Materials Bank, also the Leuven Climate House, maakleerplek, and the city of Leuven itself play an informative and activating role here. Barriers and uncertainties that citizens encounter are identified and addressed through campaigns, advice, and technical support. This way, residents become more familiar with circular construction principles over time and put them into practice. Finally, Leuven entrepreneurs are engaged through the Circular Desk, where the city collaborates with them to explore opportunities, partnerships, and pilot projects related to circularity.

Module B-2 Climate Neutrality Portfolio Design

The portfolio is presented in three documents:

- The set of individual action outlines (Annex III);
- A slide deck summarizing the portfolio actions (Annex IV);
- A spreadsheet containing the larger portfolio structure within which the individual actions sit (Annex V).

B-2.1: Description of Action Portfolios – Textual or Visual	
Fields of Action	List of Actions
Energy Systems	
	SOLAR POWER
1	Solar Energy for Every Leuven Resident
2	Large-Scale Deployment of Solar Panels on Large Buildings
3	Zonnebouwers+
	LARGE-SCALE COLLECTIVE GREEN HEAT
4	Pilot 1: Renovation Historic City Hall – Green Heat Heritage Cluster
5	Pilot 2: Residual Heat Celestijnenlaan
6	Pilot 3: Redingensite
7	Pilot 4: Vaart-Marie-Thumas
8	Pilot 5: Wakkerzeelsebaan Wijgmaal
	ENERGY-EFFICIENT & GREEN ENERGY INDUSTRIAL PROCESSES
9	Net-Zero Brewing Leuven
10	Process Emissions
11	Recuperation Residual Heat
12	CO_2-Neutral Steam Production
	POLICY & GOVERNANCE
13	Leuven Energy Company
14	Motivating Inspiration Framework Urban Development Projects
15	Green Heat in Urban Planning Tools
	ENERGY SHARING / ENERGY COMMUNITIES
16	Case: Cold and Heat Exchange Study
Built Environment	
	RESIDENTIAL BUILDINGS
17	Climate House
18	Collective Renovation – Case: Suburb Ter Elst
19	Renovation of Apartment Buildings
	NON-RESIDENTIAL BUILDINGS
20	Collective Renovation Program Large Building Owners
21	Renovation of City Building Stock – Clusters
22	Renovation of Hal 9
	NEW BUILDINGS

23	Centre for Performing Arts
	POLICY & GOVERNANCE
24	Property-Linked Financing
25	Alternative Funding for School Buildings
Mobility & Transport	
26	Development of a Regional Bicycle Network
27	Small-Scale Public Space Project Program
28	Sustainable Commuting Network
29	Shared Mobility for Every Leuven Resident
30	The Ring Road as a Multimodal Hub
31	Expansion of a High-Quality Public Transportation Network
32	Sustainable Parking Policy of the City of Leuven
33	Sustainable Parking Policy at KU Leuven
34	Upscaling of Charging Infrastructure
35	Mobility for All
	SUSTAINABLE URBAN LOGISTICS
36	Sustainable Urban Logistics
37	Electrification of Waste Transport
38	Hydrogen Panels
39	CO_2-Neutral Cargo Ship
Green Infrastructure & Nature-Based Solutions	
40	Climate Adaptation Policy
41	Climate Adaptation Taskforce
42	Digital Twin Climate Adaptation
43	Climate Adaptation Toolkit
44	Molenbeek Valley
45	Trees for Leuven
	CIRCULAR WATER USE
46	Case: Water Battery
	NATURE-INCLUSIVE FARMING
47	Case: 'Koolstofboeren' – Nature-Inclusive Farming
48	Case: Carbon Farming
Waste & Circular Economy	
	MATERIALS
49	Materials Bank – Materials
50	Wienerberger – Materials
51	Plastics Hub – Materials
	INFRASTRUCTURE
52	Materials Bank – URC
53	EcoWerf – URC
	BUILDING STOCK

54	Circular Economy & Waste in Building Stock of UZ Leuven
55	Circular Economy & Waste in Building Stock of KU Leuven
56	Circular Economy & Waste in Building Stock of imec
Place-Based Projects	
57	Place-Based Project Ruelenspark
58	Place-Based Project Haasrode
59	Place-Based Project Arenberg
60	Place-Based Project Climate-Robust City Centre
61	Place-Based Project Vaart-Dijle
62	Place-Based Project Kessel-Lo
63	Place-Based Project Wijgmaal
Upscaling Potential	
	ENERGY SYSTEMS
64	Collective Green Heat
65	Green Electricity
	BUILT ENVIRONMENT
66	Climate-Positive New Buildings
67	Non-Residential Renovation
68	Residential Renovation
	GREEN INFRASTRUCTURE & NATURE-BASED SOLUTIONS
69	Regional Green-Blue Network
	WASTE & CIRCULAR ECONOMY
70	Building Materials
71	Plastics

B-2.2: Individual Action Outlines

Collected in Annex III.

B-2.3: Summary Strategy for Residual Emissions

In Module A-2.3, we initially set the residual emissions target at an ambitious level of 15 per cent relative to baseline emissions. This served as our initial benchmark for assessing the required emissions reductions. Once we constructed and thoroughly analyzed our portfolio of actions, we conducted a more precise calculation of potential emissions reductions for each sector individually. The resulting estimates for residual emissions per sector can be found in the table below. For the waste sector, no estimates are available as of yet, so the target values specified in Module A-2.3 were copied. Overall, our estimated total residual emissions, amounting to 17 per cent of total baseline emissions, remain well below the general target of 20 per cent.

Table 4: Residual Emissions

	Baseline Emissions	Residual Emissions	
	(absolute)	(absolute)	(%)
Buildings	313.956	34.708	11
Transport	64.629	19.003	29
Industrial Process and Product Use (IPPU)	38.328	17.755	46
Waste	47.864	7.180	15
Agricultural, Forestry and Land Use (AFOLU)	-7.275	-7.275	0
Total	457.501	78.646	17

Our primary approach for addressing these residual emissions in the short term is carbon offsetting. This can be achieved directly on Leuven territory by protecting and reinforcing existing carbon sinks like Heverleebos. Alternatively, we can opt for indirect offsetting by obtaining carbon credits that signify carbon capture or emission reductions achieved elsewhere. A platform like Claire provides the opportunity of purchasing credits locally, using reliable and conservative calculation methods.

When looking beyond 2030, other possibilities to deal with residual emissions (must) enter the scene.

Addressing residual emissions within the **buildings** sector presents a complex challenge. Offsetting solutions are less than ideal for residential properties, primarily because making offsetting mandatory lacks public support and is legally challenging to enforce. Voluntary offsetting, while an option, is unlikely to cover a substantial portion of these emissions, even when accompanied by intensive campaigning efforts. For buildings in the tertiary sector, offsetting may be a more viable solution, especially with upcoming EU legislation, such as the CSRD, targeting smaller players in the near future.

In the somewhat longer term, a key strategy to deal with these residual emissions involves maintaining a high pace of home and tertiary-building renovations. To achieve this, the Leuven Climate House will undoubtedly continue its efforts beyond 2030, with a focus on those (clusters of) buildings that have not yet undergone renovation. Simultaneously, the gradual phase-out of the gas distribution grid will take place, with district heating and individual heat pumps stepping in. The implementation of Neighborhood Heat Plans will guide the adoption of the most optimal heating strategies for each district.

Within the **industry** sector, the table above demonstrates that we anticipate that residual emissions will be proportionally notably higher compared to other sectors. This is primarily due to the challenge posed by process emissions and process heat, especially at high temperatures, which today remains difficult to generate in a fossil-free manner at an acceptable cost. This sector, however, will also be targeted by upcoming EU legislation, and a higher level of offsetting seems achievable here, compensating for this higher share of residual emissions in the short term. In the medium term, innovative solutions concerning further electrification, green hydrogen, and green synthetic fuels will be implemented when ready. Strong ties to the KU Leuven university can catalyze the early adoption of these technologies as the university is a frontrunner in many related fields, e.g. solar hydrogen panels, lignin-derived chemicals, and LCA.

In **mobility and transport**, the realization of the proposed breakthrough projects will provide the basis for further emissions cuts in this field, as high-quality bicycle infrastructure and public transport

networks are deployed. As the market is conquered further by fossil-free vehicles and key players in Leuven increasingly couple their logistics streams, a sustained decline in emissions in this field is anticipated. Moreover, the impact of higher-level legislation, including regulations at the EU level, is poised to serve as a significant driver in promoting green mobility and will significantly influence the pace of this transition. At the same time, carbon offsetting is likely to play a role in logistics and public transport, where decision-making authority is concentrated among a few key players, and where public demand for green product chains is increasing.

The **Scope 2 emissions** through use of electricity from the grid will be reduced further by improving energy efficiency wherever possible, for instance through more efficient household appliances, relighting campaigns, … Pushing PV production even higher, as well as the possibility of realizing wind turbines on the Leuven territory or participating in wind projects beyond Leuven, will continue to elevate the share of renewable electricity through local production or green power contracts.

Currently, our portfolio contains several promising breakthrough projects aimed at addressing **Scope 3 emissions**, particularly within the plastics and building materials sectors. To achieve the necessary comprehensive reduction in Scope 3 emissions, it is imperative to gain a deeper understanding of these emissions, extending beyond the figures provided for the waste sector. The insights obtained from the presented pilot projects are actively being incorporated into a strategic framework that is currently under development. This framework is designed to facilitate the expansion of our efforts in reducing emissions and promoting circularity, with the R-ladder serving as the guiding principle. This integration of the R-ladder approach will extend to multiple materials streams and various target groups. As a result, the R-ladder concept will become more deeply ingrained at the policy level. This includes its incorporation into legislation governing urban development projects, but also influencing decisions at the business and household levels, e.g. encouraging the use of circular materials in small-scale renovation projects.

Module B-3 Indicators for Monitoring, Evaluation and Learning

The indicator set outlined above was selected based on both relevance and workability. An indicator was considered most relevant if it directly measures the outcome of one of the impact pathways outlined in Module B-1. This explains the current focus on so-called output and outcome indicators, rather than input or process indicators. Some indicators, for instance concerning annual rain, annual heatwave days (determined at the national level), etc., were omitted in this overview because they cannot be influenced significantly by policymaking at the city level. However, these metrics are still readily available and will therefore be used to find correlations in the data or to investigate certain trends. To ensure a sufficiently workable set of indicators, existing measurement networks and initiatives were tapped into wherever possible.

B-3.1: Impact Pathways

Outcomes/ Impacts Addressed	Action/Project	Nr.	Indicator Name	Indicator Unit	Baseline	Target Values		
					2019	2025	2027	2030
ES – 2.1, ES – 3.1, all BE pathways	ES Collective Green Heat Pilots 1-5, Net-Zero Brewing Leuven (InBev), Process Emissions (Imec), Heat Pump (Beneo), Carbon-Neutral Steam Production (Beneo), Case: Cold and Heat Exchange Study (KUL-imec), Leuven Energy Company, Motivating Inspirational Framework Urban Development Projects, Green Heat in Urban Planning Tools, Energy Sharing / Energy Communities BE All projects	001	GHG emission from stationary energy	t CO_2-eq/y	305.414	160.000	100.000	37.300
ES – 3.1	ES Net-Zero Brewing Leuven (InBev), Process Emissions (Imec), Heat Pump (Beneo), Carbon-Neutral Steam Production (Beneo), Case: Cold and Heat Exchange Study (KUL-imec) CE Materials Bank - Materials Wienerberger - Materials Plastics Hub - Materials Materials Bank - URC Ecowerf - URC	002	GHG emission from IPPU	t CO_2-eq/y	30.900	22.900	20.300	16.300

ES – 2.1, ES – 3.1, all BE pathways, MOB – 1.1, MOB – 2.1, MOB – 4.1	ES Collective Green Heat Pilots 1-5, Net-Zero Brewing Leuven (InBev), Process Emissions (Imec), Heat Pump (Beneo), Carbon-Neutral Steam Production (Beneo), Case: Cold and Heat Exchange Study (KUL-imec) BE All projects MOB All projects	003	Energy use by fuel type within city boundary	MWh/y	Reported in Module A-1	/	/	Reported in CCC CO_2 calculations.
ES – 1.1, ES – 1.2	ES Solar Energy for Every Leuven Resident, Large-Scale Deployment of PV Panels Large Buildings, Zonnebouwers+ (ECoOB)	004	Local RE production	MWh/y	21.000	81.200	101.200	131.300
				MW	17,69	68,4	85,2	110,6
				% of total electricity consumption	2,7	8,5	10,5	13,4
				% of total final energy consumption	0,83	-	-	6,9
All ES and BE pathways, MOB – 2.1, MOB – 4.1	ES - BE All projects (direct or indirect via electrification of heat demand) MOB Scaling Up Charging Infrastructure Sustainable Urban Logistics Cargo Transport Electrification - Trucks (Colruyt, AB InBev, Siemens) Electrification Waste Transport (EcoWerf) Hydrogen Panels (EcoWerf) CO_2-Neutral Cargo Ship (Beneo)	005	GHG emissions from grid supplied energy	t CO_2-eq/y	47.600	30.300	24.500	15.800
ES – 1.1, ES – 1.2, ES – 1.3	ES Solar Energy for Every Leuven Resident, Large-Scale Deployment of PV Panels Large Buildings, Zonnebouwers+ (ECoOB)	006	GHG emissions from grid supplied energy	t CO_2-eq/MWh	0,0619	0,0370	0,0287	0,0162
ES – 2.1	ES Pilots 1-5, Heat Pump (Beneo), Leuven Energy Company, Motivating Inspirational Framework Urban Development Projects, Green Heat in	007	Heat and cold delivery via district heating	MWh/y	0	173.500	231.300	318.000

	Urban Planning Tools, Case: Cold and Heat Exchange Study (KUL-imec)							
BE – 1.4 (BE – 1.1, BE -1.2, BE – 1.3)	ES Solar Energy for Every Leuven Resident, Leuven Energy Company, Zonnebouwers+ (ECoOB)	008	Energy poverty	% of households with active budget meter	0,89	-	-	-
				% of households in deprivation (Leuven)	16,0	-	-	-
				% of households with measured energy poverty (Flanders)	2,2	-	-	-
BE – 1.1, BE – 1.2, BE – 1.3, BE – 1.4	BE Klimaathuis, Collective Renovation - Case: Urban Area Ter Elst, Renovation of Apartment Buildings, Property-Linked Financing	009	Energy consumption per household	MWh/y	17,5	15,2	14,4	13,2
BE – 1.2, BE – 1.3, BE – 1.4, BE – 2.1	BE Klimaathuis, Collective Renovation - Case: Urban Area Ter Elst, Renovation of Apartment Buildings, Collective Renovation Program Large Building Owners, Renovation City Building Stock – Clusters, Renovation Of Hal 9, Property-Linked Financing, Alternative Funding for School Buildings	010	Degree of renovation	%	0,9	3,0	4,5	5,0
BE – 1.1, BE – 1.2, BE – 1.3, BE – 1.4	BE Klimaathuis	011	Number of pieces of advice by the Leuven Klimaathuis	#/y	0	-	-	-
BE – 1.1, BE – 1.2, BE – 1.3, BE – 1.4	BE Klimaathuis	012	Number of campaigns by the Leuven Klimaathuis	#/y	0	-	-	-
BE – 1.1, BE – 1.2, BE – 1.3, BE – 1.4	BE Klimaathuis	013	Number of granted renovation subsidies in Leuven	#/y	2.128	-	-	-
BE – 3.1, NBS – 1.1, NBS – 1.3, NBS – 1.4	NBS Climate Adaptation Policy Climate Adaptation Taskforce Climate Adaptation Toolkit Molenbeek Valley	014	Growth rate of sealed land	m^2/y	296.359	134.700	80.800	0
NBS – 1.1	NBS Climate Adaptation Policy	015	Average minimum and maximum	days/y	6,2	-	-	-

	Climate Adaptation Taskforce Climate Adaptation Toolkit Molenbeek Valley		temperature on heatwave days.					
NBS – 1.1	NBS Climate Adaptation Policy Climate Adaptation Taskforce Climate Adaptation Toolkit Digital Twin Climate Adaptation	017	Number of potential vulnerable institutions where NBS targeting heat stress reduction have been implemented	Adapted locations/total locations	Unknown/146	80/146	106/146	146/146
NBS – 1.2	NBS Climate Adaptation Policy Climate Adaptation Taskforce Climate Adaptation Toolkit Digital Twin Climate Adaptation Circular Water Use Water Battery	020	Local groundwater level	m TAW	-	-	-	-
NBS – 1.2	NBS Climate Adaptation Policy Climate Adaptation Toolkit Circular Water Use Water Battery	023	Household water consumption	m^3/cap/y	1 member: 40 2 members: 64 3 members: 90 4 members: 105 5 members: 121	-	-	-
NBS – 1.5	NBS Climate Adaptation Policy Climate Adaptation Taskforce Climate Adaptation Toolkit Trees for Leuven	025	(Perceived) quality of nature and green spaces	%	84 (2023)	>84	>84	>84
NBS – 1.5	NBS Climate Adaptation Policy	026	Accessible green spaces	ha/100 inhabitants	-	-	-	-
NBS – 1.5	NBS Climate Adaptation Policy Trees for Leuven	028	Percentage of buildings where the 3-30-300 rule is met.	% of buildings	-	-	-	-
NBS – 1.6, MOB – 1.1, MOB – 2.1, MOB – 4.1	NBS Climate Adaptation Policy Climate Adaptation Taskforce Digital Twin Climate Adaptation Climate Adaptation Toolkit Trees for Leuven	030	PM2.5 concentration levels	ug/m^3	Multiple measurement points	-	-	Better than reference year (2019) in every measurement point.
NBS – 1.6, MOB – 1.1, MOB – 2.1, MOB – 4.1	NBS Climate Adaptation Policy Climate Adaptation Taskforce Digital Twin Climate Adaptation Climate Adaptation Toolkit	031	PM10 concentration levels	Number of days	Multiple measurement points	-	-	Better than reference year (2019) in every measurement point.

	Trees for Leuven							
NBS – 1.6, MOB – 1.1, MOB – 2.1, MOB – 4.1	NBS Climate Adaptation Policy Climate Adaptation Taskforce Digital Twin Climate Adaptation Climate Adaptation Toolkit Trees for Leuven	032	NO_2 concentration levels	ug/m³	Multiple measurement points	-	-	Better than reference year (2019) in every measurement point.
NBS – 1.7	NBS Climate Adaptation Policy Case: Nature-Inclusive Carbon Farming on a City-Regional Scale (Provincie Vlaams-Brabant) Case: Carbon Farming (Arvesta)	033	Structural connectivity of green spaces	ha	189	-	-	-
NBS – 1.7	NBS Climate Adaptation Policy Climate Adaptation Taskforce Climate Adaptation Toolkit Molenbeek Valley Trees for Leuven	034	Change in the number of (bird) species in built-up areas in the city	% of change in species	-	-	-	-
NBS – 1.7	NBS Climate Adaptation Policy	035	Percentage of protected natural areas	%	1,28% (72,286 ha) (2022)	>1,28%	>1,28%	>1,28%
NBS – 1.7	NBS Climate Adaptation Policy Climate Adaptation Taskforce Climate Adaptation Toolkit	036	Added number of green walls	# requests filed/y	150 (2020)	-	-	-
NBS – 1.7	NBS Climate Adaptation Policy Trees for Leuven	037	Net increase in number of trees	#	0 (reference year)	5.000	8.000	10.000
NBS – 1.7	NBS Climate Adaptation Policy Trees for Leuven	038	Net increase in area of “neighborhood forests”	m²/y	1.955 (2020)	-	-	-
NBS – 2.1, NBS – 3.1, NBS – 3.2	NBS Climate Adaptation Policy Climate Adaptation Taskforce Climate Adaptation Toolkit Molenbeek Valley Case: Nature-Inclusive Carbon Farming on a City-Regional Scale (Provincie Vlaams-Brabant) Case: Carbon Farming (Arvesta)	039	GHG emission from AFOLU	t CO_2-eq/y	-7.275	-	-	-
NBS – 2.1, NBS – 3.1, NBS – 3.2	NBS Climate Adaptation Policy Climate Adaptation Taskforce Case: Nature-Inclusive Carbon Farming on a City-Regional Scale (Provincie Vlaams-Brabant) Case: Carbon Farming (Arvesta)	040	Surface area of agricultural land where carbon sequestration measures have been implemented	ha	-	-	-	-

MOB – 1.1, MOB – 2.1, MOB – 4.1	MOB Development of a Regional Bicycle Network Small-Scale Public Space Project Program Sustainable Commuting Network Shared Mobility for Every Leuven Resident Ring Road as a Multimodal Hub Expansion of a High-Quality Public Transportation Network Sustainable Parking Policy of the City of Leuven Sustainable Parking Policy at KU Leuven Scaling Up Charging Infrastructure Mobility for All Sustainable Urban Logistics Electrification Waste Transport (EcoWerf) Hydrogen Panels (EcoWerf) CO_2-Neutral Cargo Ship (Beneo) CE Materials Bank - Materials Wienerberger - Materials Plastics Hub - Materials Materials Bank - URC EcoWerf - URC	041	GHG emission from transport	t CO_2-eq/y	-	-	-	-
MOB – 1.1, MOB – 2.1, MOB – 4.1	MOB Development of a Regional Bicycle Network Small-Scale Public Space Project Program Sustainable Commuting Network Shared Mobility for Every Leuven Resident Ring Road as a Multimodal Hub Expansion of a High-Quality Public Transportation Network Sustainable Parking Policy of the City of Leuven Sustainable Parking Policy at KU Leuven Scaling Up Charging Infrastructure Mobility for All Sustainable Urban Logistics Electrification Waste Transport (EcoWerf) Hydrogen Panels (EcoWerf) CO_2-Neutral Cargo Ship (Beneo) CE Materials Bank - Material Wienerberger - Material Plastics Hub - Material	042	Fuel consumption for in-boundary transportation per fuel type	MWh/y	Reported in Module A-1	/	/	Reported in CCC CO_2 calculations.

