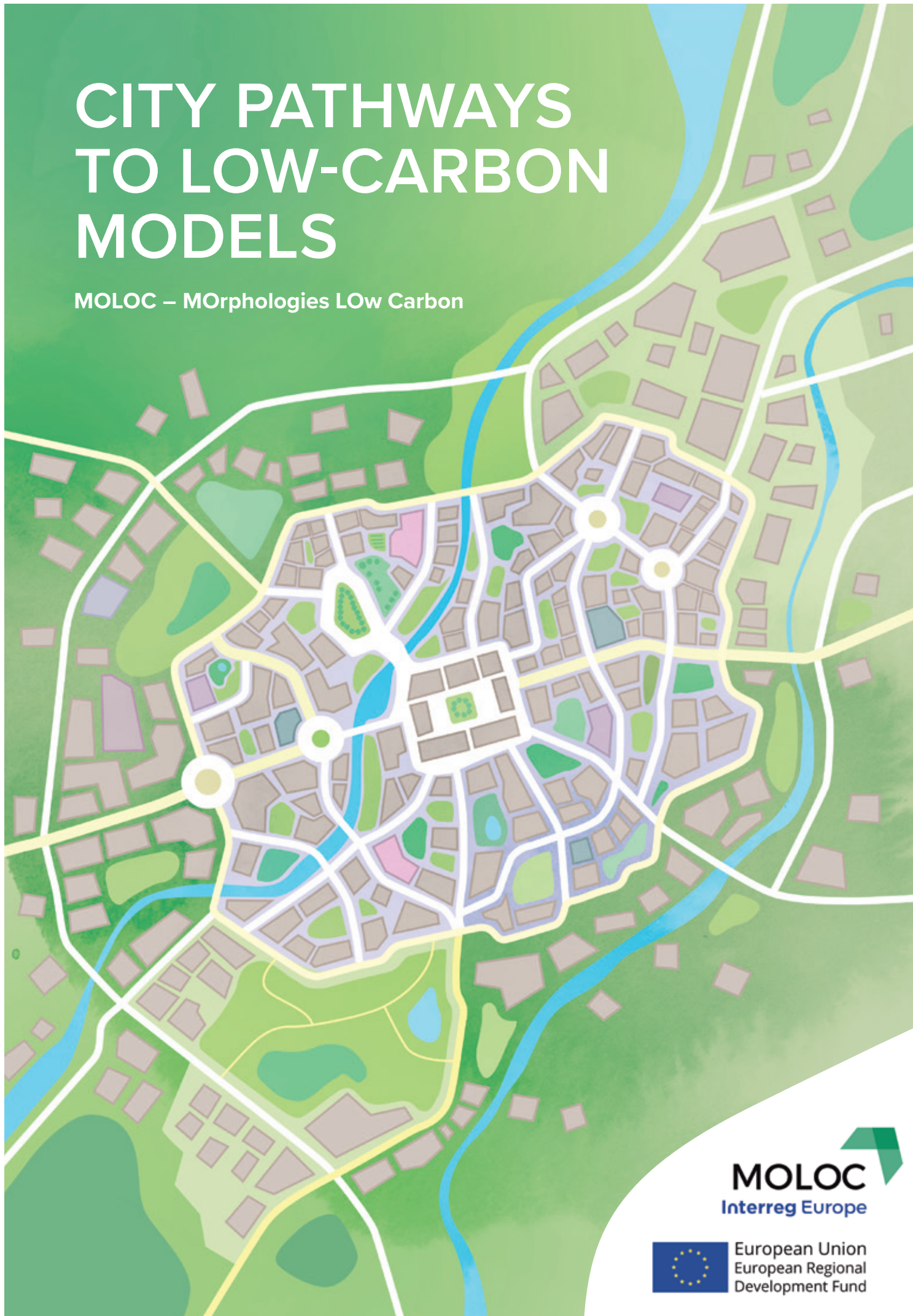


CITY PATHWAYS TO LOW-CARBON MODELS

MOLOC – MOrphologies LOw Carbon



MOLOC
Interreg Europe



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INTRODUCTION

What is MOLOC ?

European cities are at the forefront of climate actions. They contribute to a large share of global greenhouse gas emissions, but they are also a privileged site for crucial initiatives. The morphology of a city is often inherited from the construction of a city along its history. Municipalities have to adapt this morphology to the current challenges of adaptation to climate change and energy transition.

MOLOC stands for MOrphologies **LOW** Carbon¹ and explores the brakes that limit the impact of local policies and actions in their ambitions to change current urban morphologies in the light of sustainable development.

The MOLOC project raises two main questions:

1

What are the means of action to adapt urban morphologies to the impacts of climate change and energy transition?

2

How do cities overcome isolated experimentation and build a coherent model of a low-carbon city?

In this challenging context, MOLOC aims to develop a new city building approach, associating quality of life and energy efficiency.



ZOOM: Low-carbon city

A **low-carbon city**² is an urban model, which fits the new climate context and develops solutions to energy challenges. Integrated low-carbon strategies are needed to identify suitable actions in cities and to increase awareness of citizens.

A low-carbon model seeks to lower the carbon footprint of cities by means of minimizing or abolishing the utilization of energy sourced from fossil fuels. It combines the features of a low carbon society with a low carbon economy while supporting partnerships among governments, private sectors, and civil societies².

With a total budget of €1,4 M and a timeline of five-years from January 2017 until December 2021, the MOLOC project seeks to make a lasting impact in the urban morphologies of its five partner cities. MOLOC is a project supported by the **Interreg Europe program**³, which strives to help regional and local governments across Europe to develop and deliver better policy through cooperations between European regions. With an investment of €359 M from the **European Regional Development Fund**, Interreg Europe sponsors projects such as MOLOC to facilitate exchange among European regions and shared learnings for improved economic, social and environmental progress.

MOLOC Partners

All six MOLOC partners are involved in energy transitions. They are in a process of designing and testing innovative ways of achieving low-carbon cities:

- ▶ **City of Lille (France) – lead partner**
- ▶ **Central Mining Institute in collaboration with the City of Katowice (Poland)**
- ▶ **Free and Hanseatic City of Hamburg, Senate Chancellery (Germany)**
- ▶ **City of Turin (Italy)**
- ▶ **City of Suceava (Romania)**
- ▶ **Energy Cities**, advisory partner, is a network of more than 1,000 European cities which advocates for a locally-driven energy transition. Their role was to advise partner cities on choosing the right methodology to build low-carbon strategies. When partners are referred to in the course of the document, this refers to the cities and action plans, excluding Energy Cities who did not represent a city themselves.

For most cities there was a direct connection or representation to city or municipal governments for the project. As an exception, in the case of Katowice it was the Central Mining Institute that was the MOLOC partner, although they worked closely with the City of Katowice's energy department. For the sake of simplicity, when a city is named it will be a reference to the partner of the project, often a collective of stakeholders in part in the city government and in part outside the city government.

The MOLOC project takes place in three stages over two phases:

Phase I

2017-2018: Comparative analysis on obstacles to achieving low carbon cities

2019: Design of local action plans

Phase II

2020-2021: Action plan implementation and monitoring

The stages 2017-2019 part of Phase I of the project were for analysis and local action plan development, especially from the exchanges and learnings among different partners. 2020-2021 are dedicated to Phase II for the implementation of actions plans made from Phase I.

City Actions

Each city involved in the project has elaborated and will implement an action plan for a low-carbon strategy which is co-designed with local partners and stakeholders. The action plans reflect mutual exchanges that have taken place among partners (i.e. during study visits and exchanges of best practices).

The realization of efficient action plans will contribute to the improvement of policy instruments, addressed by the project. Inspired by a **bottom-up approach**, partners were careful to pay attention to citizen and stakeholder needs. This was appropriated by **local stakeholder group** within the whole process to co-design their action plan, along with wider dissemination when possible.

METHODOLOGY

A Wholistic View: Why Morphology?

Morphology seems an enigmatic term, especially in the context of low-carbon cities, but in the MOLOC project it can be understood various ways. In general **morphology refers to physical geometry; a science describing the exterior form or visual aspect of a living organ⁴**. When it comes to urban morphologies, we can look at the whole city as an entity with a form that is shifting constantly. Considered as a whole, it is imperative to have an approach that deals with the history, modernization, and flux of a city.

The MOLOC project takes an approach to morphologies that focuses on the **urban planning and governance** strategies for low-carbon city models. From renovation to the planning of new districts, MOLOC partners took different approaches to influencing their unique city morphologies. Seen as very dynamic hubs of activity, cities have aspects such as roads, plots, soils, densities, buildings, and many other phenomena that define how the ensemble of morphology is structured. Different scales make up this urban world: the building, urban fabric (e.g. open spaces, facades, streetscapes, etc.) city and even agglomeration.