	Materials Bank - URC EcoWerf - URC							
MOB – 1.1	MOB Development of a Regional Bicycle Network Sustainable Commuting Network Shared Mobility for Every Leuven Resident Ring Road as a Multimodal Hub Expansion of a High-Quality Public Transportation Network Sustainable Parking Policy of the City of Leuven Sustainable Parking Policy at KU Leuven Scaling Up Charging Infrastructure Mobility for All	043	Modal share of green transport modes (biking, walking and public transport)	%	35	-	-	60
MOB – 1.1	MOB Development of a Regional Bicycle Network Sustainable Commuting Network Shared Mobility for Every Leuven Resident Expansion of a High-Quality Public Transportation Network Sustainable Parking Policy of the City of Leuven Sustainable Parking Policy at KU Leuven	044	Private Car Ownership	#	37.124 cars 0,735 cars per household	-	-	-
MOB – 1.1	MOB Sustainable Commuting Network Ring Road as a Multimodal Hub Expansion of a High-Quality Public Transportation Network Mobility for All	045	Number of PT km	km/y	6.414.300	-	-	8.980.100
MOB – 1.1	MOB Sustainable Commuting Network Ring Road as a Multimodal Hub Expansion of a High-Quality Public Transportation Network Mobility for All	046	Number of PT users	#/y	-	-	-	-
MOB – 1.1	MOB Sustainable Parking Policy of the City of Leuven	047	Number of parking spots on public domain	#	-	-	-	-
MOB – 2.2	MOB Small-Scale Public Space Project Program Ring Road as a Multimodal Hub	048	Road Deaths & Injured	#/1.000 inhabitants/y	5,4 light injuries 0,26 severe injuries 0,03 deaths	-	-	-
MOB – 2.2	MOB Development of a Regional Bicycle Network Small-Scale Public Space Project Program	049	Traffic Safety Active Modes	#/y	257 (light injury) +20 (severe injury)	-	-	-

	Ring Road as a Multimodal Hub				+0 (deaths 30 days (bike) 52 (light injury) +3 (severe injury) +2 (deaths 30 days) (pedestrian)			
MOB – 3.1	MOB Scaling Up Charging Infrastructure	050	Number of EV charging points	#	177 (public, 2022)	-	-	7,200 + 920 for fast charging ((semi-)public)
MOB – 5.1	MOB Sustainable Commuting Network Shared Mobility for Every Leuven Resident Expansion of a High-Quality Public Transportation Network Mobility for All	051	(Perceived) quality and accessibility of public transport	%	88.8	>88.8	>88.8	>88.8
CE - all	WCE Materials Bank - Materials Wienerberger - Materials Plastics Hub - Materials Materials Bank - URC EcoWerf - URC CE&W (Circular Economy & Waste) in Building Stock of UZ Leuven (University Hospital) CE&W (Circular Economy & Waste) in Building Stock of KU Leuven CE&W(Circular Economy & Waste) in Building Stock of imec	053	GHG emission from waste	t CO_2-eq/y	47.864	-	-	-
CE - all	WCE Materials Bank - Materials Wienerberger - Materials Plastics Hub - Materials Materials Bank - URC EcoWerf - URC CE&W (Circular Economy & Waste) in Building Stock of UZ Leuven (University Hospital) CE&W (Circular Economy & Waste) in Building Stock of KU Leuven CE&W(Circular Economy & Waste) in Building Stock of imec	054	Mass of waste produced per capita	kg/capita/y	HH: 363 Non-HH: 335	-	-	Lokaal Materialenplan 2023-2030 HH: 254 Non-HH: 235
CE - all	WCE Materials Bank - Materials Wienerberger - Materials Plastics Hub - Materials Materials Bank - URC EcoWerf - URC	055	Percentage of waste processed per end-of-life treatment type	%	Recycling: 42% Composting: 12% Incineration: 46%	Lokaal Materialenplan 2023-2030 Recycling: 55%	-	Lokaal Materialenplan 2023-2030 Recycling: 60%

	CE&W (Circular Economy & Waste) in Building Stock of UZ Leuven (University Hospital) CE&W (Circular Economy & Waste) in Building Stock of KU Leuven CE&W(Circular Economy & Waste) in Building Stock of imec							
CE – 1.1	WCE Materials Bank - Materials Wienerberger - Materials Plastics Hub - Materials Materials Bank - URC EcoWerf - URC CE&W (Circular Economy & Waste) in Building Stock of UZ Leuven (University Hospital) CE&W (Circular Economy & Waste) in Building Stock of KU Leuven CE&W(Circular Economy & Waste) in Building Stock of imec	056	Amount of recycled building materials	t/y	3.024	-	-	-
CE – 1.1	WCE Materials Bank - Materials Wienerberger - Materials Materials Bank - URC EcoWerf - URC CE&W (Circular Economy & Waste) in Building Stock of UZ Leuven (University Hospital) CE&W (Circular Economy & Waste) in Building Stock of KU Leuven CE&W(Circular Economy & Waste) in Building Stock of imec	057	Circular Material Use Rate (CMU) for building materials (reuse, repair, repurpose)	t/y	-	-	-	-
CE – 2.1	WCE Plastics Hub - Materials CE&W (Circular Economy & Waste) in Building Stock of UZ Leuven (University Hospital)	058	Amount of recycled plastics	t/y	2.400	-	-	HH: 70% Non-HH: 65%
CE – 2.1	WCE Plastics Hub - Materials CE&W (Circular Economy & Waste) in Building Stock of UZ Leuven (University Hospital)	060	Circular Material Use Rate (CMU) for plastics (reuse, repair, repurpose)	t/y	-	-	-	-
-	WCE Plastics Hub - Materials Materials Bank - Materials Wienerberger - Materials Materials Bank - URC EcoWerf - URC	061	Inflow of Critical Raw Materials	t/y	-	-	-	-

	CE&W (Circular Economy & Waste) in Building Stock of UZ Leuven (University Hospital) CE&W (Circular Economy & Waste) in Building Stock of KU Leuven CE&W(Circular Economy & Waste) in Building Stock of imec							

ENERGY SYSTEMS & BUILT ENVIRONMENT

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	GHG emission from stationary energy
Indicator Unit	t CO_2-equivalent/y
Definition	Greenhouse gas emissions (mainly CO_2 emissions) from the operations of buildings
Calculation	Base emission information can be derived through "Amount of fuel consumption per fuel type x GHG emission per fuel type". In the CoM CO_2 inventory, the sectors Households, Tertiary, Industry and Own Buildings are used for this calculation, adding up the emissions from all fossil fuels reported. This information will be readily available in the FutureProofedCities application that Leuven uses to track and manage its carbon balance.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	Buildings
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	ES – 2.1, ES – 3.1, all BE pathways
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	CoM
Data requirements	
Expected data source	CoM CO_2 Inventory
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	CoM CO_2 Inventory
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	GHG emission from IPPU
Indicator Unit	t CO_2-equivalent/y
Definition	Greenhouse gas emissions from industrial processes and product use within city boundary.
Calculation	GHG emission calculation methodology for the IPPU sector is described in detail in the 2014 IPCC Mitigation of Climate Change, chapter 10, page 746. City-level calculation and scoping methodology described in GPC, pages 109 onward. For Leuven, it is taken from the CoM CO_2 inventory, including both scope 1 and scope 2 emissions.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	IPPU
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	ES – 3.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	CoM
Data requirements	
Expected data source	CoM CO_2 Inventory
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	CoM CO_2 Inventory
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Energy use by fuel type within city boundary
Indicator Unit	MWh/y
Definition	Real consumption data for each fuel or energy type disaggregated by sub-sector.
Calculation	Calculation formulae for stationary energy from GHG Protocol for Cities (GPC) pages 60 – 73.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	All
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	ES – 2.1, ES – 3.1, all BE pathways, MOB – 1.1, MOB – 2.1, MOB – 4.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	CoM
Data requirements	
Expected data source	CoM CO_2 Inventory
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	CoM CO_2 Inventory
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Local RE production
Indicator Unit	%, MWh/y, MW
Definition	Absolute energy production (MWh/y) as well as installed capacity (MW) and relative production compared to total electricity and final energy demand (%) for Leuven.
Calculation	The production data are yearly reported on Provincies in cijfers by the Flemish Energy and Climate Agency. The percentages are calculated by dividing the reported RE production for a given year by the total electricity consumption or final energy demand as reported in the CoM emission inventory.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Energy Independence
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	ES – 1.1, ES – 1.2
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	CoM
Data requirements	
Expected data source	Calculation based on electricity and final energy demand from CoM CO_2 Inventory, production data from Provincies in cijfers
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	CoM CO_2 Inventory
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	GHG emissions from grid supplied energy
Indicator Unit	t CO_2-equivalent/y
Definition	GHG emissions occurring as a consequence of the use of grid-supplied electricity within the city boundary.
Calculation	Calculated by multiplying the non-local electricity consumption which is not filled in using green electricity contracts by the national emission factor, as reported in the CoM CO_2 Inventory
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	All
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	ES – 1.1, ES – 1.2, ES – 1.3
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	CoM
Data requirements	
Expected data source	CoM CO_2 Inventory
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	CoM CO_2 Inventory
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Grid specific emission factor
Indicator Unit	t CO_2-eq/MWh
Definition	Mass GHG emissions per unit of grid-supplied energy
Calculation	Calculated in the CoM CO_2 Inventory datasheet.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	All
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	ES – 1.1, ES – 1.2, ES – 1.3
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	CoM
Data requirements	
Expected data source	CoM CO_2 Inventory
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	CoM CO_2 Inventory
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Heat and cold delivery via district heating
Indicator Unit	MWh/y
Definition	The amount of green heat and cold that is delivered yearly via district heating within the city boundaries.
Calculation	Summation of reported values by ESCO's, the Leuven Energy Company or Fluvius.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	Buildings
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	ES – 2.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Reported values by ESCO's, the Leuven Energy Company or Fluvius.
Expected availability	Requires effort
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Energy poverty, approximated by combining local data on active budget meters and a deprivation index for Leuven with regional data on energy poverty for Flanders.
Indicator Unit	% of households
Definition	The percentage of households unable to afford the most basic levels of energy
Calculation	The % of households living in energy poverty is approximated by the % of households with an active budget meter for electricity.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Fighting Energy Poverty, Inclusive Climate Transition
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	BE – 1.4 (BE – 1.1, BE -1.2, BE – 1.3)
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Provincies In Cijfers, Barometer Energiearmoede
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	Rapport Armoede, Barometer Energiearmoede
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Energy consumption per household
Indicator Unit	MWh/y
Definition	A measured trend of the energy a household consumes in MWh. Comparisons can be made on a quarterly or yearly basis.
Calculation	Calculated by dividing the yearly energy consumption of households from the CoM CO_2 inventory by the number of households for Leuven.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	Buildings
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Manageable Energy Bill
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	BE – 1.1, BE – 1.2, BE – 1.3, BE – 1.4
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	CoM CO_2 inventory, Provincies In Cijfers
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	Rapport Energie en Klimaat
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Degree of renovation
Indicator Unit	%
Definition	The percentage of buildings within the city boundaries that has been renovated during the past year.
Calculation	Derived from the number of registered renovations
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	Buildings
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Living Quality
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	BE – 1.2, BE – 1.3, BE – 1.4, BE – 2.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Provincies In Cijfers, Bouwvergunningen: Renovatie-intensiteit
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Number of pieces of advice by the Leuven Klimaathuis
Indicator Unit	Number of pieces of advice
Definition	The number of pieces of personalised advice on renovation, green heat,… given by the Leuven Klimaathuis to the citizens.
Calculation	Internal metric.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	BE – 1.2, BE – 1.3, BE – 1.4
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Reported by Klimaathuis
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Number of campaigns by the Leuven Klimaathuis
Indicator Unit	Number of campaigns
Definition	The number of campaigns targeting vulnerable groups or crucial topics.
Calculation	Internal metric.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Inclusive transition
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	BE – 1.1, BE – 1.2, BE – 1.3, BE – 1.4
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Reported by Klimaathuis
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Number of granted renovation subsidies in Leuven
Indicator Unit	Number/y
Definition	The number of granted renovation subsidies (Mijn VerbouwPremie)
Calculation	Reported metric
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	BE – 1.2, BE – 1.3, BE – 1.4
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Provincies In Cijfers, Renovatiepremie: goedkeuringen renovatiepremie
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Growth rate of sealed land
Indicator Unit	m^2/y
Definition	Newly urbanised land in m^2, per capita, and year.
Calculation	Area of newly sealed land in m^2. (Calculate by taking the difference with the previous year)
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Water management: flooding protection; improved public health; biodiversity Good spatial planning and accessibility of public domain.
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	BE – 3.1, NBS – 1.1, NBS – 1.3, NBS – 1.4
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Provincies In Cijfers, Verharding, Oppervlakte Verharding
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	https://www.vmm.be/publicaties/uitbreiding-klimaatportaal-vlaanderen-met-klimaatadaptatietools
Other indicator systems using this indicator	

NATURE-BASED SOLUTIONS

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Average minimum and maximum temperature on heatwave days.
Indicator Unit	°C
Definition	The average maximum and minimum temperature as measured during official heatwave days (nationally defined). As heat stress measures take effect, a lower measured temperature during heatwaves is the target.
Calculation	The existing temperature measurement network is used to analyse the temperature in the Leuven territory during heatwave days. All the maximum and minimum temperatures for each heatwave day are averaged to produce one average maximum and one average minimum heatwave temperature per year.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Lower heat stress leading to improved public health, energy savings (cooling demand)
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Existing measuring network “Leuven Cool”
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	To assess number of heatwave days: https://www.vmm.be/data/gemeente-in-cijfers https://klimaat.vmm.be/themas/hitte
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Percentage of potential vulnerable institutions where NBS targeting heat stress reduction have been implemented
Indicator Unit	% of institutions
Definition	VMM provides a comprehensive map containing the institutions that will be vulnerable to considerable heat stress in 2050. These locations need to be targeted with priority for NBS implementation.
Calculation	The vulnerable locations indicated on the VMM heat stress map in the "No action - high impact - 2050" scenario serve as the base data. These locations need to be screened to assess whether heat stress reduction nature-based solutions (NBS) have been implemented. The number of locations where NBS have been implemented represents the output for this indicator.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Lower heat stress leading to improved public health, energy savings (cooling demand)
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Registered actions from potential vulnerable institutions through permits or a visual screening (retirement homes, schools, hospitals and daycares), combined with data from Klimaatportaal Vlaanderen
Expected availability	Requires some effort
Suggested collection interval	Every 3 years
References	
Deliverables describing the indicator	Eindrapport Klimaatportaal https://klimaat.vmm.be/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Local groundwater level
Indicator Unit	mTAW
Definition	The height of the local groundwater table is influenced by local extraction, but also by amount and distribution of precipitation and periods of unusual heat.
Calculation	The city monitors groundwater level in a selection of observation wells monthly.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Water management: security water availability
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.2
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	The city monitors the water level in a selection of observation wells DOV-verkenner (freatisch grondwater); Klimaatportaal Vlaanderen
Expected availability	Good
Suggested collection interval	Monthly
References	
Deliverables describing the indicator	https://www.dov.vlaanderen.be/page/actuele-grondwaterstandindicator Drought plan Leuven https://omgeving.vlaanderen.be/nl/ruimte-voor-water-impact-op-droogte
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Household water consumption
Indicator Unit	m^3/cap/y
Definition	The indicator 'Household water consumption (m^3/capita/y)' measures the average consumption of water for all domestic uses (excluding industry).
Calculation	Reported via Gemeente in cijfers
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Water management: security water availability
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.2
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Gemeente in cijfers
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	https://www.vmm.be/data/gemeente-in-cijfers
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	(Perceived) quality of nature and green spaces
Indicator Unit	%
Definition	Share of residents who are satisfied with the nature and green spaces in the city.
Calculation	Obtained through a yearly questionnaire, i.e. “De Stadsmonitor”
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Improved public health and well-being
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.5
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	De stadsmonitor, indicator “Tevredenheid groen in de buurt”
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	De Stadsmonitor: https://gemeente-stadsmonitor.vlaanderen.be/gemeente/leuven
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Accessible green spaces
Indicator Unit	ha/100.000 inhabitants
Definition	The amount of accessible green area per 100 000 inhabitants
Calculation	Total amount of accessible green space in hectares / Total inhabitants
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Human health and well-being; social cohesion; biodiversity; water management; heat reduction; increased value and attractiveness for housing/businesses
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.5
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Spatial analysis of the parks and green spaces in the Leuven territory. Accessibility to citizens is a selection criterium.
Expected availability	Accessibility assessment requires some effort.
Suggested collection interval	Every 3 years
References	
Deliverables describing the indicator	https://omgeving.vlaanderen.be/nl/evolutie-groenaanbod Omgevingsanalyse Leuven in cijfers '18 https://www.kuleuven.be/duurzaamheid/duurzame-bedrijfsvoering/plan-groen-2015 https://gemeente-stadsmonitor.vlaanderen.be/gemeente/leuven/klimaat-milieu-en-natuur
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Percentage of buildings where the 3-30-300 rule is met.
Indicator Unit	% of buildings
Definition	The 3-30-300 rule offers a well-established guideline that outlines the notable advantages for both mental and physical well-being when certain conditions are met. These conditions include having a minimum of three trees visible from one's residence, a tree coverage of at least 30% within the neighbourhood, and the presence of a cooling park within a 300-meter walk.
Calculation	GIS-analysis needed, methodology to be developed
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Human health and well-being; biodiversity; water management; heat stress mitigation
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.5
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	GIS-analysis needed, methodology to be developed Input data includes open data on public v. private domain, roads, public green spaces, tree coverage,…
Expected availability	Methodology to be developed
Suggested collection interval	yearly
References	
Deliverables describing the indicator	https://digitaal.hortipoint.nl/vergroenen-van-de-stad/de-3-30-300-vuistregel/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	PM2.5 concentration levels
Indicator Unit	ug/m³
Definition	This indicator corresponds to the highest annual mean of PM2.5 concentration recorded in a particular year at stations in urban and suburban background locations.
Calculation	Reported by VMM, models based on mobility data, industry emissions,… (ATMO-Street & VLOPS)
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Air quality and hence human health
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.6, MOB – 1.1, MOB – 2.1, MOB – 4.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Data reported yearly by VMM
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	https://www.vmm.be/lucht/fijn-stof/concentratie-pm2-5
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	PM10 concentration levels
Indicator Unit	Number of days
Definition	This indicator corresponds to the highest number of days in a year where the PM10 concentration level recorded at stations in urban and suburban background locations has exceeded the WHO recommendation of 45 µg/m3. It refers to the number of days on the monitoring station that measured the most days in excess of the WHO recommendation of 45 µg/m³.
Calculation	Reported by VMM, models based on mobility data, industry emissions,… (ATMO-Street & VLOPS)
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	yes
If yes, which co-benefit does it measure?	Air quality and hence human health
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.6, MOB – 1.1, MOB – 2.1, MOB – 4.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Data reported yearly by VMM
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	https://www.vmm.be/lucht/fijn-stof/uitstoot-pm10
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	NO_2 concentration levels
Indicator Unit	ug/m^3
Definition	corresponds to the highest value of the annual mean of nitrogen dioxide (NO2) concentrations recorded in a particular year at stations with the highest traffic location levels.
Calculation	Reported by VMM, models based on mobility data, industry emissions,… (ATMO-Street & VLOPS)
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Air quality and hence human health
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.6, MOB – 1.1, MOB – 2.1, MOB – 4.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Data reported yearly by VMM
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	https://www.vmm.be/lucht/stikstof/concentratie-stikstofdioxide
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Structural connectivity of green spaces
Indicator Unit	ha
Definition	Degree of physical ("structural") connectivity between natural environments within a defined urban area.
Calculation	$Indicator\,2 = \frac{1}{A_{total}}\left(A_1^2 + A_2^2 + A_3^2 + \ldots + A_n^2\right)$ Where: • Atotal is the total area of all natural areas. • A1 to An are areas that are distinct from each other • n is the total number of connected natural areas. The criterium to distinguish patches of natural land is suggested in the NZC reference material to be 100 m, with additional identification of large barriers like roads. Due to time constraints and the nature of the Leuven data (which also takes into account solitary trees and very small patches of green (BBK 2018)), a suitable distance was found to be 2 m, without doing a manual correction for roads etc. When investigating the resulting distinguished green areas, this criterium seems to provide a reasonable metric for structural connectivity of green in the Leuven area.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Biodiversity
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.7
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	GIS calculation
Expected availability	Requires some effort
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Change in the number of (bird) species in built-up areas in the city
Indicator Unit	% of change in species
Definition	The indicator 'Change in number of species of birds in urban area/built-up areas in the city' is a trend indicator that provides an overview of changes in species diversity as a proxy for habitat quality.
Calculation	The indicators will measure the change in number of species over time rather than the absolute number of species. Net change in species from the previous survey to the most recent survey is calculated as: The change in number of species is the number of species assessed at a time (T2) minus the number of species assessed previously (T1) and this divided by the number of species assessed previously (T1).
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Biodiversity
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.7
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Waarnemingen.be, complemented by custom citizen science programs and data from projects that are realized within the PACT initiative;
Expected availability	Requires some effort
Suggested collection interval	Yearly calculation from some specific periods and locations in the database waarnemingen.be
References	
Deliverables describing the indicator	https://waarnemingen.be/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Percentage of protected natural areas
Indicator Unit	%
Definition	It assesses the share of protected natural areas and restored and naturalised areas in the City.
Calculation	(Area of protected or secured natural areas) / (Total area of the city) x 100
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Biodiversity
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.7
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Protected natural area within the Leuven territory is monitored by the city. The area includes land for which a “nature management plan” has been established.
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	ORBA, the city project management system
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Added number of green walls
Indicator Unit	#
Definition	Added number of green walls, approximated by citizens' requests to remove a pavement tile for this purpose.
Calculation	/
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	AFOLU
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Biodiversity, pluvial flood risk, energy consumption
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.7
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Based on reported number of citizens' requests to remove a pavement tile to start a "wall garden". Filing a request is mandatory.
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	ORBA, the city project management system
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Net increase in number of trees in the public domain
Indicator Unit	Number/y
Definition	The number of trees planted minus the number of trees felled
Calculation	Follow-up by the city.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	AFOLU
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Biodiversity, mental and physical health, air quality
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.7
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Additional trees on public domain as reported within the city. Trees on private terrain will later also be included and can be estimated based on citizen science projects like Klimaattuiniers (KU Leuven), combined with data from permits for felling of trees
Expected availability	Requires some effort
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	ORBA, the city project management system
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Net increase in area of “neighbourhood forests”
Indicator Unit	m^2/y
Definition	The net increase in surface area of “neighbourhood forests,” which are small, local patches of forest that are created to permanently remain forest.
Calculation	Monitored by the city.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	AFOLU
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Biodiversity, mental and physical health, air quality
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 1.7
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Monitored by the city.
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	ORBA, the city project management system
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	GHG emission from AFOLU
Indicator Unit	t CO2-eq/y
Definition	IPCC guidelines divides AFOLU emission activities into three categories: Livestock, Land, Aggregate sources and non-CO2 emissions sources on land. The cumulative of these emissions forms the sectoral emissions.
Calculation	Detailed calculation and scoping methodology described in GPC pages 121- 137
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	AFOLU
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 2.1 and 3.1, 3.2
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	CoM
Data requirements	
Expected data source	GIS analysis to assess carbon sinks in combination with agriculture data from CoM CO2 inventories.
Expected availability	Poor
Suggested collection interval	3-yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Surface area of agricultural land where carbon sequestration measures have been implemented
Indicator Unit	ha
Definition	Surface area of agricultural land where carbon sequestration measures have been implemented. These measures can include agroforestry, conversion of croplands to grasslands,…
Calculation	Reported by firms like Claire, reported by farmers, reported number of subsidies granted.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	AFOLU
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Usually combined effect of carbon sequestration and increased biodiversity, better water management and erosion prevention.
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	NBS – 2.1, 3.1 and 3.2
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	To be determined. Likely monitored at provincial level, and/or reported by firms like Claire, reported by farmers.
Expected availability	Requires some effort
Suggested collection interval	Every 2 or 3 years
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

MOBILITY & TRANSPORT

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	GHG emission from transport
Indicator Unit	t CO_2-eq/y
Definition	Greenhouse gas emissions from the operations of vehicles.
Calculation	CoM CO_2 inventory with exclusion of national roads.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	Transport
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	MOB – 1.1, MOB – 2.1, MOB – 4.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	CoM
Data requirements	
Expected data source	CoM CO_2 inventory
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Fuel consumption for in-boundary transportation per fuel type
Indicator Unit	MWh/y
Definition	Emissions per fuel type emerging from the operations of vehicles.
Calculation	Calculation formulae for Transport indicators from GHG Protocol for Cities (GPC) pages 75 to 87.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	Transport
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	MOB – 1.1, MOB – 2.1, MOB – 4.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	CoM
Data requirements	
Expected data source	CoM CO_2 inventory
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Modal share of green transport modes (biking, walking and public transport)
Indicator Unit	%
Definition	An increase in the shares of walking, biking and public transport indicates that the mobility behaviour of the local population has changed and that the preference for climate friendly mobility options has risen. The transport modes walking, biking and public transport are summarized as « green transport modes », because they cause no (walking and biking) greenhouse gas emissions, or at least significantly less (public transport) greenhouse gas emissions than the transport modes private motor cars or motorbikes. The indicator can be defined as the average number of trips per day that an inhabitant of the city does walking, biking or going by public transport, expressed as a percentage of the average total number of trips per inhabitant and day
Calculation	$$MS_{green} = \frac{T_w + T_b + T_{train} + T_{bus} + T_{tram}}{T_{total}} \; x\ 100$$ $Where:$ $T_w = Walking\ trips\ per\ capita\ and\ day$ $T_b = Bike\ trips\ per\ capita\ and\ day$ $T_{train} = Train\ trips\ per\ capita\ and\ day$ $T_{bus}\ Bus\ trips\ per\ capita\ and\ day$ $T_{tram} = Tram\ trips\ per\ capita\ and\ day$ $T_{total} = Total\ trips\ per\ capita\ and\ day$
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Air quality, physical health
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	MOB – 1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Stadsmonitor, Onderzoek verplaatsingsgedrag
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/

Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Private Car Ownership
Indicator Unit	%
Definition	Total number of cars and number of cars per households.
Calculation	Total number of cars and number of cars per households.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Availability of parking space for climate adaptation, social activities,…
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	MOB – 1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	/
Data requirements	
Expected data source	Provincies in cijfers: https://leuven.incijfers.be/jive?workspace_guid=63c45a3c-ebc7-4c1b-b276-2edb78fc762c
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Number of PT km
Indicator Unit	km/y
Definition	Number of kilometres per year travelled by PT modi.
Calculation	Reported value
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	MOB – 1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	/
Data requirements	
Expected data source	Reported in CoM
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Number of PT users
Indicator Unit	Number/y
Definition	Yearly number of PT users in Leuven.
Calculation	Reported value
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	MOB – 1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	/
Data requirements	
Expected data source	Monitored by public transport company De Lijn.
Expected availability	(Public) availability to be determined
Suggested collection interval	TBD
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Number of parking spots on public domain
Indicator Unit	Number
Definition	The number of parking spots on public domain in Leuven.
Calculation	Derived from GIS parking inventory for Leuven, which is updated manually.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Availability of parking space for climate adaptation, social activities,…
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	MOB – 1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	/
Data requirements	
Expected data source	Derived from GIS parking inventory for Leuven.
Expected availability	Requires effort
Suggested collection interval	TBD
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Road Deaths & Injured
Indicator Unit	# of deaths / 1.000 inhabitants, # of injured / 1,000 inhabitants
Definition	Number of deaths due to traffic accident per 1,000 inhabitants. Number of light and severe injuries due to traffic accidents per 1,000 inhabitants.
Calculation	Reported value
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Traffic safety, physical and mental health
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	MOB – 2.2
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	/
Data requirements	
Expected data source	https://leuven.incijfers.be/jive?workspace_guid=56fea694-a12e-48e4-9664-661c2322d185 (collected by Statbel)
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Traffic Safety Active Modes
Indicator Unit	Number of deaths or injured cyclists or pedestrians per year
Definition	Fatalities and injured of active modes users in traffic accidents in the city in relation to their exposure to traffic; This indicator corresponds to the number of deaths within 30 days after the traffic accident as a corollary of the event per annum caused by active modes of transport, per billion trips per annum (exposure)
Calculation	Reported value
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co-benefits)?	Yes
If yes, which co-benefit does it measure?	Traffic safety, physical and mental health
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	MOB – 2.2
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	/
Data requirements	
Expected data source	https://bestat.statbel.fgov.be/bestat/crosstable.xhtml?datasource=c60f6fc7-818f-4a23-9622-524506c6b305
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Number of EV charging points
Indicator Unit	Number
Definition	The total number of public and semi-public EV charging points in Leuven.
Calculation	Reported values
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Air quality, financial returns, jobs
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	MOB – 3.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	/
Data requirements	
Expected data source	MOW: https://mow.vlaanderen.be/laadpalen
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	(Perceived) quality and accessibility of public transport
Indicator Unit	%
Definition	An indicator that monitors how content citizens are with the current offer of public transport, as well as whether or not they perceive public transport options to be present sufficiently nearby.
Calculation	Average of two metrics from the "Stadsmonitor", i.e. satisfaction with the offered public transport options and sufficient nearby trams/buses.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Inclusive climate transition, physical and mental health, transport poverty
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	MOB – 5.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Indicators taken from the "Stadsmonitor" https://leuven.incijfers.be/jive?workspace_guid=e5d5c9c0-80bf-4697-b73f-877e68eb73a8 - Voldoende OV in de buurt - Tevredenheid over OV / deelmob
Expected availability	Good
Suggested collection interval	Every 3 years
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

WASTE & CIRCULARITY

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	GHG emission from waste
Indicator Unit	t CO_2-eq/y
Definition	Greenhouse gas emissions from waste treatment, waste incineration and landfills
Calculation	This is the sum of household residual waste incineration (Ecowerf figures) supplemented by business waste incineration. For the latter, Flemish figures were used and extrapolated to Leuven size based on the number of established companies.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	Waste
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	All CE pathways
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	Yes
Data requirements	
Expected data source	Reported in CoM inventory and by EcoWerf.
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Mass of waste produced per capita
Indicator Unit	kg/capita/y
Definition	Separate monitoring of household- and non-household waste produced per capita for Leuven.
Calculation	Reported by EcoWerf, Valipac
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	Waste
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	All CE pathways
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	Yes
Data requirements	
Expected data source	Reported by EcoWerf, Vites, Valipac
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	Lokaal Materialenplan 2023-2030
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Percentage of waste processed per end-of-life treatment type
Indicator Unit	%
Definition	Percentage of waste per end-of-life treatment. The relevant end-of-life treatments for Leuven are recycling, composting and incineration. There are no active landfills.
Calculation	Reported by Ecowerf, Valipac
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it impact?	Waste
Does the indicator measure indirect impacts (i.e. co- benefits)?	No
If yes, which co-benefit does it measure?	/
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	All CE pathways
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	Yes
Data requirements	
Expected data source	Reported by EcoWerf, Valipac
Expected availability	Good
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	Lokaal Materialenplan 2023-2030
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Amount of recycled building materials
Indicator Unit	t/y
Definition	The amount of recycled building materials that pass through the recycling park and material hubs in Leuven.
Calculation	Reported by recycling parks and in the future also by material hubs/Materialenbank.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Dependence on materials, reduced utility usage during virgin material production, job creation
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	CE – 1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Reported by recycling park and in the future also by material hubs/Materialenbank.
Expected availability	Requires some effort
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Circular Material Use Rate (CMU) - for building materials (reuse, repair, repurpose)
Indicator Unit	%
Definition	The circular material use rate (CMU rate) measures, in percentage, the share of material recovered and fed back into the economy - thus saving extraction of primary raw materials – in overall material use.
Calculation	Ratio of the circular use of materials (U) to the overall material use (M). Reported by URC's (Materialenbank and Ecowerf)
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Dependence on materials, rate of circular material use and resource productivity, job creation
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	CE – 1.2
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Reported by sorting facilities and recycling parks - in the future the data can be reported by URC's (Urban Resource Centers) from Materialenbank and Ecowerf
Expected availability	Requires some effort
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Amount of recycled plastics
Indicator Unit	t/y
Definition	The amount of recycled plastics that pass through the recycling park or material hubs in Leuven, added to the amount of recyclable plastics that is collected separately.
Calculation	Reported by EcoWerf/recycling park/material hubs/Materialenbank.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Dependence on materials, reduced utility usage during virgin material production, job creation
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	CE – 2.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Reported by EcoWerf/recycling park/material hubs/Materialenbank.
Expected availability	Requires some effort
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	Lokaal Materialenplan 2023-2030
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Amount of reused plastics
Indicator Unit	t/y
Definition	The amount of reused plastics that pass through the material hubs in Leuven.
Calculation	Reported by material hubs/Materialenbank.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Dependence on materials, reduced utility usage during virgin material production, job creation
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	CE – 2.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Reported by material hubs/Materialenbank.
Expected availability	Requires some effort
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Circular Material Use Rate (CMU) - for plastics (reuse, repair, repurpose)
Indicator Unit	%
Definition	The circular material use rate (CMU rate) measures, in percentage, the share of material recovered and fed back into the economy - thus saving extraction of primary raw materials – in overall material use.
Calculation	Ratio of the circular use of materials (U) to the overall material use (M). Reported by Plastics hub, Ecowerf and UZ Leuven.
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Dependence on materials, rate of circular material use and resource productivity, job creation
Can the indicator be used for monitoring impact pathways?	Yes
If yes, which NZC impact pathway is it relevant for?	CE – 2.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Reported by sorting facilities and recycling parks - in the future the data can be reported by Plastics hub, and URC's (Urban Resource Centers) from Materialenbank and Ecowerf
Expected availability	Requires some effort
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	/
Other indicator systems using this indicator	/

B-3.2: Indicator Metadata	
(for each indicator selected – take from Comprehensive Indicator Sets)	
Indicator Name	Inflow of Critical Raw Materials
Indicator Unit	% and Material type
Definition	The critical materials inflow highlights the share of the material inflow that is considered critical, enabling the risk assessment of specific material flows and to prioritize accordingly. Entities can refer to a list of critical materials developed by the European Commission: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0474
Calculation	Mass of inflow defined as critical, divided by total mass of linear inflow, multiplied by 100%. Reported by URC's (Materialenbank, Ecowerf) and Plastics Hub. (other material streams have to be reported by their referred responsible entity)
Indicator Context	
Does the indicator measure direct impacts (i.e. reduction in greenhouse gas emissions?)	No
If yes, which emission source sectors does it impact?	/
Does the indicator measure indirect impacts (i.e. co- benefits)?	Yes
If yes, which co-benefit does it measure?	Dependence on materials, Dependence on abroad territories and countries, rate of raw material extraction
Can the indicator be used for monitoring impact pathways?	No
If yes, which NZC impact pathway is it relevant for?	/
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Reported by sorting facilities and recycling parks - in the future the data can be reported by Plastics hub.
Expected availability	Requires the knowledge on the type and amount of inflow materials.
Suggested collection interval	Yearly
References	
Deliverables describing the indicator	Reference material: World Business Council for Sustainable Development (2023) *Circular Transition Indicators V4.0 - Metrics for business, by business.* https://www.wbcsd.org/Programs/Circular-Economy/Metrics-Measurement/Resources/Circular-Transition-Indicators-v4.0-Metrics-for-business-by-business Reference EU Critical Raw Material Act https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en
Other indicator systems using this indicator	/

5 Part C – Enabling Climate Neutrality by 2030

Module C-1 Organisational and Governance Innovation Interventions

1. Internal City Climate Policy
2. Regional Collaboration
3. External City Climate Policy
4. Extending the Neural Network
5. Climate Action Plans
6. Civic Contracting
7. MEL

INTERNAL CITY CLIMATE POLICY

Intervention

Description

Climate policy is a transversal policy area. It touches directly on the work of different city departments: sustainability, mobility, public domain, spatial planning, heritage, economy, housing, education, area-oriented operation, and so on. In addition, it is crucial that all the departments, including those which are less obvious, such as culture, communication, sport, finance, etc., become involved in the climate objectives and help to achieve or propagate them in their own field of work. An effective policy requires an integrated and holistic approach and close cooperation between departments and administrators across policy areas.

This is not new for city administration. There is already close and good cooperation in many areas, often from an area-oriented approach or from strategic project work. The area coordinators and services as area-oriented operation are crucial in this approach. The drawing up of a number of policy plans, such as the structure plan, climate action plan (made within the scope of the climate team), or youth space plan also took place through transversal processes in which a broad support was sought within the organization.

A number of citywide innovative processes have been launched from the chief executive officer's staff. They are building the government of tomorrow, with an eye toward providing efficient services to residents. Such an innovative *governance approach* is also appropriate for the climate theme. Climate must be integrated in a thorough, thoughtful, smart and efficient way as a common thread in our internal processes, both substantive and operational.

Responsible organization/entity	Sustainability service - Staff general manager
Contact	Ilse Premereur - Geert Vanhorebeek (climate policy city of Leuven) Jessie Van Couwenberghe (EU Mission) Elke Van Hamme (internal governance processes)
Stakeholders involved and role of each stakeholder	Staff General Manager: Introduce horizontal principles and SDGs into MYP and ensure knowledge sharing on this and around projects, e.g. through FONS or workshops. Key directorates ifv climate ambitions: Spatial policy, public domain, buildings, Social Affairs.

		Support directorates: finance, general manager, communications.
	Commitments	City of Leuven integrates climate objectives within the entire city policy. If choices have to be made, it is important to focus on and prioritize "win-win" projects, which add value to both climate objectives and other policy areas. City of Leuven focuses on generating impact and rolling out motivating and stimulating actions: An accelerated transition, together with the pioneering role of Leuven, requires the city to focus on those projects and processes that - sometimes only after upscaling them or within the policy framework – have the largest impact and thus contribute in the first place, directly or indirectly, to an accelerated emission reduction. City of Leuven provides the necessary capacity (grant management) to find financing for climate projects: Achieving the climate goals and realizing the portfolio of breakthrough projects requires targeted funding. The additional capacity will be used to search for grants, write project proposals with internal and external partners. City of Leuven commits to monitor climate goals: The CCC outlines a clear path towards climate neutrality, indicating how much reduction we plan to achieve in which year and with which measures. Targets, linked to concrete, calculated measures, clearly show how the city is going to achieve the proposed reduction. Monitoring is crucial for adjusting policy and making sure the planned measures are not falling short in reaching the climate objectives.
	Enabling impact	Joining forces and working in an integrated way creates synergies that generate efficiency gains, making climate policy more visible and thus more convincing to its own people, as well as to third parties.

	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐
	Efficient use of raw materials	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐
	Biodiversity	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐
	Climate adaptation	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐

REGIONAL COLLABORATION

Intervention

Description

Leuven is not an island; it is connected to the region by stone roads and stream valleys. The challenge of climate change does not stop at the municipal border; the levers for solutions may lie in neighboring municipalities. City-regional cooperation allows to capitalize on economies of scale, and is a prerequisite to realize breakthrough projects, such as the bicycle route network.

The Leuven City Region is an attractive, dynamic region in full bloom. The number of inhabitants is rising, economic activity and the knowledge economy are growing. The downside of this is that the livability and accessibility of the region are under high pressure. Moreover, a large part of the population lives in car-dependent locations outside the cities and village centers. This causes congested roads, encroachment on open space and difficult to access facilities. Climate change and urbanization pressures threaten the unique landscapes and biodiversity of the forests on the province's southern border.

We want to meet these challenges by making both mobility and spatial planning more sustainable. We make residents less dependent on the car by developing both a network for high-quality public transportation and a high-quality bicycle network. At the same time, we concentrate most of the new housing, workplaces and facilities at the nodes of that network. We are working toward a 15-minute region. Inappropriate developments outside the cores we counteract.

Already today, the City of Leuven is working intensively with neighboring municipalities and supra-local partners on projects such as Regionet Leuven, Walden and the Brabantse Wouden. By strengthening this cooperation, we can better meet the challenges.

Responsible organization/entity	Geertrui Vanloo
Contact	Wiet Vandaele
Stakeholders involved and role of each stakeholder	Neighboring municipalities: partners in co-production, each from its own strengths Province of Flemish Brabant: director & facilitator Flemish government: various agencies of the Flemish government carry out necessary investment projects e.g.: ANB for nature links, AWV for HOV axis, ...
Commitments	City of Leuven commits to continue and increase the existing collaborations.

		Commitments not yet validated The Province of Flemish Brabant emphasises the importance of further developing the existing city-regional cooperation on spatial policy and mobility, set up within Regionet Leuven searches for the necessary co-financing to maintain a coordinatoting role.
	Enabling impact	• The expansion of the network of high-quality public transportation and bicycle routes and amenities within walking distance allow for a far-reaching *modal shift*; • Further spread of building is reduced. This is how we protect open space and enable adaptation.
	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Economic development and jobs	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Efficient use of raw materials	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐
	Biodiversity	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Climate adaptation	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R

EXTERNAL CITY CLIMATE POLICY

Intervention

Description

In climate policy, the city is often the initiator or leader of projects or measures but, to generate impact, a city also relies on close collaborations with others. An effective policy requires an integrated and holistic approach and close cooperation between departments and other authorities, organizations, associations, companies, ... across policy domains. An important external effect has already been developed in many policy areas and in different city departments (e.g., sustainability, mobility, public domain, economy, housing, area-oriented operation, etc.). In the future, this external effect will be further developed.

Climate must be integrated in a thorough, thoughtful, smart and efficient way as a common thread in our external processes, both substantive and operational.

The urban climate policy is partly realized by organizations in which the city participates (intermunicipal companies, social housing companies, non-profit organizations, the water group, etc.) and by government agencies active in Leuven (AWV, De Lijn, Vlaamse Waterweg, infrabel, ANB, etc.). All these actors should be maximally involved in order to formulate and realize the same ambitions.

Important elements of the integrated climate policy are realized by other organizations, associations or companies. Therefore, the city is increasingly working together in networks (e.g. around nature policy, food strategy, water, circular economy, etc.) in order to engage and support these partners in the realization of the urban objectives.

If we want to guide our cities **together faster towards a climate-neutral future**, **further coordination with our supra-local governments** is crucial. In light of the next **Flemish elections,** we are therefore reaching out from Leuven to other climate-ambitious Flemish central cities to come up with a supported **memorandum** together, addressed to the full Flemish government and the party chairmen.

In it, we want to make a plea to maximally further activate the Flemish levers to **accelerate urban climate transitions**, and this against the background of the acceleration initiated at the European level.

The memorandum aims to formulate **recommendations** in **five emission domains**: energy, built environment, mobility, climate adaptation and circular economy.

Finally, Leuven depends on other governments and it is desirable to cooperate with neighboring municipalities and other municipalities. To this end, city administrations together with the administration must set up an active operation that directs and supports where necessary but also provides support in the city. This will be further included in the breakthrough project on city-regional cooperation.

This external leg of climate policy is very important and different from the role and tasks of the Leuven 2030 non-profit organization.

	Responsible organization/entity	Sustainability service - Staff general manager
	Contact	Ilse Premereur - Geert Vanhorebeek (climate policy city of Leuven) Jessie Van Couwenberghe (EU Mission) Geertrui Vanloo - general manager
	Stakeholders involved and role of each stakeholder	Key directorates in function of climate ambitions: spatial policy, public domain, buildings. Other authorities: Flanders, Province of Flemish Brabant Urban organizations: Dijledal, CPAS, Autonomous municipal corporations, Intercommunales and non-profit organizations: EcoWerf, Fluvius, Water Group, Aquafin, De Lijn.... Companies: Voka, C-Valley, Leuven MindGate, ...
	Commitments	City of Leuven supports Leuven 2030 as a key actor in climate policy. City of Leuven promotes and calls attention to climate objectives at every (partner) organization, intercommunal, network,... in which the city participates or is represented. City of Leuven and Leuven 2030 motivate partner organizations and businesses to achieve climate goals and allocate resources for this purpose.
	Enabling impact	Joining forces and working in an integrated way creates synergies that generate efficiency gains. This makes climate policy more visible and thus more convincing to third parties. Moreover, economies of scale are possible if we involve enough external stakeholder.

	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Efficient use of raw materials	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Biodiversity	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Climate adaptation	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐

EXTENDING THE NEURAL NETWORK

<table>
<tr><td>  </td><td colspan="2">Intervention</td></tr>
<tr><td></td><td colspan="2">Description
A successful approach to climate transition requires more intense and coordinated cooperation among actors in the societal pentagon. Closer links between actors fuel cooperation and collective impact.
The L2030 network aims to strengthen itself according to the image of a neural network. Derived from the workings of our brains, a neural network consists, on the one hand, of nodes (large or small) and connections between those nodes (strong or weak). By analogy with that image, L2030 wants to focus on addressing and strengthening nodes and establishing and strengthening connections between them in the network, with a view to accelerating a socially just climate transition in Leuven.
Strengthening the network, we take a strategic approach: rather than trying to activate the entire Leuven network, we focus on the 20% (mainly) frontrunners and key actors, paying attention to each part of the social pentagon. This 20% is an indicative target, derived from the idea of the critical tipping point (cf. "tipping point" in social change).
In delineating this 20%, we use parameters such as:
• Representation of each part of the social pentagon
• Content priority programs
• Solution/policy actors at the supra-local level
In the coming years, L2030 aims to contribute to the further development and support of existing networks (f.ex. School2030 and L2030 Urban Lab, or existing networks with regard to social justice and sustainable food), but also to help new networks emerge (f.ex. within the construction sector).</td></tr>
<tr><td></td><td>Responsible organization/entity</td><td>Leuven 2030</td></tr>
<tr><td></td><td>Contact</td><td>Katrien Rycken</td></tr>
<tr><td></td><td>Stakeholders involved and role of each stakeholder</td><td>Leuven 2030: initiator of new neural networks, nurturer and facilitator/supporter of existing networks.</td></tr>
<tr><td></td><td>Commitments</td><td>Leuven 2030 commits to:
*further develop and facilitate the existing neural network of Leuven 2030;
*extend the existing neural network, e.g. within the construction sector.</td></tr>
<tr><td></td><td>Enabling impact</td><td>Complex societal challenges such as urban climate transition require aligned and structural cooperation between a</td></tr>
</table>

		multitude of actors from various walks of life. No single actor can solve this alone. However, this cooperation must be facilitated. It does not happen by itself. We believe that closer links between actors fuel cooperation and collective action. It is this impact that enables this transition.
	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Efficient use of raw materials	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Biodiversity	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Climate adaptation	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐

CLIMATE ACTION PLANS

<table>
<tr><td>  </td><td colspan="2"><h2>Intervention</h2></td></tr>
<tr><td></td><td colspan="2">Description
It is an illusion to think that the climate transition can be managed centrally. It is probably more correct to assume that it’s to be facilitated primarily decentrally.
Climate Action Plans (KAP) can encourage a diverse range of stakeholders from citizens to businesses to set the right priorities and take the most accurate climate action.
The network organization Leuven 2030’s goal is to facilitate the climate transition in a more decentralized way and to encourage stakeholders in taking ambitious climate action.
Towards actors that already have a KAP, the operation will aim to positively challenge actors to raise the level of ambition where necessary. In addition, Leuven 2030 can support stakeholders' goals and actions where possible, e.g. by facilitating cooperation between stakeholders.
To actors who do not yet have a KAP, L2030 will connect them with the right partners in its network so they can co-develop a strategic plan with prioritised climate actions.</td></tr>
<tr><td rowspan="3"></td><td>Responsible organization/entity</td><td>Leuven 2030</td></tr>
<tr><td>Contact</td><td>Katrien Rycken</td></tr>
<tr><td>Stakeholders involved and role of each stakeholder</td><td>Leuven 2030: as soon as feasible - develop operations aiming at supporting stakeholders in their climate action plans (KAP).</td></tr>
<tr><td></td><td>Commitments</td><td>Leuven 2030 aims to build – within the available capacity – operations that, through monitoring the partners' climate action plans, accelerates the climate transition.</td></tr>
<tr><td></td><td>Enabling impact</td><td>This breakthrough project ensures that actors are invited to set goals and actions for their own foot- and handprint. This will undoubtedly impact the number of actions that will take place within the Leuven ecosystem.
In addition, this operation strengthens the fabric between Leuven stakeholders, which we also expect to have a positive impact on accelerating the climate transition. After all, the complexity of the climate transition necessitates cooperation.</td></tr>
</table>

	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Economic development and jobs	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Efficient use of raw materials	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Biodiversity	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Climate adaptation	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐

CIVIC CONTRACTING

Intervention

Description

Concept

Civic Contracting is a mechanism to catalyze collective action aligned to a common goal by creating greater transparency and accountability. It aims to move beyond broad promises and towards more binding action by formalizing commitments along a spectrum ranging from open pledges to outcome-based contracts. Signatories agree to report publicly on progress, thereby giving others the confidence that they are holding up their end of the bargain.

Civic Contracting is by no means limited to citizens; 'civic' in this context refers not to citizens but to the civic spirit and sense of collective purpose that compels actors to participate in an effort primarily aimed at creating public value. Civic Contracting is open to all types of stakeholders and envisaged to work best with a diverse set of signatories.

Background

Leuven 2030 and the city of Leuven first became aware of Civic Contracting as part of EIT Climate-KIC's Deep Demonstration of Healthy, Clean Cities. Alongside Dark Matter Labs, we refined the concept and tailored it to our local context as part of our joint bid for Bloomberg Philanthropies' Global Mayors Challenge 2021. Although that bid was ultimately unsuccessful, Leuven 2030 continued to develop the idea against the background of the Mission.

Civic Contracting in the Mission

Civic Contracting is a key component of Leuven's activities in the Pilot Cities Programme, which will see Leuven 2030 and the city of Leuven develop two Civic Contracts, one place-based and one actor-based, both centered on the topic of green heat.

Civic Contracting will also be applied more broadly within the context of the Mission as a means of monitoring the commitments secured over the course of the CCC process. Several components are envisaged to form part of this approach:

- A public inventory of commitments;
- A reporting mechanism;
- Peer-to-peer account-giving.

Responsible organization/entity	Leuven 2030
Contact	Luca Lia luca.lia@leuven2030.be
Stakeholders involved and role of each stakeholder	Leuven 2030:

		• Develop and implement a process for monitoring commitments included in the Climate City Contract; • Develop one place-based and one actor-based Civic Contract as part of Leuven's pilot activities. Signatories: • Contribute commitments to the Climate City Contract and agree to report progress publicly. Key stakeholders (e.g., city of Leuven, KU Leuven): • Become signatories to the Climate City Contract; • Demonstrate leadership and act as role models, inspiring other actors to follow suit.
	Commitments	Leuven 2030: • Develop and implement a process for monitoring commitments included in the Climate City Contract; • Develop one place-based and one actor-based Civic Contract as part of Leuven's pilot activities.
	Enabling impact	Civic Contracting contributes indirectly to climate neutrality by supporting and enabling stakeholders to formalize and follow through on their commitments. By creating greater transparency and accountability, it strives to catalyze collective, aligned action towards the goal of achieving net-zero emissions.
	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Efficient use of raw materials	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Biodiversity	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Climate adaptation	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐

MONITORING, EVALUATION AND LEARNING (MEL)

<table>
<tr><td>  </td><td colspan="2">Intervention</td></tr>
<tr><td></td><td colspan="2">Description

An important part of portfolio management and implementation will be to establish a MEL approach. Particularly in a context of innovation and experimentation, there is great value in periodic stock-taking to assess progress and, when needed, adjust course.

On the short term, the Leuven team will pursue MEL by:

• Establishing a structured learning process as part of Leuven's activities in the Pilot Cities Programme, with a focus on the emissions domains of Energy Systems and Built Environment;
• Creating a context for learning as part of the effort to establish greater transparency and accountability (accountability-for-learning);
• Monitoring the transition, and thereby providing a basis for evaluation and learning;
• Aligning monitoring systems to the indicators presented in Module B-3 of the Action Plan;</td></tr>
<tr><td></td><td>Responsible organization/entity</td><td>Leuven 2030</td></tr>
<tr><td></td><td>Contact</td><td>Luca Lia
luca.lia@leuven2030.be</td></tr>
<tr><td></td><td>Stakeholders involved and role of each stakeholder</td><td>City of Leuven:

• Establish a structured learning process as part of its activities in the Pilot Cities Programme;

• Align monitoring systems to the indicators presented in the Action Plan.

Leuven 2030:

• Monitor the transition in Leuven and report on progress to its community of stakeholders;

• Align monitoring systems to the indicators presented in the Action Plan;

• Support and enable stakeholders to take stock, reflect, and learn.</td></tr>
<tr><td></td><td>Commitments</td><td>Leuven 2030:

• Create a context for learning by convening stakeholders and establishing a process of accountability-for-learning;</td></tr>
</table>

		• Monitor the transition in Leuven and report on progress to stakeholders.
	Enabling impact	Monitoring, evaluating, and learning from Mission activity is critical to ensuring effective and impactful action. It enables better, more intelligent decision-making and therefore contributes to achieving a greater impact.
	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Efficient use of raw materials	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Biodiversity	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Climate adaptation	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R

Module C-2 Social and Other Innovation Interventions

1. Action-Oriented Future Scenarios
2. Youth Climate Council
3. Inclusive Language
4. Platform for Collective Climate Action
5. Storytelling
6. Commitments by Citizens
7. Carbon Conversations
8. Digital Twin
9. Social Justice

ACTION-ORIENTED FUTURE SCENARIOS

<table>
<tr><td>  </td><td colspan="2"><h2>Intervention</h2></td></tr>
<tr><td></td><td colspan="2">Description
The steps you take today are based on your images of the future. Therefore, to get people to take action for the climate, it is often suggested that better narratives with positive images of the future can play an important role. Only: there are more images of doom in circulation than there are inspiring images of how things can be different. Moreover, many people or groups do not get the chance to imagine their own positive futures and are dependent on the images that do circulate, which do not always match their lifeworlds. Thus, the climate crisis is also a crisis of imagination.
Therefore, in this project we will co-create positive images of the future that give hope and prospects for action. We will do this specifically around housing and with Leuven residents who are prosperous but reluctant to make major changes. We translate the future scenarios that come out of the co-creative workshops into activating communication. Moreover, we also invite theater makers to join the workshops and work with the outcome. Finally, we pour what we learn into a methodological framework that can be applied to other target groups and climate domains.</td></tr>
<tr><td></td><td>Responsible organization/entity</td><td>Open Time knowledge center, Erasmus University College Brussels (lead)
Leuven 2030 (partner)
NONO (partner)</td></tr>
<tr><td></td><td>Contact</td><td>Sven Rosius,
sven.rosius@leuven2030.be</td></tr>
<tr><td></td><td>Stakeholders involved and role of each stakeholder</td><td>Open Time knowledge center, Erasmus University College Brussels (lead)
Open Time knowledge center has expertise in the field of "Futures Studies. The affiliated researcher will provide the theoretical and methodological knowledge and skills for the co-creation of futures studies with the intended audience. The researcher will also lead the workshops.
NONO (partner)
NONO is a sustainable behavior change agency that uses insights from behavioral science to design effective communications. In this project, NONO will transform future scenarios into</td></tr>
</table>

		communication messages and a communication strategy. **Leuven 2030 (partner)** Leuven 2030 acts in this project as a client and link to the local network. This means that she helps determine the approach of the case study, helps recruit the target group and ensures that the outcome of the project finds its way to her network. In the context of this project, she pays particular attention to the link with the arts and culture field. **30CC** 30CC is Leuven's cultural center. She puts forward two artists to attend the workshops and invites them to work with the insights gained. She also provides a bridge between the future scenarios and the citywide culture festival "New Horizons" that will take place in Leuven from September 2023 to mid-January 2024.
	Commitments	The Open Time knowledge center commits to incorporate the lessons learned into a methodological framework that can be applied to other audiences and climate domains. The Open Time knowledge center commits to share the methodological framework for other organizations to use. NONO translates the obtained future scenarios into concrete communication material and to also communicate about the scenarios to the outside world. Moreover, NONO is developing a framework to also assess its impact. Leuven 2030 commits to sharing the outcomes of this project with its broad network. 30CC commits to incorporating the obtained future scenarios into its broader operations and specifically as an entry point for the citywide cultural festival "New Horizons," which will take place soon.
	Enabling impact	Getting people and organizations to take action for the climate requires better and more diverse narratives with positive images of the future. With this project,

		we not only make work of such visions of the future, we also convert them into effective communication and verify their effectiveness. Moreover, we are using the future scenarios as an input for cultural initiatives in the city. This is expected to help initiate action in the city. We are also targeting a hard-to-reach and critical audience that can have a lot of impact but still has limited momentum. Finally, with this project we also want to establish a methodological framework that can be deployed to other target groups and climate domains. In this way, we are also mindful of the scalability of impact.
	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Efficient use of raw materials	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Biodiversity	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Climate adaptation	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R

YOUTH CLIMATE COUNCIL

	Intervention	
	Description A group of committed young people want to help think about the city's climate policy. They act as ambassadors who want to inspire and activate. The young people play the role of the city's "conscience": they are the future, they have high expectations for climate policy and address politicians, policy makers and the broader stakeholder field about their responsibility. Each time, the young people choose a theme on which they will work for several months, e.g. mobility, reducing paved surfaces, circular economy, ... They receive information from experts, study the city's policy, question other young people about their experiences, ... From these findings, a number of action points emerge, which they address in a dynamic way. Then they invite policy makers to engage in a constructive dialogue about the problems young people identify and to think together about possible solutions.	
	Responsible organization/entity	Vzw Stedelijk Jeugdwerk Leuven (City of Leuven).
	Contact	Jelena Van Meerbeek - jelena@mijnleuven.be
	Stakeholders involved and role of each stakeholder	School 2030 - School 2030 leads young people who are already taking commitments on school climate councils and are eager to go the extra mile. The City of Leuven's Sustainability Department and Leuven 2030 provide substantive input and referral to experts and policymakers.
	Commitments	City of Leuven connects young people with climate experts (at least twice a year). City of Leuven connects young people with politicians and facilitates a dialogue about the climate issue (at least twice a year). City of Leuven organizes actions or events to raise awareness about the climate issue with a broader audience (at least once a year).
	Enabling impact	Young people are given the opportunity to help think about Leuven's climate policy and become fully-fledged

		discussion partners. They feel heard and involved. This contributes to social inclusion and democratic climate plans. The positive impact for the young people themselves is not small either. They can turn negative emotions, such as climate anxiety, into a positive force whereby they can change their immediate environment for the better.
	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Efficient use of raw materials	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Biodiversity	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Climate adaptation	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R

INCLUSIVE LANGUAGE

<table>
<tr><td>  </td><td colspan="2"><h2>Intervention</h2></td></tr>
<tr><td></td><td colspan="2">Description
The project aims to broaden the language palette of the service providers involved and integrate them into the operation so that all residents, in particular socially vulnerable groups, recognize themselves in the offer and can actively contribute to the climate transition.

By means of targeted training and coaching, the project wants to build the capacity of these actors so that the perspective of this target group is systematically included in the communication, offer and project development of climate work. In terms of development, implementation and follow-up, the training and coaching offer is a continuous interaction between civil society (organizations with experience expertise) and the relevant service providers.

At the heart of this project is the perspective of socially vulnerable groups. Their experiences form the basis for the content of the recurring training and coaching offerings.</td></tr>
<tr><td rowspan="4"></td><td>Responsible organization/entity</td><td>Consortium social justice within Leuven 2030</td></tr>
<tr><td>Contact</td><td>Erik Béatse</td></tr>
<tr><td>Stakeholders involved and role of each stakeholder</td><td>Civil society (Saamo, community work 't Lampeke, Less Is More): contribute expertise, organize dialogue tables, help develop formation and coaching.

Academic players (UCLL, KUL and KUL Engage): contributing expertise.

Government: give formation and coaching an active place in operation and planning.</td></tr>
<tr><td>Commitments</td><td>Unspecified.</td></tr>
<tr><td></td><td>Enabling impact</td><td>An inclusive climate policy is important because every resident's contribution is needed to increase the impact of climate programs. In addition, all residents should benefit from investments in a climate neutral city. A climate policy</td></tr>
</table>

		without attention to inclusion and social justice is not a sustainable story. An inclusive climate policy ensures greater support, greater impact, a lever for greater quality of life for all residents and a lever for other projects o.v. sustainability. Language - both word, visual language and message - is crucial here. Language largely determines whether a citizen feels recognized, whether his or her own efforts are seen, and thus determines the willingness to contribute further.
	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Efficient use of raw materials	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Biodiversity	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Climate adaptation	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐

PLATFORM FOR COLLECTIVE CLIMATE ACTION

Intervention

Description

The goal of the FEAST project (https://feast2030.eu) is to make it easy for all Europeans to eat healthily and sustainably.

The project running from 07/2022 to 06/2027 places vulnerable groups at the center to ensure a just and equitable transition.

Leuven Living Lab will focus on how digital tools can help create more healthy and sustainable food for vulnerable people.

One of the concepts being tested is a common action platform.

This platform gives stakeholders working with vulnerable groups and food the opportunity to work together to make an even greater impact.

The chosen functionalities and platform are based on the needs of the stakeholders. It also looks at how such a platform works best and what human interaction is needed to make it work optimally.

This intervention focuses on the topic of food. However, it addresses two cross-cutting topics, namely the use of digital tools to improve stakeholder collaboration and impact and how to change behavior for the better.

The lessons from this project can provide an indication of how to change behavior and accelerate collaboration - including in other thematic areas.

Responsible organization/entity	Leuven 2030
Contact	Marie Mauer - Leuven Living Lab project coordinator
Stakeholders involved and role of each stakeholder	SAAMO Flemish Brabant; KU Leuven (Institute for media studies); Stakeholder organizations working around vulnerable groups and food (yet to be confirmed which partners will participate);
Commitments	Leuven 2030 coordinates the Leuven Living Lab project within the framework of the European FEAST project. KU Leuven provides input for the community action platform based on their research on behavior and digital media. SAAMO connects Leuven 2030 with organizations in Leuven that work with vulnerable groups and share their knowledge about this target group.

		Stakeholder organizations participate in the testing phase of the common action platform and provide feedback.
	Enabling impact	First, this intervention aims to have an effect on healthier food consumption linked to climate neutrality. Second, an indirect effect will be advanced knowledge of how a collective action platform can be used as a tool to accelerate collaboration among stakeholders. Finally, lessons related to behavior change represent another indirect impact that will help shape future interventions.
	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Efficient use of raw materials	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Biodiversity	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Climate adaptation	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐

STORYTELLING

<table>
<tr><td>  </td><td colspan="2"><h2>Intervention</h2></td></tr>
<tr><td></td><td colspan="2">Description
Leuven 2030 specifically deploys its channels (website, newsletter, social media, etc.) to make sustainable projects and partner initiatives known within the various stakeholder groups within the Leuven ecosystem.
In it, the organization's guiding principle is that preference will be given to sustainable projects and initiatives by members, to demonstrate that Leuven 2030 is a broad-based and supported network.
In the process, the reach of Leuven 2030's channels grows organically, allowing more and more engaged followers to find their way to the network. The impact of the communication is evaluated monthly.
The content is brought in the form of inspiring, enthusing stories, learnings and best practices, and is intended to make the content of the Climate City Contract tangible and accessible. Through repeated call to actions, the ecosystem is encouraged to also take action within the framework of the CCC.</td></tr>
<tr><td></td><td>Responsible organization/entity</td><td>Leuven 2030</td></tr>
<tr><td></td><td>Contact</td><td>Sarah Hennin</td></tr>
<tr><td></td><td>Stakeholders involved and role of each stakeholder</td><td>Leuven 2030: communicates through various channels.
Partners within the CCC/Leuven ecosystem: provide content on which to base Leuven 2030 and co-distribute through their own channels.</td></tr>
<tr><td></td><td>Commitments</td><td>Leuven 2030 uses its communication channels (website, newsletter, social media, etc.) to promote climate projects and initiatives from partners within the different stakeholder groups within the Leuven ecosystem.
Citizens take ambassadorship within own network regarding the fomulated commitments.
Organizations proactively provide input to Leuven 2030 about their own campaigns and initiatives, as well as form communicative synergies with other organizations and stakeholders on climate goals
Companies proactively provide input to Leuven 2030 about their own campaigns</td></tr>
</table>

		and initiatives, as well as form communicative synergies with other companies and stakeholders on climate goals. Actively engage in internal communication around CCC to own employees. Knowledge institutions proactively provide input to Leuven 2030 about their own campaigns and initiatives, as well as form communicative synergies with other knowledge institutions and stakeholders on climate goals. Actively engage in internal communication around CCC to own staff and e.g. students. Local governments actively provide input to Leuven 2030 about their own campaigns and initiatives, as well as form communicative synergies with other stakeholders on climate goals. Actively engage in internal communication around CCC to own employees and residents.
	Enabling impact	Storytelling makes complex climate-related problems and solutions understandable and relevant to the general public. Stories have the power to evoke emotions, inspire people and stimulate action. By telling compelling stories about sustainable initiatives, innovative solutions and positive changes regarding the climate transition, we inspire the Leuven ecosystem to take further steps. In addition, storytelling by Leuven 2030 also contributes to cohesion within the network, instills pride in one's own achievements, and thus helps to create the collective mindset and sense of belonging needed to achieve climate neutrality together.

	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Efficient use of raw materials	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Biodiversity	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Climate adaptation	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐

COMMITMENT BY CITIZENS

<table>
<tr><td>  </td><td colspan="2"><h2>Intervention</h2></td></tr>
<tr><td></td><td colspan="2">Description
Leuven 2030 aims to involve citizens in the climate transition in addition to businesses, knowledge institutions and local government.
We want to do this by inviting citizens to also make a commitment to the Climate Contract, linked to breakthrough projects from the portfolio. We do this by translating projects into concrete commitments tailored to citizens, such as reducing paved surfaces the driveway, switching to a green electricity contract, car sharing, etc.
The format to engage citizens will be conceived in such a way that citizens are encouraged to make sustainable choices in more and more areas of life. The citizen involvement we create in this way will contribute to behavioral change and activation of citizens.
Leuven 2030 and the City of Leuven will join forces on this in the coming years. For example, in 2024, the City of Leuven will conduct a large-scale campaign aimed at increasing citizen involvement in our Climate City Contract.</td></tr>
<tr><td rowspan="4"></td><td>Responsible organization/entity</td><td>Leuven 2030</td></tr>
<tr><td>Contact</td><td>Katrien Rycken</td></tr>
<tr><td>Stakeholders involved and role of each stakeholder</td><td>Leuven 2030: participation in the development of the format aiming to activate citizens within the Climate City Contract.
City of Leuven: develop and roll out campaign, cooperation in developing format with a view to activating citizens in the framework of the Climate Contract.
Citizens: taking commitment on breakthrough projects.</td></tr>
<tr><td>Commitments</td><td>Leuven 2030 provides input on how to activate citizens to participate and support the Leuven Climate Contract for the 2024 city’s communication campaign. In line with the Leuven 2030 multi-year strategy, this will prioritize the 20% changemakers within this target group.</td></tr>
<tr><td></td><td>Enabling impact</td><td>The format for involving citizens in the Leuven Climate City Contract aims to reach and encourage an increasing proportion of Leuven residents to make</td></tr>
</table>

		impactful sustainable choices in more and more areas of life.
	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 R 3 ☐ 4 ☐ 5 ☐
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Efficient use of raw materials	1 ☐ 2 R 3 ☐ 4 ☐ 5 ☐
	Biodiversity	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐
	Climate adaptation	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐

CARBON CONVERSATIONS

<table>
<tr><td>  </td><td colspan="2"><h2>Intervention</h2></td></tr>
<tr><td></td><td colspan="2">Description
To really get people to take action, we need to talk, but most importantly, we need to listen.
KlimaatContact is based on the proven methodology of Carbon Conversations (UK) and KlimaatGesprekken (NL).
Climate Contact wants people to choose a climate-friendly society. Not because they have to, but because they see it as better.

We do this by training and supporting climate coaches to deliver a 6-part workshop series. Participants will be inspired and activated to be part of the climate transition and enter the conversation with others.

In the workshops we use the latest insights from climate psychology. Participants learn concrete techniques to better communicate about climate change and the choices we make. They conduct positive and connecting climate conversations and thus influence their environment. In time, this creates a snowball effect. Once enough people are reached, climate-friendly choices become the new normal.</td></tr>
<tr><td rowspan="3"></td><td>Responsible organization/entity</td><td>Klimaatcontact vzw</td></tr>
<tr><td>Contact</td><td>Loes van Hove: trainer, coordinator and regional communicator Climate Contact loes.vanhove@klimaatcontact.be
Ellen Vandenbroucke (city intern): coordinator School 2030 (education department) + climate coach ellen.vandenbroucke@leuven.be</td></tr>
<tr><td>Stakeholders involved and role of each stakeholder</td><td>Loes van Hove: facilitator & supporter - Apart from this citywide ambition, Loes has already played her role as a regional facilitator particularly well in recent years. Flemish Brabant now has some 25 climate coaches.</td></tr>
<tr><td></td><td>Commitments</td><td>Klimaatcontact vzw coordinates KlimaatContact.</td></tr>
<tr><td></td><td>Enabling impact</td><td>Connective and constructive climate conversations lead to more supported climate action.</td></tr>
</table>

		Since the start-up of KlimaatContact in 2019, we worked with individuals with great success: people found each other, learned to involve others in climate change and thus set in motion a huge amount of climate action. Meanwhile, we have grown into an organization with more than 150 active climate coaches across Flanders. Since January 2022, we have been working on behalf of organizations and companies such as the Province of Limburg, Department of Environment, Flemish Energy and Climate Agency, AZ Groeninge, the King Baudouin Foundation, Colruyt Group, P&G, the Port of Antwerp, UCLL, City of Ghent, Fair Fashion Fest, VUB, KU Leuven and University of Antwerp, etc. etc. We are also currently looking at ways in which City of Leuven can offer such a pathway for its own staff.
	Indirect impacts Health and environment (air quality, noise pollution, livability, physical and mental well-being,...) Social inclusion, democracy and cultural impact Economic development and jobs Efficient use of raw materials Biodiversity Climate adaptation	Level of impact (1 = no impact, 5 = very high impact) 1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R 1 ☐ 2 R 3 ☐ 4 ☐ 5 ☐ 1 ☐ 2 R 3 ☐ 4 ☐ 5 ☐ 1 ☐ 2 R 3 ☐ 4 ☐ 5 ☐ 1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐

DIGITAL TWIN

<table>
<tr><td>  </td><td colspan="2"><h2>Intervention</h2></td></tr>
<tr><td></td><td colspan="2">Description
A digital twin combines different data streams to create a graphical representation of the city. Within this graphical representation, computational models are then run to do simulation and prediction.

A digital twin is widely applicable within various policy domains. A digital twin can make simulations and predictions about e.g. mobility using a traffic model, or it can show links between motorized transport and air quality or help determine where best to plan which modes of transport. A digital twin can also be used in the energy sector to e.g. simulate green energy yields linked to weather forecasts, or to investigate which energy requirements need to be met in urban planning. Of course, a digital twin can also be used within the built environment sector to e.g. create planning prioritization for the renovation of a neighborhood or over the entire city.
Through the horizontal, cross-sectoral deployment of a digital twin, this tool offers added value in planning and management tasks within those different policy domains and can also take data and insights from those different domains and combine them to arrive at even broader insights.</td></tr>
<tr><td></td><td>Responsible organization/entity</td><td>City of Leuven ism service provider (management tool- data)
Research institution (mathematical models)</td></tr>
<tr><td></td><td>Contact</td><td>Tim Guily</td></tr>
<tr><td></td><td>Stakeholders involved and role of each stakeholder</td><td>City: management and coordination tool - provide data
Companies: hosting and management tool - connection data - data delivery
Research institutions: mathematical models - supply (new) data
Citizens: supplying data</td></tr>
<tr><td></td><td>Commitments</td><td>City of Leuven produces a functional Digital Twin for Nature Based Solutions.
City of Leuven systematically monitors relevant indicators (such as heat, drought, water infiltration, CO2 capture,...) for the development, management and use of a Digital Twin for NBS.
City of Leuven further develops the Digital Twin (in 3D) so it can also be</td></tr>
</table>

		used for other domains, including energy. Companies use transparent and open systems - open data. Research institutions develop open computational models - organize knowledge transfer.
	Enabling impact	More efficient planning, implementation and management of climate actions.
	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐
	Social inclusion, democracy and cultural impact	1 ☐ 2 R 3 ☐ 4 ☐ 5 ☐
	Economic development and jobs	1 ☐ 2 ☐ 3 ☐ 4 R 5 ☐
	Efficient use of raw materials	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐
	Biodiversity	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐
	Climate adaptation	1 ☐ 2 ☐ 3 R 4 ☐ 5 ☐

SOCIAL JUSTICE

	**Intervention**	
	Description A thorough climate transition undoubtedly also has major social implications, with the risk of fueling social inequality. This highlights the need for policies that proactively link climate goals and social objectives. Leuven 2030 aims to be at the forefront of practice development for an inherently socially just climate transition. Within the Leuven 2030 network, there has been a consortium of professionals from the social work field who want to help set the course for a socially just climate transition. Their efforts led to the identification of some breakthrough projects that directly contribute to this objective. In addition, through a review of the portfolio, they also made some useful additions to the current set of breakthrough projects to enhance the social-justice nature of the actions. Finally, spurred by this group, a guiding principle was dedicated to this objective so that 20% of each breakthrough project benefits 20% of the population, living below the poverty line. In the coming years, within the Leuven 2030 network, we want to work on these social justice goals in a more structural way. The way in which will be further concretized in the coming period.	
	Responsible organization/entity	Leuven 2030
	Contact	Ewoud Monbaliu
	Stakeholders involved and role of each stakeholder	Leuven 2030: supporting/facilitating the consortium Social organizations: providing expertise and capacity
	Commitments	Leuven 2030 has a pioneering role in developing practice regarding an intrinsically social just climate transition. Therefore, Leuven 2030 commits to structurally include objectives on social justice.
	Enabling impact	A thorough climate transition also undoubtedly has major social implications, with the risk of fostering social inequality. To avoid climate

		transition leading to polarization of society, this commitment is necessary. In addition, this social intervention will also be important to include everyone in the climate transition. We are not leaving anyone behind. Knowing that 15% of Leuven residents live in a socially vulnerable position, this is a relevant and necessary action.
	Indirect impacts	Level of impact (1 = no impact, 5 = very high impact)
	Health and environment (air quality, noise pollution, livability, physical and mental well-being,...)	1 ☐ 2 R 3 ☐ 4 ☐ 5 ☐
	Social inclusion, democracy and cultural impact	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 R
	Economic development and jobs	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Efficient use of raw materials	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Biodiversity	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐
	Climate adaptation	1 R 2 ☐ 3 ☐ 4 ☐ 5 ☐

Module C-3 Financing of Action Portfolio

C-3.1: Summary of Interventions with Cost Implication (To Be Unpacked in Investment Plan)					
Action/Intervention Name	Responsible Entity and Person	Start/End Date	Field of Action	Impact	Total Cost Estimated
Solar Energy for Every Leuven Resident	City of Leuven		Energy Systems	/	/
Large-Scale Deployment of Solar Panels on Large Buildings	City of Leuven		Energy Systems	/	/
Zonnebouwers+	ECoOB		Energy Systems	/	232.000 EUR
Pilot 1: Renovation Historic City Hall - Green Heat Heritage Cluster	City of Leuven		Energy Systems	1.150 t CO_2-eq/y	15-20 mio EUR
Pilot 2: Residual Heat Celestijnenlaan	City of Leuven		Energy Systems	/	/
Pilot 3: Redingensite	City of Leuven		Energy Systems	2.200 t CO_2-eq/y	10.550.000 EUR
Pilot 4: Vaart-Marie-Thumas	City of Leuven		Energy Systems	/	/
Pilot 5: Wakkerzeelsebaan Wijgmaal	City of Leuven		Energy Systems	/	/
Net-Zero Brewing Leuven	AB InBev		Energy Systems	/	/
Process Emissions	imec		Energy Systems	7.000-9.000 t CO_2-eq/y	/
Recuperation Residual Heat	Beneo-Remy		Energy Systems	1.000 t CO_2-eq/y	850.000 EUR
CO_2-Neutral Steam Production	Beneo-Remy		Energy Systems	9.100 t CO_2-eq/y	/
Leuven Energy Company	City of Leuven		Energy Systems	/	/
Case: Cold and Heat Exchange Study	KU Leuven, imec		Energy Systems	A few 100 t CO_2-eq/y	/
Climate House	City of Leuven		Built Environment	/	15 VTE
Collective Renovation – Case: Suburb Ter Elst	City of Leuven		Built Environment	830 t CO_2-eq/y	18.500.000 EUR
Renovation of Apartment Buildings	City of Leuven		Built Environment	64 t CO_2-eq/y (example case)	3.230.000 EUR (example case)
Collective Renovation Program Large Building Owners	Leuven 2030		Built Environment	/	/
Renovation of City Patrimony - Clusters	City of Leuven		Built Environment	/	129.874.000 EUR
Renovation Of Hal 9	City of Leuven		Built Environment	/	10.600.000 EUR

Centre for Performing Arts	City of Leuven		Built Environment	/	85.000.000 EUR
Property-Linked Financing	Consortium 'Social Justice'		Built Environment	/	/
Alternative Funding for School Buildings	City of Leuven		Built Environment	/	/
Development of a Regional Bicycle Network	City of Leuven		Mobility & Transport	Contributes to 4.100 t CO_2-eq/y	10-50 mio EUR
Small-Scale Public Space Project Program	City of Leuven		Mobility & Transport	Contributes to 1.100 t CO_2-eq/y	1-10 mio EUR
Sustainable Commuting Network	City of Leuven		Mobility & Transport	/	<100k EUR
Shared Mobility for Every Leuven Resident	City of Leuven		Mobility & Transport	/	1.850.000 EUR
The Ring Road as a Multimodal Hub	City of Leuven		Mobility & Transport	/	>50 mio EUR
Expansion of a High-Quality Public Transportation Network	City of Leuven		Mobility & Transport	Contributes to 4,400 t CO_2-eq/y	>200 mio EUR
Sustainable Parking Policy of the City of Leuven	City of Leuven		Mobility & Transport	Contributes to 900 t CO_2-eq/y	1 mio EUR
Sustainable Parking Policy at KU Leuven	KU Leuven		Mobility & Transport	/	5,1 mio EUR/j
Upscaling of Charging Infrastructure	City of Leuven		Mobility & Transport	Contributes to 19,500 t CO_2-eq/y	10-50 mio EUR
Mobility for All	City of Leuven		Mobility & Transport	/	1 mio EUR
Sustainable Urban Logistics	City of Leuven		Mobility & Transport	Contributes to 5,300 t CO_2-eq/y	10 mio EUR
Electrification of Waste Transport	EcoWerf		Mobility & Transport	Contributes to 1,200 t CO_2-eq/y	Ca. 1,5 mio EUR/vehicle
Hydrogen Panels	EcoWerf		Mobility & Transport	Contributes to 1,200 t CO_2-eq/y	5-7 mio EUR
CO_2-Neutral Cargo Ship	Beneo		Mobility & Transport	200 t CO_2-eq/y/ship	/
Climate Adaptation Taskforce	City of Leuven		Green Infrastructure & Nature-Based Solutions	/	/
Digital Twin Climate Adaptation	City of Leuven		Green Infrastructure & Nature-Based Solutions	/	/
Climate Adaptation Toolkit	City of Leuven		Green Infrastructure & Nature-Based Solutions	/	/

Molenbeek Valley	City of Leuven		Green Infrastructure & Nature-Based Solutions	/	/
Trees for Leuven	City of Leuven		Green Infrastructure & Nature-Based Solutions	/	/
Case: Water Battery	National Park Brabantse Wouden, City of Leuven		Green Infrastructure & Nature-Based Solutions	/	> 1 mio EUR
Case: Nature-Inclusive Carbon Farming on a City-Regional Scale	Province of Flemish Brabant		Green Infrastructure & Nature-Based Solutions	166 t CO_2-eq/y (example case)	510.000 EUR (example case)
Case: Carbon Farming	Arvesta		Green Infrastructure & Nature-Based Solutions	/	/
Materials Bank – Materials	City of Leuven, Materials Bank Leuven		Waste & Circularity	/	3,9 mio EUR
Wienerberger – Materials	Wienerberger		Waste & Circularity	/	/
Plastics Hub – Materials	UZ Leuven		Waste & Circularity	/	4 mio EUR
Materials Bank – URC	City of Leuven, Materials Bank Leuven		Waste & Circularity	/	/
EcoWerf – URC	EcoWerf		Waste & Circularity	/	3,3 mio EUR
Circular Economy & Waste in Building Stock of UZ Leuven	UZ Leuven		Waste & Circularity	/	/
Circular Economy & Waste in Building Stock of KU Leuven	KU Leuven		Waste & Circularity	/	/
Circular Economy & Waste in Building Stock of Imec	imec		Waste & Circularity	/	/
Place-Based Project Ruelenspark	City of Leuven		Place-Based Projects	Ca. 700 t CO_2-eq/y	ES: 4,1 mio EUR NBS: 1,1 mio EUR
Place-Based Project Haasrode	City of Leuven		Place-Based Projects	6.300 t CO_2-eq/y	Ca. 39,4 mio EUR
Place-Based Project Arenberg	City of Leuven		Place-Based Projects	900 t CO_2-eq/y (ES, Research Park Arenberg only)	Ca. 3,9 mio EUR (ES, Research Park Arenberg only)
Place-Based Project Climate-Robust City Centre	City of Leuven		Place-Based Projects	/	/
Place-Based Project Vaart-Dijle	City of Leuven		Place-Based Projects	/	/

Place-Based Project Kessel-Lo	City of Leuven		Place-Based Projects	/	/
Place-Based Project Wijgmaal	City of Leuven		Place-Based Projects	/	/

6 Outlook and Next Steps

Moving forward, attention will shift to implementation of the Climate City Contract. Several areas of activity have been identified to support this process:

1. ***Portfolio Management and Execution***: As a critical first step we will establish a process for moving our portfolio of actions into implementation. Such a process will be designed to enable a wide range of activities (convening stakeholders, creating synergies, surfacing learnings, sustaining engagement) and provide value to a diverse set of actions (early-stage/mature, city-led/ecosystem-led, place-based/non-place-based). It will support the creation of a pipeline of new actions and enable the continuous development of the portfolio;

2. ***Catalyzing Investment***: To support implementation of the portfolio we will seek to use the Investment Plan as a means of deepening engagement with the financial sector and unlocking investment. This could involve the creation of new financial infrastructure such as a steward-owned fund, although further discussion is needed to determine the right approach. Other steps include expanding capacity and capabilities around climate finance, continuing to develop business cases, and engaging with other cities to share best practices and explore possibilities for collaboration;

3. ***Governance and Capacity Building***: Alongside the creation of a portfolio process and an investment approach we will further solidify and develop the governance structure set up around the Mission. This could involve the creation of a hybrid team pooling city and ecosystem capacity and in any case will need to entail expanding capacity and resources to adequately carry the components of the CCC forward;

4. ***Monitoring Commitments***: We will establish an approach to foster greater transparency and accountability and track commitments formalized in the Climate City Contract. Several components could form part of such an approach, including a public inventory of commitments, a reporting mechanism, and a forum for peer-to-peer account-giving. These could be accompanied by the creation of supportive social and digital infrastructure and a team entrusted with overseeing the monitoring process;

5. ***Outreach to Citizens***: We will launch a public campaign to raise further awareness of the Climate City Contract and connect to a wider range of citizens. This broad engagement will complement citizen engagement at the level of individual actions included in the portfolio.

An activity that cuts across all of these areas is building and sustaining support for the Mission, an effort that will continue into the coming months and years. Two upcoming milestones in this regard are a session convening key signatories to revisit the set of guiding principles included in the Commitments section of the CCC (October) and an event to celebrate and present the CCC to stakeholders (November).

Future iterations of the CCC will develop organically as work in the areas set out above gets underway. The portfolio will evolve as new insights and pathways are surfaced in implementation and new signatories come into the fold. Commitment will evolve too, and hopefully deepen in response to the monitoring process. Progress along all three dimensions of the CCC will be documented, enabling us to submit an updated version every two years.

7 Annexes

Annex I: Scoping Note

Annex II: Pathways to Climate Neutrality

Annex III: Portfolio Individual Action Outlines

Annex IV: Portfolio Slide Deck

Annex V: Portfolio Spreadsheet

NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

Climate City Contract

2030 Climate Neutrality Commitments

leuven

LEUVEN 2030

NetZeroCities has received funding from the H2020 Research and Innovation Programme under the grant agreement n°101036519.

Table of Contents

1 Introduction

This document presents and contextualizes the commitments collected for the Climate City Contract (CCC). As described in a section below, commitment was sought at two levels: the level of a set of guiding principles formulated for the CCC and the level of individual actions included in the Action Plan. Both sets of commitments are appended. Like the other components of the CCC, the commitments are part of a process of iterative development, and are expected to be refined and supplemented with new commitments as the CCC moves into implementation.

2 Goal: Climate Neutrality By 2030

The city has formally committed to pursuing climate neutrality by 2030. This is affirmed in a decision adopted by the city board in the context of participation in the Pilot Cities Programme. The decision is included in Annex I. The city had previously committed to reducing emissions by 55 per cent by 2030. The Mission raises that target to at least 80 per cent, and the Action Plan marks a first step in attempting to close the resulting gap.

As noted in the introduction to the Action Plan, the goal set by the Mission is exceedingly ambitious and may not be achieved in full. Nevertheless, the hope and the aspiration is to use the Mission as a **catalyst** for accelerated action and to deliver steep and durable emissions reductions that set the stage for full climate neutrality. In addition to mitigation, the effort to adapt to climate change forms an integral part of our Climate City Contract.

Included in the goal of reaching climate neutrality are all **Scope 1 and Scope 2 emissions**, with the exception of:

- Emissions from transport on highways passing through Leuven (E40/E314);
- Emissions falling under the EU's Emissions Trading Scheme (ETS);
- Non-energy-related emissions from Industrial Processes and Product Use (IPPU).

These exclusions are discussed in greater detail in Part A of the Action Plan.

Scope 3 emissions are partially included, in the form of emissions from the treatment of waste, totaling approx. 48.000 tons, and emissions associated with materials use in the built environment. These latter emissions, while targeted in the Action Plan, are not included in the emissions inventory as they cannot yet be accurately quantified, but they are estimated to be roughly equal in size to Scope 1 and Scope 2 emissions combined. Future iterations of the Climate City Contract are expected to more fully map and address Scope 3 emissions.

Beyond the direct impacts of mitigation and adaptation, the decision to take part in the Mission was motivated by delivering the broad set of indirect impacts or **co-benefits** that accompany climate action. These include improved physical and mental well-being, improved air quality, increased road safety, increased biodiversity, job creation, energy independence, and an increased sense of belonging. They are identified at length in the impact pathways presented in Module B-1 of the Action Plan.

3 Key Priorities and Strategic Interventions

When it comes to climate change, there are no silver bullets. Rapid decarbonization calls instead for a broad sweep of measures, designed to do everything, everywhere, all at once. Nevertheless, out of the many interventions needed, some are more impactful than others. Presented below is a set of five key interventions, arranged in no particular order and selected with regard for both direct and indirect impacts. They informed the composition of the portfolio as well as the process of obtaining commitments.

1) Collective Green Heat

Of the five emissions domains, the largest potential for emissions reduction (Scope 1 and 2) resides in Energy Systems and Built Environment. Within Energy Systems, the most impactful action is **the deployment of collective green heat**, which carries a reduction potential of approx. 48.000 tons. Delivering on this potential is a top priority, and one that is reflected in numerous actions included in the portfolio, including the set of pilots developed around the topic (Redingensite, Vaart, etc.) and the action investigating the possibility of establishing a Leuven Energy Company. The deployment of collective green heat also sits at the heart of Leuven's activities in the Pilot Cities Programme.

2) Renovation of Non-Residential Buildings

Within Built Environment, the action with the greatest potential emissions impact is **the renovation of non-residential buildings** (approx. -45.000). While the potential impact of renovating residential buildings is roughly similar, there is a higher degree of concentrated ownership in the non-residential sector, creating a more favorable context for action at scale. If renovation is paired with action to shift to green heat, which in practice it is likely to, the impact of this intervention rises to approx. 60.000 tons of reduced emissions. Two main actions in the portfolio address the renovation of non-residential buildings: the collective renovation program for large building owners and the renovation of city-owned buildings.

3) Adaptation

Alongside mitigation, a key priority is adapting to climate change. One strategic intervention is **the replacement of impermeable surfaces with natural infrastructure**. This enables greater infiltration, replenishing water supplies and softening the impact of flooding, and mitigates the heat-island effect – two pillars of urban resilience. Adaptation also yields many indirect impacts, and it is where climate action becomes most tangible, creating buy-in for the transition as a whole. The portfolio actions addressing adaptation include actions to develop new policy and strategy, establish a taskforce, deploy a toolkit to support citizen and stakeholder engagement, and expand and preserve the Leuven tree stock.

4) Place-Based Integration

One key for accelerating the transition lies in **integrating and cleverly combining actions**. While integration is a principle that we have sought to stitch into the whole of the portfolio, it is most fully and most radically expressed in the portfolio's seven place-based actions. These seek to draw out the connections and potential synergies between actions spanning multiple emissions domains and surface pathways to joined-up implementation. By diving headlong into the complexity of rapid decarbonization, they hope to uncover novel approaches and move whole areas towards climate neutrality and urban resilience.

5) Just Transition

A successful transition is one in which **social justice** and decarbonization go hand in hand. This implies that the costs and benefits of the transition are equitably distributed and that processes are designed to be inclusive and responsive to a wide range of voices. As described in the Action Plan, there are several elements in place contributing to a just transition in Leuven, yet opportunities remain to go further. The Climate City Contract seeks to capture some of those opportunities both by incorporating social justice in the portfolio and by enshrining it in the set of guiding principles that form part of Leuven's Commitments section.

An overview of just-transition actions included in the portfolio is presented in Module A-3.3.

4 Principles and Process

The Commitments pillar of our Climate City Contract took shape along **two complementary tracks**. On the one hand, we sought commitment at the level of the individual actions included in the portfolio. On the other hand, we called on stakeholders to commit to a set of 10 guiding principles. The content of both types of commitments developed iteratively, in consultation with stakeholders. The guiding principles were developed in tandem with the city board and with Leuven 2030's Board of Directors, which represents six stakeholder groups, while portfolio commitments were shaped in bilateral discussion with stakeholders.

Formalizing commitment marks an important step in our climate-neutrality journey. We believe it has the potential to catalyze collective, aligned action and create greater **transparency and accountability**. By making a formal commitment and agreeing to share progress publicly, signatories to the Climate City Contract voluntarily invite scrutiny and demonstrate that they intend to follow through on their commitment. This builds trust and could inspire others to follow suit, creating a positive feedback cycle that gradually ratchets up ambition. The effectiveness of such a contracting system depends on a number of factors:

- The specificity of commitments: Are commitments concrete? Time-bound? The more specific a commitment, the greater the chances at holding its owner to account;
- The level of transparency: Are commitments and progress reports easily accessible, and written in language that is easy to understand?;
- The level of scrutiny: Are there effective monitoring systems in place? Is there a mechanism for reporting? A forum for peer-to-peer account-sharing (mutual accountability)?

Following submission of the Climate City Contract, the Leuven team will establish a monitoring approach to track commitments and support and enable stakeholders to hold themselves and each other to account. The type of accountability we seek to establish is one oriented towards **learning**. This creates an opportunity to align to the structured learning process that is being put in place as part of Leuven's activities in the Pilot Cities Programme.

While the precise design of the system is not yet decided, there is clarity around the components it could include: a public inventory of commitments, a reporting mechanism, a process for peer-to-peer account-giving (which could consist of signatories giving a prepared statement, then participating in a question-and-answer session with other signatories), and expert review (for assessing technical aspects of commitments). New forms of digital infrastructure (e.g., a platform for progress-sharing) and social infrastructure (e.g., a venue for the informal gathering of signatories) could be created to support this process.

Appendix: Guiding Principles

SIGNATORIES

1. CITY OF LEUVEN
2. LEUVEN 2030
3. AB INBEV
4. AG STADSONTWIKKELING LEUVEN
5. ARVESTA
6. BENEO REMY
7. BUURTWERK ‘T LAMPEKE
8. DE LIJN
9. DIJLEDAL
10. ECOOB
11. ECOWERF
12. FLUVIUS
13. IMEC
14. KU LEUVEN
15. KBC
16. MATERIALISE
17. MOBIEL 21
18. PROVINCE OF FLEMISH BRABANT
19. SAAMO
20. SWECO BELGIUM
21. UCLL
22. UZ LEUVEN
23. VRIENDEN VAN HEVERLEEBOS EN MEERDAALWOUD
24. WIENERBERGER
25. ZORG LEUVEN


leuven


LEUVEN
2030
MINDER UITSTOOT, MEER TOEKOMST


imec


KU LEUVEN


beneo
connecting nutrition and health


ecoWERF


UZ
LEUVEN


DE LIJN


VLAAMS-
BRABANT


arvesta
Experts in the field


KBC


Wienerberger


SAAMO


UCLL
HOGESCHOOL


Lampeke


ABInBev


Dijledal
GOED WONEN


materialise


VHM


Zorg
Leuven
MAAKT MEER MOGELIJK


fluvius.


MOBIEL21
ZET MENSEN IN BEWEGING


SWECO


ECOOB
Energiecoöperatie Oost-Brabant


ag stadsontwikkeling
leuven

Signatories to the Climate City Contract (October 9, 2023). Photo by Björn Snelders.

LEUVEN CLIMATE CITY CONTRACT

EU MISSION ON 100 CLIMATE NEUTRAL & SMART CITIES - TOWARDS GUIDING PRINCIPLES

CCC CHARTER

1. CONTEXT

In light of the first Leuven climate contract (Climate City Contract), a representative innovation portfolio of breakthrough projects is being developed, each including the commitments of the actors involved. Complementary to these project-related commitments, a charter is being drawn up with guiding principles that in the short term will generally and sufficiently formally find their way into the internal processes of the organizations that explicitly opt for an accelerated Leuven climate transition.

2. APPROACH

The set of guiding principles is conceived to touch on every crucial aspect within an urban climate transition, from "thematic" to "cross-cutting" approaches.

The charter of guiding principles is not an options menu. With it, the signatory organsations commit to a dedicated mindset and the will to achieve global, coherent policies. Pursuing a positive social impact is crucial and a priority within each organisation.

3. TO 10 GUIDING PRINCIPLES

GOVERNANCE

The accelerated transition will be together, or won't be.

- Achieving equitable and sustainable prosperity for current and future generations requires a broad-based acceleration of the transition.
- In light of the urban climate transition, it is not enough to only implement fossil-free and resource-saving policies within one's own **'circle of control'**. The acceleration of the transition will also be realised in everyone's '**circle of influence'**.
- For each climate action we implement, we take into account the possible impact on (the climate actions of) other actors and look for synergies. Conversely, we adopt a constructive attitude to contribute to the realisation of climate projects of other actors, in which we are a stakeholder and/or can act as a facilitator.
- We realise meaningful systemic impact by collaborating and aligning, across legal entities, silos, ownership boundaries and existing processes.
- The European and internationally agreed climate commitments and the findings of climate scientists (IPCC) on the urgency of the challenge are our compass.

MINDSET

The climate transition requires clear prioritisation and a focus on the most impactful actions.

- An accelerated transition, together with the pioneering role that Leuven wants to continue to assume, requires a focus on those **projects and processes** that - sometimes through upscaling - can realise the **greatest impact** and thus contribute in the first place, directly or indirectly, to an accelerated emission reduction.
- We approach the accelerated transition challenge with an open mind to explore new territory, to test and embrace **new logics**, to help develop new levers, to **innovate** and **accelerate**, to **lead** beyond existing frames of thought, system boundaries and comfort zones.
- We actively propagate this **crucial mindset**, with a focus on meaningful impact on the ground, both to our own constituency, and to the outside world.
- We are committed to a strong and ambitious **in-house sustainability strategy**, making explicit the targeted emissions reductions and the intended positive social impact.

SOCIAL JUSTICE

The climate transition will be social and equitable or wont't be.

- **Social justice** is an obvious principle in the transition sought. Some 15% of Leuven residents live below the poverty line. Therefore, we apply the guiding principle of the 15% intention in relevant breakthrough projects. Their results (access to (residual) heating, access to shared mobility...) reach an audience of which some 15% live below the poverty line.
- An accelerated transition requires **not only an approach based on personal responsibility**, but a '1+1=3 approach'; i.e. together, where stronger shoulders take in tow parties and residents - who otherwise have less opportunity to do so themselves, and where those with a larger footprint also take greater responsibility.

FUNDING

Everyone's financial policy is a crucial lever in accelerating climate transition.

- The necessary steps are being taken to embed **climate budgeting** into its own policy making.
- **Ways will be examined to maximize** the **sustainability of its own financing**, e.g. by choosing financial products with a sufficiently mature sustainability focus and by examining the extent to which it is possible to contribute to the financing of the climate transition according to one's ability.
- Finally, it explores ways in which **portfolio-level funding**, through a yet-to-be-determined vehicle, can be a **funding logic** that can be supported and subscribed to by the partners involved.

MONITORING

To measure is to know.

- There is an explicit willingness to be **transparent** about the commitments taken and to report on the realisations - where possible according to calibrated climate standards - that contribute to the acceleration of the Leuven transition. A shared platform thus takes stock of the commitments made and the corresponding progress in realisations.
- In addition, its own **internal and public channels** are also used to communicate about its own commitments and the progress of realisations, in accordance with the guidance of the partnered communication strategy.

DECARBONIZATION BUILT ENVIRONMENT

Every building (and) related project is a key to transition.

- For any type of large-scale construction (new construction and renovation), a **fossil-free energy supply** with maximum local production of renewable energy and minimum energy consumption, is targeted for the building in question.
- For large-scale construction projects, the potential for **decarbonisation of the entire project site** (if applicable) as well as **for the wider environment** surrounding the project site is investigated and mapped. We pay attention to the existing spatial qualities of the property and its affordability (ref. social justice).
- The choice of building **design** (focusing as much as possible on adaptability and reuse) and of **materials used** (use of secondary materials and materials with the lowest possible climate impact) also provides reduction potential along the entire value chain and at the local level for a significant reduction in emissions.

MATERIAL IMPACT

Reducing resource use across the chain and commitment to circular construction are important levers for accelerating climate transition.

- The **impact of building materials** is in the same magnitude as scope 1 and 2 emissions. This is taken into account in the policy.
- For any type of large-scale construction (new construction and/or renovation), the (financial, organizational) feasibility of **substantially reducing the total impact of the materials used** is investigated, and based on that knowledge (incl. reuse and LCA), choices are made that take maximum account of this.

LOCAL PRODUCTION RE

Committing to maximum local production of renewable energy has a positive impact on many aspects of our climate challenge.

Producing renewable energy locally has a positive impact on emission rates, our energy independence and security, and energy price stability. In addition, local energy production provides sustainable job creation and strategic community-building. Opting for as much local renewable energy as possible fits into a broader vision around an active sustainable heating policy and an organised strategy to move away from fossil fuels in the next few years.

- For any type of large-scale construction (new construction and renovation), **maximum deployment of PV** on the available (rooftop) area (or any technology that boosts local renewable energy production) is opted for.
- For any type of large-scale construction (new construction and renovation), the (financial, organizational) **feasibility** of **maximum heat production** (including the possibility of a party other than the project owner investing in it) is investigated.

MOBILITY

Efficient and sustainable urban mobility creates a positive social impact, including *transport justice*.

- We recognise the importance of integrated planning and mobility policy.
- Infrastructure managers, operators, attractors and users are shaping the **transition to efficient and sustainable mobility for the purpose of** emission reduction, better health, a safer and higher quality living environment and assured multimodal accessibility.
- Impactful efforts are made using a three-pronged approach: reduce (e.g. shorter unsustainable trips), shift (to sustainable modes) and change (zero-emission vehicles), including for **urban logistics**,-while paying attention to social justice.
- The **STOP principle** is actively facilitated and promoted: initial focus on pedestrians (Stappers in Dutch) and cyclists (Trappers in Dutch), then on public and shared transport (Openbaar vervoer in Dutch), then on private road transport (P), with an eye on physically, economically, socially and digitally inclusive mobility.

ADAPTATION & BIODIVERSITY

Climate change will also make itself increasingly felt in the Leuven region. Anticipating this is forward-looking policy.

- An ambitious strategy around adaptation complements ambitions around mitigation. We **systematically depave** where we can, taking into account the growth of the city. Where we own substantial paved surfaces, a strategy will be drawn up in the short term to reduce paving on the whole of those sites in **coordination** with other policy objectives. This will seek - across the whole of the sites - to **maximise depaving/de-surfacing**, **sustainable water management**, and explicitly contribute to restored, richer and **more robust biodiversity**.
- We strengthen the **green and blue infrastructure** that makes our city more resilient and climate resilient.
- In addition, systems are being developed to encourage individuals to break up existing pavement. Net de-surfacing is sought in the reconstruction of **public spaces**.

Appendix: Letter of Support from the Federal Government

KINGDOM OF BELGIUM

Minister of Development Cooperation and of Major Cities
Minister of Climate, the Environment, Sustainable Development and Green Deal

Brussels, 6th of October 2023

"EU Mission on Climate Neutral and Smart Cities"

Commitment of the Federal Government in supporting the 4 selected Belgian EU Mission Cities

The EU Mission "100 Climate-Neutral and Smart Cities by 2030" aims to support the just transition towards climate neutral and smart European cities in 2030. As such, European cities can substantially contribute to the Green Deal target of reducing emissions by at least 55% by 2030 and, in more practical terms, to offer cleaner air, safer transport and less congestion and noise to their citizens.

As part of the 112 European cities selected for this EU Mission, the City of Antwerp, the City of La Louvière, the City of Leuven and the Brussels Capital Region are taking bold steps to accelerate their efforts and, as trailblazers, contribute to Belgium's path towards a climate neutral and sustainable future.

The Climate City Contract they deliver within the framework of the EU Mission consists of an Action Plan, Commitments and an Investment Plan. The presented pathways for an accelerated climate transition within each of these cities will, amongst others, address identified barriers and define breakthrough projects to leverage actual and future impact. Policy coherence across different authorities and innovative finance are important levers to facilitate the successful implementation of the action plans that will be shared with the European Commission.

.be

As Belgian Federal ministers in charge of Development Cooperation and of Major Cities, and of Climate, the Environment, Sustainable Development and Green Deal respectively, we recognise that the efforts at city level will contribute to the realisation of the climate ambition at national level. We confirm our intention to contribute to a policy, governance and financial context in which these Belgian EU Mission cities can create maximum impact, including beyond their own territory and communities.

Under the Belgian presidency of the Council of the European Union in the first half of 2024, we intend to organise a high level event in the context of the EU Mission on Climate Neutral and Smart Cities. In doing so, we aim to contribute to the exchange of knowledge and expertise between Belgian and European cities, including through the support for innovation and research networks and identifying potential incoherence in policies. With respect, gratitude and pride for the courage of our EU Mission Cities to radically formulate answers to this complex societal challenge called climate transition, and to enhance this challenge as the number one opportunity for a healthy and prosperous future for all.

Caroline GENNEZ
Minister of Development Cooperation and of Major Cities

Zakia KHATTABI
Minister of Climate, the Environment, Sustainable Development and Green Deal

Appendix: Commitment Agreements

SIGNATORIES

1. CITY OF LEUVEN
2. LEUVEN 2030
3. KU LEUVEN
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7. AB INBEV
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11. PROVINCE OF FLEMISH BRABANT
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13. ZORG LEUVEN
14. FLUVIUS
15. DIJLEDAL
16. WIENERBERGER
17. ECOOB
18. MOBIEL 21
19. CAMBIO
20. BLUEBIKE
21. SCONE
22. POPPY

COMMITMENT AGREEMENT

CLIMATE CITY CONTRACT

leuven

Field of Action	☐ General ☒ Energy Systems ☒ Built Environment ☒ Mobility & Transport ☒ Green Infrastructure & Nature-Based Solutions ☒ Circular Economy & Waste	
Field	Action	Commitment
ES	Solar energy for every Leuven resident	City of Leuven continues to prioritise the promotion of PV, on roofs of single-family houses, apartment buildings and buildings in the tertiary sector and industry.
ES	Large-scale deployment of solar panels on large buildings	City of Leuven further facilitates and accelerates PV rollout (e.g. research largest roofs).
ES	Leuven Urban Region Wind Strategy (no project)	City of Leuven commits to implement the framework when the legal context changes.

ES	Collective green heat projects (Pilots)	City of Leuven instigates potential projects and takes on the necessary role to ensure that they are implemented (facilitating, (pre)financing,...).
ES	Pilot: fossil-free neighbourhood (no project)	City of Leuven develops a connection plan for neighbourhoods (implementing the energy strategy). One or more pilot neighbourhoods will be chosen for a switch to fossil-free living. City of Leuven develops an action plan.
ES	Leuven Energy Company	City of Leuven opts for an orchestration role in green heat policy. The city considers the public domain to be a common good and will strive for a socially just energy transition. City of Leuven starts a multi-stakeholder process and uses the resources of the Pilot Cities Programme.
ES	Motivating inspirational framework urban development projects	City of Leuven translates the "guiding principles" into an inspirational framework in which the ambitious goals within the different fields and topics (circular, adaptation, energy, green, water,...) are formulated in a challenging, innovative way.
ES	Green heat in urban planning tools	City of Leuven uses urban planning tools to achieve climate ambitions, among other city objectives (using the sustainability framework as a guide).
BE	Climate House	City of Leuven provides the necessary resources to expand the existing program, tailored to all residents.

BE	Collective renovation – Case: Suburb Ter Elst	City of Leuven uses the LEKP 2.1 funds to develop a programme for collective renovation. Whereas the focus of the Climate House is now mainly on individual guidance, the city will also develop a group programme. City of Leuven creates the framework, necessary to initiate collective renovation projects, including a clear view on the most plausible scenarios for climate-neutral neighbourhoods.
BE	Renovation of apartment buildings	City of Leuven expands the program of the Climate House with a trajectory for VMEs (association for co-owners). The city builds on the market research conducted by Transition Stories and puts the recommendations into practice, within a few pilot projects (e.g. 3 VMEs - association for co-owners).
BE	Collective renovation program large building owners	City of Leuven commits to participate in the renovation programme for the city's building stock.
BE	Alternative funding for school buildings	City of Leuven, through School 2030, commits to bridge the gap between the network of schools in the city's portfolio and the goals of the collective renovation and heat program.
BE	Renovation of city building stock (urban heritage) – Clusters	City of Leuven further updates 'Photo' of city's building stock: City of Leuven updates and checks the building catalogue and analyses if its still in line with current regulations and ambitions. This will provide the city with a general picture of the state of the building stock and of what is needed to accelerate sustainability. It can also be used as a tool to make conscious choices regarding climate ambitions. City of Leuven opts for a framework to make considerate sustainability choices in

		(re)construction projects (including communication). City of Leuven sets ambitious goals regarding sustainable choices for its own building stock. It examines which actions, projects and interventions in municipal buildings can support the goal of the mission in order to make well-considered choices. For each project, it will consider which solutions to choose (according to the clusters: new construction, total renovation, sustainable interventions, replacement/merger, disposal/private cooperation) and how to find a good synergy between the various ambitions. The City of Leuven will communicate about this in a clear, visually strong and unambiguous way. City of Leuven applies innovation to city's building stock. The City of Leuven is committed to raise the level of ambition for certain urban projects and "experiment" with innovative techniques and/or design ideas, thinking beyond the project or the moment. If or where necessary, the city will set up a collaborative network with educational institutions, innovative companies and research/design agencies. City of Leuven continues to integrate circular design and construction in city projects. City of Leuven is already strongly committed to circularity and will continue on this path. Circularity will be integrated in the workflow and in all specifications. The city will also expand its knowledge with circular building principles (reuse of materials, change-oriented design, modular construction, sharing spaces, etc.) and make conscious decisions on how to integrate them in the building-stock projects.
MOB	Development of a regional bicycle network	City of Leuven commits to working with neighbouring municipalities to achieve a more coordinated approach to accelerate the development of the infrastructure for a regional bicycle network. City of Leuven also provides the necessary investment funds.

MOB	Small-scale public space project program	City of Leuven starts a program (ambition, budget, staff, framework, app, participation, prioritization, etc.) for the accelerated development of small-scale interventions.
MOB	Shared mobility for every Leuven resident	City of Leuven provides incentives to encourage car sharing, with a specific focus on transport poverty. City of Leuven proactively recruits and supports extra providers of shared mobility during an 18-month trial period. City of Leuven commits to increase the promotion of shared mobility (communication and nudging) and provides the necessary incentives. City of Leuven develops a permit policy and quality framework for shared mobility (2024 or 2025). City of Leuven further develops the Hoppin points (scaling up and qualitative assessment).
MOB	The ring road as multimodal back bone	City of Leuven, together with AWV, launches an integrated spatial study for the R23.
MOB	Expansion of a high-quality public transportation network	City of Leuven, together with AWV, works towards a validated design for the corridor 'Diestsesteenweg' and 'Kop van Kessel-Lo' (focus on a quality bicycle network, public transportation and a second access to the train station).
MOB	Sustainable parking policy of the City of Leuven	City of Leuven renews the mobility plan (SUMP), including the parking policy vision for on-street and off-street parking. City of Leuven actively instigates pilot projects on co-using private parking and starts up neighbourhood parking for both bicycles and cars in neighbourhoods with high parking pressure and/or where on-street parking will be decreased. City of Leuven develops a parking platform, including the legal and quality framework for using this platform.

MOB	Sustainable Parking Policy at KU Leuven	City of Leuven commits to further collaboration with KU Leuven on mobility. City of Leuven unburdens the KU Leuven in the exploitation and facilitation of a parking platform, including the legal and quality framework using this platform.
MOB	Upscaling of charging infrastructure	City of Leuven expands the charging infrastructure step-by-step, following the principle of the "ladder of charging". City of Leuven develops an action plan for the installation of fast charging hubs. City of Leuven lists strategic and interesting locations, in addition to the charging locations already provided for the Hoppin points, at other mobility hubs and attraction poles, and (semi-)public locations such as department stores, parking garages, parking lots of large companies and universities, sports sites, commute parking, etc. City of Leuven collaborates with companies and supermarkets to make parking lots accessible and equip them with (semi-)public charging points.
MOB	Mobility for all	City of Leuven uses the resources for mobility in a more targeted way to reach people who cannot/will not/may not travel by car (a targeted mobility budget for vulnerable groups). City of Leuven makes "mobility for all" a city-wide theme.
MOB	Sustainable urban logistics	City of Leuven provides expertise on urban logistics and analyses the current logistic system in the city. City of Leuven realizes a phased implementation of a sustainable and consolidated logistic system for the concerned departments (Public Domain, Buildings Department, Green Department, Signalisation, Cleansing Department, and others). This mainly concerns: centralizing the departments, working towards sustainable/shared use of the city fleet, optimizing routes/stockage management, a modal shift to LEVs (Light Electrical Vehicles), ...

		City of Leuven integrates sustainable criteria 'green logistics' in tenders and permits (construction logistics, service logistics, ...). City of Leuven, together with major logistics stakeholders, facilitates local shopping by instigating and supporting customer-friendly solutions for e-commerce and sustainable delivery. City of Leuven explores how, in a later phase, cooperation with KU Leuven will provide additional consolidation and sustainability for (service) logistics.
NBS	Climate Adaptation Policy	City of Leuven delivers a progressive climate adaptation strategy.
NBS	Climate Adaptation Taskforce	City of Leuven establishes "an implementation Climate Adaptation team" to ensure reduction of paved surfaces and greening of public domain. The City of Leuven, together with Leuven 2030, is building a learning network where, together with various partners, it is investigating the ways in which further efforts can be made to make their building-stock climate-adaptive.
NBS	Digital Twin Climate Adaptation	City of Leuven produces a functional Digital Twin for Nature Based Solutions. City of Leuven systematically monitors relevant indicators (such as heat, drought, water infiltration, CO2 capture,...) for the development, management and use of a Digital Twin for NBS. City of Leuven further develops the Digital Twin (in 3D) so it can also be used for other domains, including energy.
NBS	Climate Adaptation Toolkit	City of Leuven develops a roadmap to systematically incorporate NBS on private property when reconstructing public domain. City of Leuven systematically uses the toolkit and roadmap for selected trajectories in the reconstruction of public domain.

		City of Leuven actively supports, motivates and encourages the removal of pavings in front yards.
NBS	Molenbeek Valley	City of Leuven, together with the province of Flemish Brabant, realizes a number of pilot projects within an integral action plan for the entire Molenbeek Valley. City of Leuven realizes NBS in the Molenbeek Valley. City of Leuven commits to strive for more greening and biodiversity in the inhabited area of the Molenbeek Valley.
NBS	Trees for Leuven	City of Leuven actively commits to planting new trees and protecting existing trees, ensuring an annual net increase in trees, in line with the planned growth (and urban development). City of Leuven provides an inventory of the tree stock and analyses the bottlenecks, eliminates bottlenecks where possible, and focuses on levers for planting additional trees. City of Leuven makes granting felling permits more strict.
CE&W	Circular infrastructure	City of Leuven supports the development of (minimum) one satellite materials bank in the city. The objective is to scale up the Materials Bank and develop an urban resource centre for collecting, storing and processing residual streams in the city.
CE&W	Circular development	City of Leuven, together with the circular partners, tries to further integrate and expand ‘ the Circular Desk for enterprises’. Opportunities, projects and potential partnerships between Leuven enterprises are actively instigated in order to implement circular principles on a large scale in the city.

CE&W	Circular implementation	City of Leuven, in collaboration with the Circular desk, implements circular projects in the city.
AREA	Place-based project Ruelenspark	City of Leuven commits to the following role: process management, development and implementation spatial policy, realization valley park, instigating collective heat projects.
AREA	Place-based project Haasrode	City of Leuven commits to process management of the project.
AREA	Place-based project Arenberg	City of Leuven develops a bicycle route through the Arenberg Park and the imec bicycle parking.
AREA	Place-based project Climate-Robust City Centre	City of Leuven pushes for additional and innovative greening of the public domain in the downtown area, striving to create liveable, green neighbourhoods. City of Leuven is committed to the following actions : - Small-scale projects to reduce paved surfaces; - Climate-robust redesigning of the public domain; - Large-scale realization of bicycle parking facilities; - Helping private parking lot owners in making the lots available for neighbourhood parking; - Expanding the opportunities for facade or vertical gardens; - Intensely promoting a green Leuven (for tourists or business tourism) ; - Instigating and supporting the reduction of paved playgrounds.
AREA	Place-based project Werkstad Vaart-Dijle	City of Leuven strives for climate-neutral and sustainable development in the area 'Werkstad Vaart-Dijle': the area between the Ring road and the highway E314, along the canal, the river Dijle and the railway: - Compact and multifunctional use (minimum space requirements, less relocating);

		- Emission-free buildings, circular principles - within the possibilities of the project (adaptable, reusable building materials, ...); - Mobility: minimize share in road traffic (max.40%); - Maximum utilization of local energy production (solar, wind, soil, biomass, etc.); - Maximum greening, minimum paving and strengthening biodiversity; - Integrated water management, with attention to soil quality.
GOV	Internal city climate policy	City of Leuven integrates climate objectives within the entire city policy. If choices have to be made, it is important to focus on and prioritize "win-win" projects, which add value to both climate objectives and other policy areas. City of Leuven focuses on generating impact and rolling out motivating and stimulating actions: An accelerated transition, together with the pioneering role of Leuven, requires the city to focus on those projects and processes that - sometimes only after upscaling them or within the policy framework – have the largest impact and thus contribute in the first place, directly or indirectly, to an accelerated emission reduction. City of Leuven provides the necessary capacity (grant management) to find financing for climate projects: Achieving the climate goals and realizing the portfolio of breakthrough projects requires targeted funding. The additional capacity will be used to search for grants, write project proposals with internal and external partners. City of Leuven commits to monitor climate goals: The CCC outlines a clear path towards climate neutrality, indicating how much reduction we plan to achieve in which year and with which measures. Targets, linked to concrete, calculated measures, clearly show how the city is going to achieve the proposed reduction. Monitoring is crucial for adjusting policy and making sure the planned measures are not falling short in reaching the climate objectives.

GOV	External city climate policy	City of Leuven supports Leuven 2030 as a key actor in climate policy. City of Leuven promotes and calls attention to climate objectives at every (partner) organization, intercommunal, network,... in which the city participates or is represented. City of Leuven and Leuven 2030 motivate partner organizations and businesses to achieve climate goals and allocate resources for this purpose.
GOV	Regional collaboration	City of Leuven commits to continue and increase the existing collaborations.
SOC	Youth Climate Council	City of Leuven connects young people with climate experts (at least twice a year). City of Leuven connects young people with politicians and facilitates a dialogue about the climate issue (at least twice a year). City of Leuven organizes actions or events to raise awareness about the climate issue with a broader audience (at least once a year).

Vanloo, Geertrui

General Director

Ridouani, Mohamed

Mayor

COMMITMENT AGREEMENT

CLIMATE CITY CONTRACT

Field of Action	☒ General ☐ Energy Systems ☐ Built Environment ☒ Mobility & Transport ☒ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment
GENERAL 'GOVERNANCE'	External city climate policy	Leuven 2030 and City of Leuven motivate partner organizations and businesses to achieve climate goals and allocate resources for this purpose.

GENERAL 'GOVERNANCE'	Neural network	Leuven 2030 commits to: - Further developing and facilitating the existing neural network of Leuven 2030; - Extending the existing neural network, e.g. within the construction industry.
GENERAL 'GOVERNANCE'	Climate Action Plans	Leuven 2030 aims to build – within the available capacity – an organization that, through monitoring of partners' climate action plans, accelerates the climate transition.
GENERAL 'GOVERNANCE'	Civic Contracting	Leuven 2030: - Develops and implements a process for monitoring commitments included in the Climate City Contract; - Develops one place-based and one actor-based Civic Contract as part of Leuven's pilot activities.

GENERAL 'GOVERNANCE'	MEL	Leuven 2030: - Monitors the transition in Leuven and reports on progress to its community of stakeholders; - Aligns monitoring systems to the indicators presented in the Action Plan; - Supports and enables stakeholders to take stock, reflect, and learn; - Creates a context for learning by convening stakeholders and establishing a process of accountability-for-learning; - Monitors the transition in Leuven and reports on progress to stakeholders.
GENERAL 'SOCIAL INNOVATION'	Action-oriented future scenarios	Leuven 2030 commits to sharing the outcomes of this project with its broad network.
GENERAL 'SOCIAL INNOVATION'	Youth Climate Council	Leuven 2030 provides substantive input and access to experts and policymakers.

GENERAL 'SOCIAL INNOVATION'	Platform for collective climate action	Leuven 2030 coordinates the Leuven Living Lab project within the framework of the European FEAST project.
GENERAL 'SOCIAL INNOVATION'	Storytelling	Leuven 2030 uses its communication channels (website, newsletter, social media, etc.) to promote climate projects and initiatives from stakeholders and partners within the Leuven ecosystem.
GENERAL 'SOCIAL INNOVATION'	Commitments by citizens	Leuven 2030 provides input on how to activate citizens to participate and support the Leuven Climate Contract for the city's 2024 communications campaign. In line with the Leuven 2030 multi-year strategy, this will prioritize the 20% changemakers within the target group.

GENERAL 'SOCIAL INNOVATION'	Social justice	Leuven 2030 has a pioneering role in developing a socially just climate transition. Therefore, Leuven 2030 commits to structurally including objectives on social justice.
MOB	Sustainable commuting network	Leuven 2030 and Scone search for 5 to 10 companies within the Leuven business network that want to participate in the community-challenge campaign. Leuven 2030 initiates and brings key partners together.
NBS	Climate Adaptation Taskforce	Leuven 2030 supports the development and expansion of the learning network on climate adaptation.

NBS	Case: 'Koolstofboeren' (Province of Flemish Brabant)	Leuven 2030 sensitizes, mobilizes and facilitates organizations, companies and citizens to substantially reduce their CO_2 emissions and - where/when beneficial - participate in carbon storage and carbon offsetting initiatives.

Van Oudenhove, Anne
President of Leuven 2030
September 28, 2023

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CLIMATE CITY CONTRACT

KU LEUVEN

 Field of Action	☒ General ☒ Energy Systems ☒ Built Environment ☐ Mobility & Transport ☒ Green Infrastructure & Nature-Based Solutions ☒ Circular Economy & Waste	
Field	Action	Commitment
GENERAL	General	KU Leuven is willing to contribute to city initiatives on supporting other Leuven property owners in the climate transition. This includes sharing knowledge and expertise, but also supporting smaller property owners financially with subsidies, as happened in the past with the ELENA project.

GENERAL	General with link to Place-based project Arenberg	KU Leuven fully exploits its educational and research capacity for the energy transition and makes its domain and building stock available for innovative technologies that support climate ambitions. This can include: Model Predictive Control (MPC) in buildings, agrophotovoltaics, hydrogen panels, hubs to support circularity, integrated PV, environmental technologies, etc. The various research groups are encouraged to instigate or scope potential projects. In addition, KU Leuven uses its own research to contribute to development plans in the city.
AREA	Place-based project Arenberg	Existing plans concerning buildings, the green park, mobility, circularity, research projects , etc. will be integrated into a coordinated approach. Synergies between the sub-plans and also beyond the KU Leuven domain, will be indicated to avoid lock-ins, minimize nuisance and accelerate the transition. Cooperation between the Arenberg campus, the Science Park and imec, among others, will be further reinforced.
ES	Case: Cold and heat exchange study	Imec and KU Leuven expressed the intention to conduct a feasibility study in the near future. If the result are positive, they commit to finance an in-depth study. The decision to realize a heat network will depend on the results of this study.
ES	Large-scale collective green heat	KU Leuven is willing to share and enlighten its usage data and plans regarding its building stock when asked for future feasibility studies on heat networks or other energy studies, if the KU Leuven buildings can contribute.
ES	Large-scale collective green heat-with link to Pilot 3: Redingensite	When/if the plan for the development of a heat network is presented, KU Leuven will evaluate case-by-case if a connection between its building stock and this heat network is possible, also taking into consideration that it will have a positive effect on the total business case and therefore a positive social impact. If it is technically and financially feasible, KU Leuven will connect to the heat network.

AREA	Place-based project Arenberg	The management committee for the Arenberg Science park expressed the ambition to have a fossil-free park in 2030: KU Leuven is landowner of the Science park and partner in the management committee as well as in other developments in the park. However, KU Leuven is not the only responsible stakeholder, building owners are responsible for the investments for renovations and green energy. KU Leuven does commit to instigate the conversation between the building owners, Bio-Incubator Leuven, Kadans and Interleuven and offer support with the climate transition by sharing knowledge and experience.
ES	Pilot 3: Redingensite	For the development of a local heat network (KU Leuven – Redingenhof – inhabitants - …) KU Leuven actively engages with the third party responsible for the development and management of the heat network, and communicates openly with the city. In coordination with the city, KU Leuven considers a heat network in the further design and development of the Redingensite. KU Leuven incorporates other sites (Groot Begijnhof, STUK-Holleberg, Amerikaans college) into the research for potential users or producers of a local heat network.
ES	General with link to Place-based project Arenberg	The roofs of KU Leuven buildings will be maximally used to generate green electricity. Besides this, KU Leuven will analyse how other surfaces can be used to generate green electricity.
ES	General with link to Place-based project Arenberg	The most efficient combination of sustainable resources (e.g., riothermia, aquathermia, air, geothermia, etc.) will be analysed for the thermal supply of the new buildings as well as for the conversion to a fossil-free energy supply in the existing buildings. When considering cost efficiency, both CAPEX and OPEX are taken into account and different long term scenarios are compared.
ES	General with link to Place-based project Arenberg	The amount electricity generated from a renewable source is optimized according to the building and the level of energy consumers in its immediate vicinity, if this can be developed and expoloited in a profitable way.

BE	General with link to Place-based project Arenberg	Climate-neutral and energy-efficient construction is the standard for all new Arenberg buildings and, by extension, the entire building stock of KU Leuven. This includes cleverly using a combination of sufficient insulation, smart management, efficient energy sources, use of sustainable and circular materials etc.
BE	Collective renovation program large building owners with link to Place-based project Arenberg	Existing buildings are renovated to reduce energy demand, if the buildings can be heated by maximally using fossil-free sources. Besides this, a programme will be developed to improve the energetic level of buildings every two years. Smart systems are used to further reduce energy demand.
BE	General with link to Place-based project Arenberg	Buildings will be designed to be modular, for optimal repurpose or reuse, and to optimize the use of spaces.
NBS	General with link to Place-based project Arenberg	Rainwater on the roofs is maximally buffered and infiltrated by using e.g. green roofs and wadis.
NBS	General with link to Place-based project Arenberg	Paved surfaces that surround the building will be reduced as much as possible therefore more water can infiltrate into the soil. KU Leuven commits to a active policy for the removal of paving, where possible.
NBS	General with link to Place-based project Arenberg	Rainwater is reused in the buildings, where possible.
NBS	General with link to Place-based project Arenberg	Wastewater is maximally recovered and reused in one or between different building blocks.

NBS + ES	General with link to Place-based project Arenberg	Geothermia can be used as an important thermal buffer for heating buildings energy-efficiently. This is often area-intensive, so it is important to focus on multi-functional use of spaces. When changes are made to open spaces, opportunities with geothermal energy are researched.
CE&W + BE	Circular economy & waste in building stock of KU Leuven	KU Leuven commits to integrate circular principles (design) and secundary materials into its building-stock policy and future construction and renovation projects. - New buildings will be constructed, as much as possible, with secundary materials. If not possible, sustainable materials with minimal impact will be used; - After buildings are demolished, the still usable materials are reused as much as possible in the new buildings. Residual material will be entered into the circular system, as much as possible; - When renovating existing buildings, circular and sustainable insulation and finishing materials are used as much as possible.

Saeys, Stefaan
Director of Technical Services
September 26, 2023

COMMITMENT AGREEMENT

CLIMATE CITY CONTRACT

Field of Action	☐ General ☒ Energy Systems ☒ Built Environment ☐ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☒ Circular Economy & Waste	
Field	Action	Commitment
ES	Pilot 2: Residual heat Celestijnenlaan	UZ Leuven commits to share information and expertise regarding cold-heat storage. UZ Leuven commits to explore the expansion of cold-heat storage and the opportunity to serve as a battery for cold-heat storage in the area, if this proves to be energetically interesting and financially/technically feasible, based on the marginal cost of the expansion.
BE	Collective renovation program large building owners	UZ Leuven commits to make its own building stock fossil-free as soon as possible. For renovations, UZ Leuven makes a maximum effort to switch to fossil-free heating and cooling techniques, while lock-ins in non-sustainable technologies are being avoided. UZ Leuven commits to share information and expertise regarding renovating buildings, where possible and whenever this information is relevant. Given hospital building stock is

		part of a very specific niche, only relevant information will be shared. UZ Leuven will not structurally contribute to the programme or take on a pioneering role.
CE&W	Circular economy & waste in building stock of UZ Leuven	UZ commits to set up a disassembly project. *Selective disassembly of targeted fractions – with Material Bank (wood, doors, etc.) *Selective disassembly focused on ceramic fractions - with Wienerberger (reuse of ceramic fraction, ceramics for recycling) UZ Leuven commits to provide infrastructure, if available, for fine-mesh collection and urban mining. UZ Leuven commits to integrate circular principles (design) and secondary materials into its building-stock policy and future construction and renovation projects.
CE&W	Plastics hub - materials	UZ Leuven cooperates as a partner in the 'plastics hub' project and commits to investigate the following issues via x-number of pilot projects: - Impact calculation for recycling - Guidelines for selective collection - Protocols for quality control of the collected plastics - Evaluation of the infrastructure needed for the predefined volumes - Evaluation of the investment and operational needs for the infrastructure - Guidelines for homogenization of fractions - Development of tests for homogenization - Testing fractions in production process

Robberecht, Wim
CEO
September 25, 2023

COMMITMENT AGREEMENT

CLIMATE CITY CONTRACT

 Field of Action	☐ General ☒ Energy Systems ☒ Built Environment ☐ Mobility & Transport ☒ Green Infrastructure & Nature-Based Solutions ☒ Circular Economy & Waste	
Field	Action	Commitment
ES	Pilot 2: Residual heat Celestijnenlaan	Imec will communicate about potential residual heat, taking into account the social impact when selling this heat to an external party. Imec will also communicate about this with the city.

ES	Case: Cold and heat exchange study	Imec and KU Leuven expressed the intention to conduct a feasibility study in the near future. If the result are positive, they commit to finance an in-depth study. The decision to realize a heat network will depend on the results of this study.
ES	Process emissions	Imec researches the possibilties to better map process emissions and structurally reduce them (the high level objective is to halve process emissions by 2030, compared to the numbers in 2018).
BE	Collective renovation program large building owners	Imec commits to make its own building stock fossil-free as soon as possible. For renovations, imec makes a maximum effort to switch to fossil-free heating and cooling techniques, while lock-ins in non-sustainable technologies are being avoided.

NBS	Digital Twin Climate Adaptation	Imec shares its knowledge about state-of-the-art digital twin tools. Imec supports innovative data capture (IoT and others). Imec supporst the integration and interoperability of the various data.
CE&W	Circular economy & waste in building stock of imec	Imec to set up a disassembly project. - Selective disassembly of targeted fractions – with Material Bank (wood, doors, etc.) - Selective disassembly focused on ceramic fractions - with Wienerberger (reuse of ceramic fraction, ceramics for recycling) Imec commits to provide infrastructure, if available, for fine-mesh collection and urban mining. Imec commits to integrate circular principles (design) and secondary materials into its building-stock policy and future construction and renovation projects.

Lebon, Hans
Executive Vice President Corporate Support and Infrastructure

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 Field of Action	☐ General ☒ Energy Systems ☒ Built Environment ☒ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment
ES	CO2-neutral steam production	Beneo-Remy commits to further explore how to replace all gas consumption for steam production with a fossil-free energy source. Technical solutions and insights will be shared, when relevant, with other Leuven stakeholders facing similar challenges, such as other industrial stakeholders, hospitals,...

ES	Recuperation residual heat	Beneo-Remy will soon recover residual heat from the effluent, that is not yet used today. This will be done via a heat pump and with the intention to use the residual heat for the internal processes of the dryers. If because of the high temperatures needed, recovering and reusing the residual heat is not profitable, Beneo-Remy commits to make the residual heat available for the surrounding area. This can be done, for example, via a heat network along the railroad towards the new development at the Wakkerzeelsebaan. The technical and financial feasibility will have to be researched by a third party.
MOB	CO2-neutral cargo ship	Beneo-Remy commits to carry out a pilot project on green logistic flows with CO_2 -neutral water transport. If the results of the pilot project are positive, Beneo Remy commits to further scale up CO_2 -neutral water transport. The results and insights from this pilot project, will be shared with other stakeholders in the Leuven ecosystem facing similar challenges.

Vanhoegaerden Roland

OMD

Handtekening *Datum*

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 Field of Action	☐ General ☒ Energy Systems ☐ Built Environment ☐ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment
ES	Net-zero brewing Leuven	AB InBev sets the ambition to emit net-zero CO_2 emissions at its Leuven Brewery by the end of 2030.

Wils, Aron
Public Affairs Manager
October 5, 2023

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Field of Action	☐ General ☐ Energy Systems ☐ Built Environment ☐ Mobility & Transport ☒ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment
NBS	Case: Carbon farming	Arvesta motivates its farmers to join the Carbon Farming program and work together towards a better result each year. Arvesta commits to help its farmers how to market a local product with a reduced CO_2 footprint to industrial partners. Arvesta continues to develop this model by establishing new partnerships within the industry, recruiting more farmers for the program and launching new innovations to reduce the CO2 footprint.

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Field of Action	☐ General ☐ Energy Systems ☐ Built Environment ☒ Mobility & Transport ☐ Green & Nature-Based Solutions ☒ Circular Economy & Waste	
Field	Action	Commitment
MOB	Electrification of waste transport	Within the framework of the internal climate plan and in order to reach the objectives of the Flemish Energy and Climate Plan, EcoWerf commits to a phased transition towards low-carbon fuel for trucks and zero-emission trucks. For the latter, Ecowerf investigates whether the self produced electricity can be used, if the necessary charging infrastructure will be provided.

MOB	Hydrogen panels	EcoWerf gathers the necessary knowledge on production logistics and employability within the sector of heavy or industrial vehicles (matching production to usage, storage options, refuelling procedure and infrastructure). EcoWerf explores the possibility of a completely *stand-alone* system on its site, installing hydrogen panels that will be programmed to provide continuous and guaranteed generation of hydrogen to supply EcoWerf's waste collecting vehicles.
CE&W	EcoWerf - URC	EcoWerf commits to: - Launching a pilot project to selectively collect waste streams and make them usable as secondary materials; - Exploring scale-up possibilities by assessing the volume potential, investment and operating costs and the process management.

De Witte, Jonathan
Managing Director
October 5, 2023

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develop different

Field of Action	☐ General ☒ Energy Systems ☒ Built Environment ☐ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment
ES	Burenberg	ION shares its "in-house" expertise on heat networks to support the future feasibility study examining the connection of the Burenberg heat network to a larger collective system in the surrounding area. ION assists with the study by actively participating in discussions with interested parties, within the time frame that ION is legally involved in the project, until approximately early 2026. *Timing:* < 2026

ES	Pilot: Sint-Jansbergsesteenweg	ION shares its "in-house" expertise on heat networks to support the future feasibility study examining the connection of the Sint-Jansbergsesteenweg heat network to a larger collective system in the surrounding area e.g. a heat network at the Celestijnenlaan. ION assists with the study by actively participating in discussions with interested parties. *Timing:* From 2024 (start of design phase)
ES	Pilot: Sint-Jansbergsesteenweg	If research shows positive results for a technically and financially feasible collective system in the area, ION commits to connect to this system within the planned development, under the conditions that this does not compromise the project schedule and that any higher costs of, for example, an oversized heat system are factored into the contracted sales prices of the buildings in order to remain budget neutral. If the possibility to connect to a larger collective system is not yet certain in the design phase, the design team will keep this option open by introducing a number of no-regret measures. For example, a suitable location and appropriate dimensions of the technical room will allow ION to connection to a collective system in a later phase. To the extent possible, the heat network (BEO fields, pipe diameters,...) will have oversized dimensions to keep the option open for the distribution of heat in the area. *Comments/Conditions:* The design team further investigates the feasibility. Final implementation depends on financial and technical feasibility. *Timing:* 2024 (start of design phase)

ES	Pilot: Sint-Jansbergsesteenweg.	If the collective system is realized, including a link to the area, the necessary usage data will be collected and shared with the City of Leuven for further analysis. *Comments/Conditions:* Conditions concerning confidentiality or clustering of data can be further discussed with the administrator. *Timing:* > 2025
ES	Pilot: Sint-Jansbergsesteenweg	For the production of warm water for sanitary facilities green techniques, such as a booster heat pump, PVT panels, solar collectors,... or a combination of these techniques are used. Electric water heaters are not used. *Comments/Conditions:* This commitment has a very big impact on the energy-efficiency of the developments and is therefore seen as a priority, within the available budgets. *Timing:* 2024 (start of design phase)
BE	Pilot: Sint-Jansbergsesteenweg.	ION strives to have buildings with an E-level below 10. Regardless, all new buildings will remain below an E-level of 20. *Comments/Conditions:* Additional costs must be factored into the sale price of the buildings, or financed through other means, in order to achieve a budget neutral operation for ION. *Timing:* 2024 (start of design phase)

ES	Pilot 9: Sint-Jansbergsesteenweg	The entire roof will be utilized for sustainable purposes (PV, green roof, experience roof, etc.), even if this means that the PV production of electricity is substantially larger than what is needed for the site. Optimal shading of the buildings will be integrated, as much as possible, into the design in order to safeguard/maximize the PV potential. *Comments/Conditions:* This commitment is applicable if the financial resources are available. PV is typically very cost-effective and has a good financial return. If the CAPEX of a larger installation is not feasible for the building owner, this option will be discussed with possible ESCo's/Leuven Energy Company, or the opportunity will be marketed widely to attract e.g. a cooperative investor. *Timing:* 2024 (start of design phase)

Voor ION HOLDING BV:

Digitaal ondertekend door
CONNECTIVE NV - Connective
eSignatures namens Kristof
Vanfleteren (+32479449535)
Datum: 03/10/2023 12:54:41
Ondertekend met eenmalig
sms-mailwachtwoord: 549582

Kristof Vanfleteren, bestuurder

Digitaal ondertekend door
CONNECTIVE NV - Connective
eSignatures namens Davy
Demuynck (+32473670715)
Datum: 27/09/2023 09:11:27
Ondertekend met eenmalig
sms-mailwachtwoord: 410201

Davy Demuynck, bestuurder

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PROVINCE OF FLEMISH BRABANT

Field of Action	☒ General ☐ Energy Systems ☐ Built Environment ☒ Mobility & Transport ☒ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment

GENERAL 'GOVERNANCE'	Regional collaboration	The Province of Flemish Brabant emphasises the importance of further developing the existing city-regional cooperation on spatial policy and mobility, set up within Regionet Leuven searches for the necessary co-financing to maintain a coordinatoting role.
MOB	Development of a regional bicycle network	The Province of Flemish Brabant currently explores, together with the municipalities in the region, how to set up a structural partnership and wants (if the necessary staff capacity can be co-financed) to continue its supporting role.
MOB	Expansion of a high-quality public transportation network	The Province of Flemish Brabant intends to continue the place-based project Regionet Leuven, and explores the necessary funding and cooperation with the municipalities involved.

NBS	Molenbeek Valley	The Province of Flemish Brabant supports the city of Leuven, where possible, with the implementation of pilot projects, within an integrated action plan for the entire valley.
NBS	Case: 'Koolstofboeren' – Nature-inclusive farming	The Province of Flemish Brabant is temporarily coordinating the project. If approved, this project will become part of the projects for which funding will be sought by the National Park structure.

Ter uitvoering van de beslissing deputatie van 5 oktober 2023,

Namens de deputatie
In opdracht van de provinciegriffier

Hilde Torfs
directeur ruimte

de verslaggever,

Bart Nevens
gedeputeerde voor Leefmilieu

COMMITMENT AGREEMENT

CLIMATE CITY CONTRACT

ag stadsontwikkeling leuven

Field of Action	☐ General ☒ Energy Systems ☒ Built Environment ☐ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment
ES + BE	Collective renovation program large building owners	AG Stadsontwikkeling commits to make its own building stock fossil-free as soon as possible. For renovations, AG Stadsontwikkeling makes a maximum effort to switch to fossil-free heating and cooling techniques, while lock-ins in non-sustainable technologies are being avoided *Comments/Conditions:* Within the limits of internal and/or external financial resources and the capacity of the organization. *Timing:* 2023-2030
ES	Collective renovation program large building owners	Within the collective renovation and heat program, various local stakeholder work together in a "learning network". The intention is not only to exchange knowledge and experiences, but also to accelerate the realization of climate projects.

		Comments/Conditions: Ongoing projects will not be delayed and there is no obligation to bundle the implementation of projects if this does not add value to all parties. *Timing:* 2023-2030
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	To enable the supply of heat and cold to the surrounding area in the future, the design phase will include research about the possibility to develop a larger sized BEO field on the site. This also includes actively searching for this space which creates the possibility, but not the obligation, to construct a larger BEO field in a later phase. This way, there is more time to seek (possibly external) financing for this larger system, including a possible extension of the heat system to the surrounding area. The Leuven energy company could play a role in this process. *Comments/Conditions:* The design team further investigates the feasibility. If funding for a larger BEO field is not available during construction, the possibility of expanding the BEO field in a later phase will be explored. However, any later expansion of the BEO field must minimize disruption to residents as well as the cost of construction. This can be solved, for example, by providing vegetation for this area that can be easily removed and replanted after a few years. *Timing:* 2024 (start of design phase)
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	To enable the long term supply of heat and cold to the surrounding area, the design provides space for a substation where the connection to the surrounding area (surrounding residents, possible residual heat Beneo-Remy) can be made. The location is chosen wisely to make sure that the connection to a heat network in the surrounding area or a connection to Beneo-Remy is convenient. *Comments/Conditions:* The design team further investigates the feasibility. For example, the provided space could also be part of the collective technical space integrated into the buildings.

		Timing: 2024 (start of design phase)
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	In the design phase the possibility to add more capacity for the heat network, than required for the site itself, is considered. This way, it can be connected to a larger collective system in the future. *Comments/Conditions:* By the time the permit is submitted, it should be clear whether this larger collective system will be implemented. If the Leuven Energy Company (if then operational) or a private party is not willing to invest, the capacity of the heat network can still be adjusted in the permit application to the exact size needed for the site itself. *Timing:* 2024 (start of design phase)
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	If a feasible financial structure and a suitable and interested investor are found, and the expansion is still feasible, the heat and cold supply will be extended to the surrounding area with the site as a central hub. In this step, the necessary substations will be built in the space provided for this purpose, the BEO field can be expanded, and/or residual heat from Beneo-Remy will be connected. *Comments/Conditions:* This option is not definitive, until all the above commitments are completed. Furthermore, renovation support from the Climate House will be necessary to make the houses connection proof. Provided the design is well thought out based on the above commitments, these additional interventions can be carried out with minimal disruption to the residents on the site. *Timing:*

		> 2025
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	If the collective system is realized, including link to the environment, the necessary usage data will be collected and shared with City of Leuven for further analysis. *Comments/Conditions:* Completion of all the above commitments is required. Conditions concerning confidentiality or clustering of data can be further discussed with the administrator. *Timing:* > 2025
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	For the production of warm water for sanitary facilities green techniques, such as a booster heat pump, PVT panels, solar collectors,... or a combination of these techniques are used. Electric water heaters are not used. *Comments/Conditions:* This commitment has a very big impact on the energy-efficiency of the developments and is therefore seen as a priority, within the available budgets. *Timing:* 2024 (start of design phase)
BE	Pilot 5: Wakkerzeelsebaan Wijgmaal	AG Stadsontwikkeling strives to have buildings with an E-level below 10. Regardless, all new buildings will remain below an E-level of 20. *Comments/Conditions:* Guidelines concerning the cost per housing unit are an important prerequisite. *Timing:* 2024 (start of design phase)
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	The entire roof will be utilized for sustainable purposes (PV, green roof, experience roof, etc.), even if this means that the PV production of electricity is substantially larger than what is needed for the site. Optimal shading of the buildings will be integrated, as much as possible, into the design in order to safeguard/maximize the PV potential.

		Comments/Conditions: This commitment is applicable if the financial resources are available. PV is typically very cost-effective and has a fast financial return. If the CAPEX for a larger installation is not feasible for the client, because e.g. the maximum budget imposed by 'Wonen in Flanders' (Dijledal) or there is no possibility for an extra loan, this option will be discussed with possible ESCo's/Leuve Energy Company, or the opportunity will be marketed widely to attract e.g. a cooperative investor. *Timing:* 2024 (start of design phase)
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	Researching the feasibility of a neighbourhood battery is interesting given that the distribution network can be overcharged due to extensive electrification, large local PV production and ability to increase self-consumption for the benefit of residents. There is also the possibility to provide flexible services for a fee. *Comments/Conditions:* Research for a neighbourhood battery should be thorough and focus on different aspects (flexibility, possible participation in the spot market/day ahead market, increase self-consumption, possible reimbursement scheme of Fluvius (in progress) to capture all the benefits. *Timing:* 2024 (start of design phase)
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	The collective green heat system will be operating under a green power contract. This condition will be imposed towards any ESCOs. *Comments/Conditions:* AG Stadsontwikkeling's current contract with VEB, also a green power contract, could potentially be used here, but AG Stadsontwikkeling is free to explore the market. *Timing:* > 2025

ES	Pilot: Sint-Jansbergsesteenweg.	Research will be done on whether a large-scale green heating and cooling system can be developed near Celestijnenlaan on the UZ Leuven-imec axis. Therefore, the option to connect to the larger collective system with the local heat network is being kept open in the design phase. This way, the site can eventually contribute to a better balanced large-scale system and reduce its own dependence on backup technologies such as air/water heat pumps. *Comments/Conditions:* The design team further investigates the feasibility. Final implementation will depend on the ability to secure sufficient funding. *Timing:* 2024 (start of design phase)
ES	Pilot: Sint-Jansbergsesteenweg.	If the collective system is realized, including a link to the area, the necessary usage data will be collected and shared with the City of Leuven for further analysis. *Comments/Conditions:* Completion of all the above commitments is required. Conditions concerning confidentiality or clustering of data can be further discussed with the administrator. *Timing:* > 2025
ES	Pilot: Sint-Jansbergsesteenweg	For the production of warm water for sanitary facilities green techniques, such as a booster heat pump, PVT panels, solar collectors,... or a combination of these techniques are used. Electric water heaters are not used. *Comments/Conditions:* This commitment has a very big impact on the energy-efficiency of the developments and is therefore seen as a priority, within the available budgets. *Timing:* 2024 (start of design phase)
BE	Pilot: Sint-Jansbergsesteenweg.	AG Stadsontwikkeling strives to have buildings with an E-level below 10. Regardless, all new buildings will remain below an E-level of 20.

		Comments/Conditions: Guidelines concerning the cost per housing unit are an important prerequisite. *Timing:* 2024 (start of design phase)
ES	Pilot: Sint-Jansbergsesteenweg	The entire roof will be utilized for sustainable purposes (PV, green roof, experience roof, etc.), even if this means that the PV production of electricity is substantially larger than what is needed for the site. Optimal shading of the buildings will be integrated, as much as possible, into the design in order to safeguard/maximize the PV potential. *Comments/Conditions:* This commitment is applicable if the financial resources are available. PV is typically very cost-effective and has a fast financial return. If the CAPEX for a larger installation is not feasible for the client, because e.g. the maximum budget imposed by 'Wonen in Flanders' (Dijledal) or there is no possibility for an extra loan, this option will be discussed with possible ESCo's/Leuve Energy Company, or the opportunity will be marketed widely to attract e.g. a cooperative investor. *Timing:* 2024 (start of design phase)
ES	Pilot: Sint-Jansbergsesteenweg.	Researching the feasibility of a neighbourhood battery is interesting given that the distribution network can be overcharged due to extensive electrification, large local PV production and ability to increase self-consumption for the benefit of residents. There is also the possibility to provide flexible services for a fee. *Comments/Conditions:* Research for a neighbourhood battery should be thorough and focus on different aspects (flexibility, possible participation in the spot market/day ahead market, increase self-consumption, possible reimbursement scheme of Fluvius (in progress) to capture all the benefits. *Timing:* 2024 (start of design phase)

ES	Pilot: Sint-Jansbergsesteenweg.	A green power contract is used for the common parts of the site. *Timing:* > 2025

Getekend door:Lies Corneillie (Signature)
Getekend op:2023-09-01 13:53:22 +02:0
Reden:Ik keur dit document goed

leuven

COMMITMENT AGREEMENT

CLIMATE CITY CONTRACT

 Field of Action	☐ General ☒ Energy Systems ☒ Built Environment ☒ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☒ Circular Economy & Waste	
Field	Action	Commitment
ES + BE	Collective renovation program large building owners	Zorg Leuven commits to make its own building stock fossil-free as soon as possible. For renovations, Zorg Leuven makes a maximum effort to switch to fossil-free heating and cooling techniques, while lock-ins in non-sustainable technologies are being avoided *Comments/Conditions:* Within the limits of internal and/or external financial resources and the capacity of the organization. *Timing:* 2023-2030

ES	Collective renovation program large building owners	Zorg Leuven invests maximally in renewable energy through PV panels, heat pumps and other fossil-free applications. The information and monitoring obtained is freely shared with the platform. *Comments/Conditions:* Within the limits of internal and/or external financial resources and the capacity of the organization. *Timing:* 2023-2030
MOB	Sustainable commuting network	The vehicle fleet of Zorg Leuven will be systematically greened, shared mobility will be further expanded, maximum use of (electric) bicycles will be encouraged and partnerships will be further explored. *Comments/Conditions:* The systematic greening of Zorg Leuven's fleet depends on the technical possibilities of fossil-free vehicles for specific targets (truck traffic - larger delivery vehicles). *Timing:* 2023-2030
AREA	Place-based project Ruelenspark	The city is currently researching whether a collective heat system with a link to the houses and stores in the Ruelens Park area is feasible and desirable. Therefore, in the design phase of the new buildings, the option is being kept open to join the larger collective system in a later phase. This way, the buildings can eventually use and contribute to a better balanced large-scale heat system. *Comments/Conditions:* The design team explores the feasibility of making the heat pumps connectable and providing sufficient technical space to make this happen. *Timing:* At start of design phase (approx. 2025)
AREA	Place-based project Ruelenspark	If the collective system is realized, including a link to the area, the necessary usage data will be collected and shared with the City of Leuven for further analysis. *Comments/Conditions:*

		Completion of all the above commitments is required. Conditions concerning confidentiality or clustering of data can be further discussed with the administrator. *Timing:* > 2025
AREA	Place-based project Ruelenspark	For the production of warm water for sanitary facilities green techniques, such as a booster heat pump, PVT panels, solar collectors,... or a combination of these techniques are used. Electric water heaters are not used. *Comments/Conditions:* This commitment has a very big impact on the energy-efficiency of the developments and is therefore seen as a priority, within the available budgets. *Timing:* Design phase (approx. 2025)
AREA	Place-based project Ruelenspark	Energy-neutral or -positive buildings will be implemented to the extent that budgets are internally or externally available. *Comments/Conditions:* Guidelines concerning the cost per housing unit are an important prerequisite, in addition to the maximum total budgets available. *Timing:* Design phase (2025)
AREA	Place-based project Ruelenspark	The entire roof will be utilized for sustainable purposes (PV, green roof, experience roof, etc.), even if this means that the PV production of electricity is substantially larger than what is needed for the site. Optimal shading of the buildings will be integrated, as much as possible, into the design in order to safeguard/maximize the PV potential. *Comments/Conditions:* Commitment is applicable if financial resources are available. *Timing:* Design phase (approx. 2025)

AREA	Place-based project Ruelenspark	The demolition of the buildings releases materials that could potentially be reused. Zorg Leuven will examine to wich extent the materials can be reused in the construction of the new buildings or in nearby developments. This involves working togheter with the Materials Bank if necessary. *Comments/Conditions:* Commitment is applicable if this is technically and organizationally feasible. *Timing:* > 2025

Wuyts, Koen
Director

Verlinden, Bieke
President

COMMITMENT AGREEMENT

CLIMATE CITY CONTRACT

 Field of Action	☒ General ☒ Energy Systems ☐ Built Environment ☒ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment
ES	<u>General</u>	After Fluvius has drawn up the first version of its investment map, further optimization will be done after discussions with the city. Fluvius takes a flexible approach in order to optimize its future plans to the needs of the city on energy transition and the objectives of the Climate City Contract. This is done by setting the right priorities and proactively reinforcing the network where necessary, with minimum disruption to the public domain. Fluvius supports the city in building a green heat policy, including providing accurate and recent energy data, making expertise available, providing concrete input and feedback on policy plans, tenders, feasibility studies,... Fluvius is available as a heat network operator in Leuven, without claiming exclusivity in terms of investments, heat production, network management or supply activities at project or city level. A balance between the role as a candidate for heat network management and the role as partner of local authorities will be maintained. Should

		these roles conflict, Fluvius will work together with the city to find a solution. Fluvius clarrifies its investment plans for the electricity network in the Leuven area, including the planned grid reinforcements and timing. Fluvius and the city investigate the impact of heat networks and possibilities for bundling work related to heat networks and grid reinforcements. Fluvius explains its contribution to the Strategic Energy Vision Antwerp (SEViA), linking it to a possible contribution for the City of Leuven. Fluvius explains the collective renovation project in Bilzen to the city of Leuven and what their role was. Fluvius prepares first high level screening for heat grid potential for city of Leuven. Available dates on the Fluvius website will be provided with additional explanations when requested.
ES	Large-scale deployment of solar panels on large buildings	Fluvius provides data on grid capacity for the 20 largest roofs in Leuven (address points provided by the city). This way, a preliminary study can determine to what extent grid reinforcements are necessary to make maximum use of the roof area. In accelerating the rollout of PV on large rooftops (the top 20 and other large rooftops), Fluvius will provide accelerated grid capacity where necessary, and propose alternative (more cost-effective) measures where appropriate, such as providing local storage capacity. Fluvius adopts a constructive attitude within its competence and capabilities in facilitating energy sharing, when this proves necessary to build a profitable business case related to PV.

ES	Fossil-free districts by 2030	Fluvius has a constructive and open approach in drawing up a concept for making neighborhoods fossil-free, and provides the necessary input regarding the impact of such a transition on the electricity network (and possibly reduced demand for grid reinforcement), the feasibility of a heat network, and the financial impact of the reduced utilization rate (or even early removal) of the gas grid.
AREA	Place-based project Ruelenspark	Fluvius adopts a constructive and open approach when drawing up an energy concept for the Haasrode industrial park (electricity & heat), and provides the necessary input regarding the impact of such a transition on the electricity grid (electrification of mobility & industrial processes, heat exchange, accelerated and larger roll-out of PV), the feasibility of a heat network, and the financial impact of the reduced utilization rate (or even early removal) of the gas grid.
ES	Pilot 4: Vaartkom - Marie Thumas	Fluvius adopts a constructive and open attitude as a candidate heat grid operator at the Vaartkom and for possible collaborations with private parties, and together with the city guards the public interest in this process.

ES	Leuven Energy Company	Fluvius clarrifies which its role within Leuven's heat policy. More concretely, Fluvius investigates whether and under what conditions it can participate in a municipal energy company, based on an energy company dedicated to the development, financing or management of heat networks, or a combination of those activities. Fluvius shares its knowledge about other developments/plans/research regarding local energy companies.
MOB	Upscaling of charging infrastructure	Fluvius and the city's Mobility Department coordinate plans regarding grid reinforcement and the scaling up of charging infrastructure, and look for ways to make this rollout cost-effective for both parties, detect potential thresholds and bottle-necks, and opportunities to implement these projects together.

Hollevoet, Jean Pierre
Director
October 5, 2023

COMMITMENT AGREEMENT

CLIMATE CITY CONTRACT

HOUSING COMPANY DIJLEDAL CV

VAARTKOM 1B LEUVEN

Field of Action	☐ General ☒ Energy Systems ☒ Built Environment ☐ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment
ES + BE	Collective renovation program large building owners	Woonmaatschappij Dijledal has the ambition to accelerate the renovation of its building stock, in linwe with the Flemish Energy and Climate Plan 2050. The timing is a major challenge for the Woonmaatschappij, and by extension the entire sector, but it also offers opportunities. Dijledal commits to explore how its renovation path can be leveraged to accelerate the transition of its building stock, and by extension, Leuven's climate transition. Given the Woonmaatschappij's target group, this ambition is an important stepping stone for a socially just climate transition in Leuven. It helps ensure that vulnerable

		groups have future-proof housing and opportunities in society. *Notes/Conditions:* Within the limits of available financial resources, the financial viability of the Residential Society and organizational feasibility.
ES + BE	Collective renovation program large building owners	Woonmaatschappij Dijledal is committed to actively participate in the renovation and heat program, where this can add value for itself and the partner(s) involved. Within the collective renovation and heat program led by the city of Leuven, different Leuven stakeholders cooperate in a "learning network. *Notes/Conditions:* A concrete and efficient alignment of ongoing and planned projects.
AREA	Place-based project Ruelenspark	The city is currently investigating whether a collective heat system with link to the houses and stores in the Ruelens Park area is feasible and desirable. Therefore, in the design phase of the new buildings, the option is being kept open to join the larger collective system in a later phase. This way, the buildings can eventually use and contribute to a better balanced large-scale heat system. *Comments/Conditions*: The design team investigates the feasibility of making the heat pumps connectable and providing sufficient technical space to make this happen. *Timing*: At start of design phase (approx. 2025)
AREA	Place-based project Ruelenspark	If the collective system is realized, including a link to the area, the necessary usage data will be collected and shared with the City of Leuven for further analysis. *Comments/Conditions*: Completion of all the above commitments is required. Conditions concerning confidentiality or clustering of data can be further discussed with the administrator. *Timing*: > 2025

AREA	Place-based project Ruelenspark	For the production of warm water for sanitary facilities green techniques, such as a booster heat pump, PVT panels, solar collectors,... or a combination of these techniques are used. Electric water heaters are not used. *Comments/Conditions:* This commitment has a very big impact on the energy-efficiency of the developments and is therefore seen as a priority, within the available budgets. *Timing*: Design phase (approx. 2025)
AREA	Place-based project Ruelenspark	Woonmaatschappij Dijledal strives to have buildings with an E-level below 10. Regardless, all new buildings will remain below an E-level of 20. The feasibility transitioning to zero or positive energy buildings is also being explored. *Comments/Conditions:* The budgets available for social housing supplemented by any subsidies are an important prerequisite. Dijledal also indicates that the preliminary urban planning process is often already decisive in terms of volume, compactness, etc., and is thus an important point of attention.
AREA	Place-based project Ruelenspark	The entire roof will be utilized for sustainable purposes (PV, green roof, experience roof, etc.), even if this means that the PV production of electricity is substantially larger than what is needed for the site. Optimal shading of the buildings will be integrated, as much as possible, into the design in order to safeguard/maximize the PV potential. *Comments/Conditions:* Commitment is applicable if financial resources are available.

AREA	Place-based project Ruelenspark	The demolition of the buildings releases materials that could potentially be reused. Zorg Leuven will examine to wich extent the materials can be reused in the construction of the new buildings or in nearby developments. This involves working togheter with the Materials Bank if necessary. *Comments/Conditions:* Commitment is applicable if financial resources are available.
AREA	Place-based project Ruelenspark	A green power contract is used for the common parts of the site.
ES	Pilot: Sint-Jansbergsesteenweg	Research will be done on whether a large-scale green heating and cooling system can be developed near Celestijnenlaan on the UZ Leuven-imec axis. Therefore, the option to connect to the larger collective system with the local heat network is being kept open in the design phase. This way, the site can eventually contribute to a better balanced large-scale system and reduce its own dependence on backup technologies such as air/water heat pumps. *Comments/Conditions:* The design team further investigates the feasibility. Final implementation will depend on the ability to secure sufficient funding. *Timing:* 2024 (start of design phase).

ES	Pilot: Sint-Jansbergsesteenweg	If the collective system is realized, including a link to the area, the necessary usage data will be collected and shared with the City of Leuven for further analysis. *Comments/Conditions:* Completion of all the above commitments is required. Conditions concerning confidentiality or clustering of data can be further discussed with the administrator. *Timing:* > 2025
ES	Pilot: Sint-Jansbergsesteenweg	For the production of warm water for sanitary facilities green techniques, such as a booster heat pump, PVT panels, solar collectors,... or a combination of these techniques are used. Electric water heaters are not used. *Comments/Conditions:* This commitment has a very big impact on the energy-efficiency of the developments and is therefore seen as a priority, within the available budgets. *Timing:* 2024 (start of design phase)
BE	Pilot: Sint-Jansbergsesteenweg	Woonmaatschappij Dijledal strives to have buildings with an E-level below 10. Regardless, all new buildings will remain below an E-level of 20. The feasibility transitioning to zero or positive energy buildings is also being explored *Comments/Conditions:* The budgets available for social housing supplemented by any subsidies are an important prerequisite. Dijledal also indicates that the preliminary urban planning process is often already decisive in terms of volume, compactness, etc., and is thus an important point of attention.
ES	Pilot: Sint-Jansbergsesteenweg	The entire roof will be utilized for sustainable purposes (PV, green roof, experience roof, etc.), even if this means that the PV production of electricity is substantially larger than what is needed for the site. Optimal shading of the

		buildings will be integrated, as much as possible, into the design in order to safeguard/maximize the PV potential. *Comment/Conditions:* This commitment is applicable if the financial resources are available. PV is typically very cost-effective and has a good financial return. If the CAPEX of a larger installation is not feasible for the building owner, this option will be discussed with possible ESCo's/Leuve Energy Company, or the opportunity will be marketed widely to attract e.g. a cooperative investor.
ES	Pilot: Sint-Jansbergsesteenweg	Researching the feasibility of a neighbourhood battery is interesting given that the distribution network can be overcharged due to extensive electrification, large local PV production and ability to increase self-consumption for the benefit of residents. There is also the possibility to provide flexible services for a fee. *Comments/Conditions:* Research for a neighbourhood battery should be thorough and focus on different aspects (flexibility, possible participation in the spot market/day ahead market, increase self-consumption, possible reimbursement scheme of Fluvius (in progress) to capture all the benefits.
ES	Pilot: Sint-Jansbergsesteenweg	A green power contract is used for the common parts of the site.
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	To enable the supply of heat and cold to the surrounding area in the future, the design phase will include research about the possibility to develop a larger sized BEO field on the site. This also includes actively searching for this space which creates the possibility, but not the obligation, to construct a larger BEO field in a later phase. This way, there is more time to seek (possibly external) financing for this larger system, including a possible extension of the heat system to the surrounding area. The Leuven energy company could play a role in this process. *Comments/Conditions:* The design team further investigates the feasibility. If funding for a larger BEO field is not available during construction, the possibility of expanding the BEO field in a later phase will be explored. However, any later expansion of the BEO field must minimize disruption to

		residents as well as the cost of construction. This can be solved, for example, by providing vegetation for this area that can be easily removed and replanted after a few years.
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	To enable the long term supply of heat and cold to the surrounding area, the design provides space for a substation where the connection to the surrounding area (surrounding residents, possible residual heat Beneo-Remy) can be made. The location is chosen wisely to make sure that the connection to a heat network in the surrounding area or a connection to Beneo-Remy is convenient. *Comments/Conditions*: The design team further investigates the feasibility. For example, the provided space could also be part of the collective technical space integrated into the buildings. *Timing:* 2024 (start of design phase)
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	In the design phase the possibility to add more capacity for the heat network, than required for the site itself, is considered. This way, it can be connected to a larger collective system in the future. *Comments/Conditions:* By the time the permit is submitted, it should be clear whether this larger collective system will be implemented. If the Leuven Energy Company (if then operational) or a private party is not willing to invest, the capacity of the heat network can still be adjusted in the permit application to the exact size needed for the site itself. *Timing*: 2024 (start of design phase)

ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	If a feasible financial structure and a suitable and interested investor are found, and the expansion is still feasible, the heat and cold supply will be extended to the surrounding area with the site as a central hub. In this step, the necessary substations will be built in the space provided for this purpose, the BEO field can be expanded, and/or residual heat from Beneo-Remy will be connected. *Comments/Conditions:* This option is not definitive, until all the above commitments are completed. Furthermore, renovation support from the Climate House will be necessary to make the houses connection proof. Provided the design is well thought out based on the above commitments, these additional interventions can be carried out with minimal disruption to the residents on the site. *Timing*: > 2025
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	If the collective system is realized, including a link to the area, the necessary usage data will be collected and shared with the City of Leuven for further analysis. *Comments/Conditions:* Completion of all the above commitments is required. Conditions concerning confidentiality or clustering of data can be further discussed with the administrator. *Timing*: > 2025
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	For the production of warm water for sanitary facilities green techniques, such as a booster heat pump, PVT panels, solar collectors,... or a combination of these techniques are used. Electric water heaters are not used. *Comments/Conditions:* This commitment has a very big impact on the energy-efficiency of the developments and is therefore seen as a priority, within the available budgets. *Timing*: 2024 (start of design phase)

ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	Woonmaatschappij Dijledal strives to have buildings with an E-level below 10. Regardless, all new buildings will remain below an E-level of 20. The feasibility transitioning to zero or positive energy buildings is also being explored *Comments/Conditions:* The budgets available for social housing supplemented by any subsidies are an important prerequisite. Dijledal also indicates that the preliminary urban planning process is often already decisive in terms of volume, compactness, etc., and is thus an important point of attention.
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	The entire roof will be utilized for sustainable purposes (PV, green roof, experience roof, etc.), even if this means that the PV production of electricity is substantially larger than what is needed for the site. Optimal shading of the buildings will be integrated, as much as possible, into the design in order to safeguard/maximize the PV potential. *Comment/Conditions:* This commitment is applicable if the financial resources are available. PV is typically very cost-effective and has a good financial return. If the CAPEX of a larger installation is not feasible for the building owner, this option will be discussed with possible ESCo's/Leuve Energy Company, or the opportunity will be marketed widely to attract e.g. a cooperative investor.
ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	Researching the feasibility of a neighbourhood battery is interesting given that the distribution network can be overcharged due to extensive electrification, large local PV production and ability to increase self-consumption for the benefit of residents. There is also the possibility to provide flexible services for a fee. *Comments/Conditions:* Research for a neighbourhood battery should be thorough and focus on different aspects (flexibility, possible participation in the spot market/day ahead market, increase self-consumption, possible reimbursement scheme of Fluvius (in progress) to capture all the benefits. *Timing*: 2024 (start of design phase)

ES	Pilot 5: Wakkerzeelsebaan Wijgmaal	The collective green heat system will be operated using a green power contract. This will be imposed as a condition towards any ESCo's. *Timing*: > 2025

Leuven, 7 september 2023

COMMITMENT AGREEMENT

CLIMATE CITY CONTRACT

Field of Action	☐ General ☐ Energy Systems ☐ Built Environment ☐ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☒ Circular Economy & Waste	
Field	Action	Commitment
CE&W	Wienerberger - materials	Wienerberger commits to set up a pilot project in the city to investigate the following issues: - Impact calculation reuse & recycling (with prices from demolisher) - Selective disassembly guidelines - Protocol quality control for selectively disassembled ceramic building materials - Evaluate sales value/channels - Guidelines for homogenization fractions. - Set up tests for homogenization - Testing fractions in production process.

CE&W	Ecowerf - URC	Wienerberger commits to: - Implement Protocol quality control for selectively disassembled ceramic building materials - Giving specs and quality control for preparing demolition waste as raw material

Nottebaert; Katrien
Commercial Director
August 18, 2023

COMMITMENT AGREEMENT

CLIMATE CITY CONTRACT

 Field of Action	☒ General ☒ Energy Systems ☒ Built Environment ☒ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment
GENERAL		ECoOB stimulates owners of large roofs non-profit (schools, church factories, non-profit organizations, care institutions, municipal roofs) towards renewable energy (PV and heat). ECoOB sets up energy scans in collaboration with City of Leuven and the Climate House. Try to combine this with renovation. ECoOB encourages owners of large roofs (companies) towards renewable energy. ECoOB sets up energy scans (to be paid for by customer) in cooperation with City of Leuven and Climate House. ECoOB commits to replicate its existing business model around PV, charging stations and smart control in apartments based on ESCO contracts. ECoOB thus realizes renewable energy in apartment building with focus on making charging infrastructure available to apartment residents. In this, fire safety is a major focus.

ES	Energy Communities	ECoOB commits to setting up energy communities in cooperation with the City of Leuven, also in preparation for possible wind energy sharing from SeaCoop and its engagement in Sea2Socket project, and making this possible for Leuven individuals. ECoOB commits to establishing small heat networks: build expertise and establish collective heat network management with citizen participation; small heat networks (such as apartment buildings, the Orchard) and combine with spatial need PV and e-mobility. ECoOB engages Leuven citizens in a Leuven cooperative for inclusive climate transition.
ES	Large-scale deployment of solar panels on large buildings	ECoOB stimulates owners of large roofs non-profits (schools, church factories, non-profit organizations, care institutions, municipal roofs) towards renewable energy (PV and heat). ECoOB sets up energy scans such in collaboration with City of Leuven and Climate House. Try to combine this with renovation. ECoOB encourages owners of large roofs (companies) towards renewable energy. ECoOB sets up energy scans (to be paid for by customer) in cooperation with City of Leuven and Climate House. ECoOB commits to replicate its existing business model around PV, charging stations and smart control in apartments based on ESCO contracts. ECoOB thus realizes renewable energy in apartment building with focus on making charging infrastructure available to apartment residents. In this, fire safety is a major focus.
ES	Zonnebouwers+	ECoOB makes a commitment to people in energy poverty to finance and provide relief for cheap energy through solar panels and - if home is not suitable - to set up energy community/energy sharing.

ES	Wind energy	ECoOB commits to creating a support base, study of technology, financing, regulations (Wind turbines when regulations allow).
ES	Large-scale collective green heat	ECoOB commits to setting up large heat networks: build expertise and establish collective heat network management with citizen participation; create support base; large heat networks (subdivisions) and combine with spatial need PV and e-mobility.
BE	Climate House	ECoOB commits to personal energy-related advice in the living room through collaboration with Climate House by: - Scans (research) and advice to citizens + co-purchase + enter into cooperation agreement for further guidance with other bodies such as Dialogue and IGO. Advice concerns current supply (PV, more sustainable heat such as heat pump boilers) + research expansion towards new technologies such as heat pumps. - "Smart use" advice: information to individuals around measuring and smart steering of energy consumption. Focus on optimizing own consumption, possibly battery, reduce standby and peak consumption.

MOB	Upscaling of charging infrastructure	ECoOB commits - To implementing the REFLEX pilot project: charging infrastructure (EV) combined with renewable energy (PV and batteries) as realized in De Wingerd - To implementing a new grant project REFLEX, opportunities e.g. on school parking lots in combination with PV. - To establishing local energy communities with neighborhood battery/charging infrastructure as soon as regulations allow.

Leo D'haese

Bestuurder ECoOB cv

Luc Motmans

Bestuurder ECoOB cv

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Field	Action	Commitment
MOB	Mobility for all	Mobiel 21 and city of Leuven co-lead the project. Mobiel 21 sets up research projects and actions to develop sustainable solutions targeting transport poverty in Leuven.

MOB	Sustainable commuting network	Mobiel 21 commits to setting up a multi-year (three years) campaign on commuting for Leuven companies and links this to a mobility study. Together with the participating companies in the pilot project, Mobiel 21 will research how structural measures such as a mobility budget, bicycle leasing, electrification, parking policy, etc. can be rolled out.

Van den broeck, Els
Managing Director

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Field of Action	☐ General ☐ Energy Systems ☐ Built Environment ☒ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
MOB	Action	Commitment
	Shared mobility for every Leuven resident	- Cambio commits to increase its fleet of shared cars in Leuven by an average of 25% per year over the next three years. - Cambio aims to provide a shared car within 150m of every home in the inner city and the centre of Kessel-Lo; - The city supports Cambio in the expansion of *station-based* shared cars by offering reserved spots. This fits in with the city of Leuven's policy on further expanding Hoppin points and its ambition to give every resident easy access to shared mobility. - Cambio and the City of Leuven are joining forces for a gradual increase in the share of electric vehicles in the coming years. The aim is to reach at least 20% by 2025, provided the market develops favourably, both the affordability of small urban cars and the affordability and availability of charging infrastructure.

		- Cambio cooperates and provides the necessary data for monitoring and evaluation so the city can introduce an adapted a permit and quality framework in 2023-24; In the evaluation, impact in terms of reducing car ownership and use are important criteria. - The City of Leuven commits to more promotion of shared mobility and provides the necessary incentives.

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Blue-bike

Field of Action	☐ General ☐ Energy Systems ☐ Built Environment ☒ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment
MOB	Shared mobility for every Leuven resident	Blue Bike commits to rolling out a fleet of 140 electric shared bicycles in Leuven within the project Blue-bike Sharing For Life. In 2024, the project will be launched at Leuven Station. The further rollout of electric share bikes will happen in 10 locations. This is an important scale-up, as it means that from now on, there will be shared bikes not only at stations but also at other important hubs. These locations will be selected together with the city. Preferably, this will be set up in a back-to-many system. The feasibility is being explored. Circular bicycles will be used for the scale-up project. Demand-driven supply will be further expanded. The city commits to a financial intervention.

		Together with the city, Blue-bike will seek additional locations and more involvement of companies in the further roll-out of shared mobility: regional transport nodes and corporate Hoppin points with co-financing from business associations (ShareDiMobi).

Bram Dousselaere 01/09/2023

Uitvoerend directeur

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SCONE

 Field of Action	☐ General ☐ Energy Systems ☐ Built Environment ☒ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment
MOB	<u>Sustainable commuting network</u>	Scone and Mobiel 21 develop an offer for the members of Leuven 2030 which will contribute to more sustainable commuting. Through a pilot project, about five larger companies and organisations within the Leuven 2030 member network are being approached who, through the Scone platform, are committed to setting up a nudging campaign around sustainable commuting. Employees of those companies are closely monitored via the Scone app so that detailed data is available on mobility behaviour. Together with the participating companies, Scone will also examine how structural measures such as mobility budget, bicycle leasing, electrification, parking policy, etc. can be rolled out. The partnership is all about Scone providing optimal customer service to leads who come forward through the Leuven 2030 network, aiming at social impact in terms of sustainable commuting.

		There is no funding from Leuven 2030 or the City of Leuven. The participating companies pay for the services provided by Scone and Mobiel 21. Scone approaches companies with a proposal, allowing them to use the Leuven 2030 logo. Mobile 21 can also be included. The pilot project aims to get the breakthrough project 'Sustainable commuting network' operational, with Leuven 2030 activating its stakeholder. From its role as a 'neutral network', Leuven 2030 wants to help publicise this offer among its members. Leuven 2030 will coordinate in the first phase (apart from providing its network). Leuven 2030 is willing, under the terms and conditions stipulated in this agreement, to transfer data from members who are interested in using the indicated services to Scone. Scone will follow up these data according to the agreed modalities.

Rombouts Jan-Willem(CEO Scone) 31/08/2023,

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POPPY MOBILITY NV

 Field of Action	☐ General ☐ Energy Systems ☐ Built Environment ☒ Mobility & Transport ☐ Green Infrastructure & Nature-Based Solutions ☐ Circular Economy & Waste	
Field	Action	Commitment

MOB	Shared mobility for every Leuven resident	On 1 September 2023 Poppy provides 35 free floating shared cars via pilot projects forming the basis for a permit and quality framework for shared cars; Poppy commits to cooperate and provide necessary data for the evaluation so that the city can adapt a permit and quality framework in 2024: - Expanding the supply of shared cars to 60 shared cars or more after 6 months. - Launch 35 Poppy cars in centre share zone. If succesful, extend to larger area. - Making user data available for the city, to be used confidentially and in line with GDPR. Poppy commits to working with existing parking operators and to negotiate if cheap/free parking rates in off-street public parkings are possible. Poppy further integrates her supply at MaaS providers The city of Leuven grants a parking permit for the entire Poppy fleet during the pilot project. The city of Leuven provides the necessary communication through its own commmunication channels (LVN, press release, Leuven Car Free, Car Share Info Evenings, website, ...) City of Leuven explores the possibility to reserve 2-3 places for Poppy cars in off-street public parkings managed by the city (Parking Vaartkom, Parking De Bond, Parking Phillips, ...).

Niset, Sylvain
Managing Director
August 14, 2023