For urban morphology in a low-carbon and sustainable context, there is a need to reference urban density as well as the urban metabolism of a city. In a way, this new low-carbon city focuses on clever and tailored morphologies that move away from wasteful, linear high-carbon systems in favor of circular metabolisms to reduce negative effects to the environment. Finally, urban morphology must react to the natural living conditions of the modern city. This may take into account such challenges as urban sprawl, polarization of jobs in the city, housing crises, and general improved conditions of living.

MOLOC Methodology

The MOLOC methodology is based in three important areas: an obstacles analysis, action plan and implication of a policy instrument.

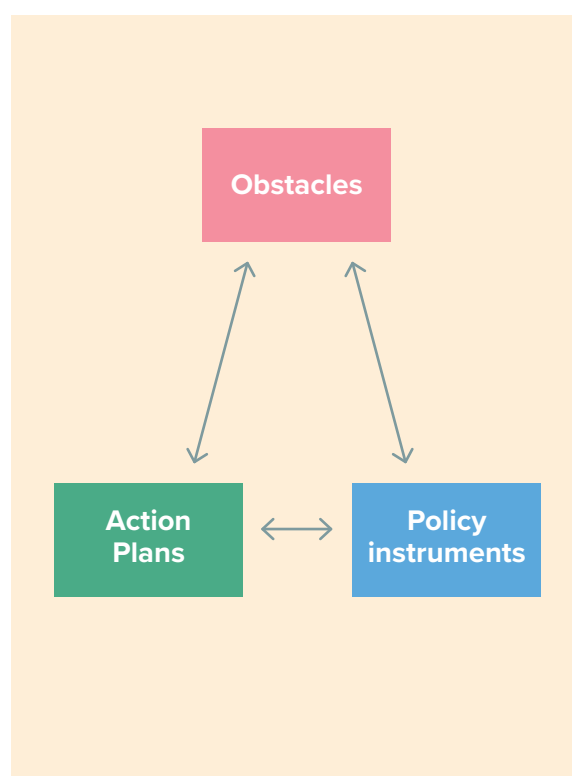
■ Obstacles Analysis:

This first step was to understand the situations that impeded low-carbon strategies in each city's context through an “**obstacles analysis**”. This process was led by Energy Cities.

■ Action Plans:

The second part of the methodology was for each partner to take their city-specific problems to designate an **action plan**. More specifically about 2-4 concrete actions were to be created to represent the solutions cities saw to work towards the challenges they face. The actions were often inspired by other partners, showing the cross-regional learning that took place during Phase I study visits and meetings.

The actions of the action plans must describe various criteria: **relevance to the project, the nature of the action itself, the stakeholders and their roles, timeframe and estimated costs** (as well as funding sources). The action plans for each city are the major deliverable of Phase I. The actions in these action plans are to be implemented in Phase II of the project until the end of 2021.



Policy Instruments:

The last part of the MOLOC methodology was to influence a **policy instrument**. This aspect tied each of the actions to a tangible policy or political stake in each city. This policy can be tied to public policy at the European or local level. Public policy at the European level could for example relate to the ERDF (European Regional Development Fund) operational plan.

As each city's political climate and structure varied, this aspect was decided early on at the application stage. In the end, the action plan provided this tie to policy instruments and could be strengthened by local stakeholders and politicians signing letters of endorsement of the respective actions in city action plans.

Energy Cities' Obstacles Analysis

A large part of the work done in Phase I was to identify specific challenges and roadblocks to achieve low-carbon agendas. To guide this analysis, Energy Cities performed various workshops and virtual meetings with partners in order to identify common obstacles that are experienced in cities.

The obstacles were chosen in a co-creation workshop, where obstacles were suggested and selected by the partners. Following the workshop, a grid of 20 obstacles was formulated and organized within four main pillars: silo thinking, changing behaviors / mobilization, political vision and implementation.

	Hamburg	Katowice	Lille	Suceava	Torino
1.1. Silo thinking					
Remind local authorities and local stakeholders of their responsibilities					
Ensure internal communication and cooperation between services					
Refer to a shared transversal vision in all activities					
1.2. Changing behaviours / mobilisation					
Overcome a lack of stakeholder participation in the low-carbon strategy					
Ensure involvement of citizens and users in the low-carbon strategy					
Deal with conflicts of interest and lobbies					
Address concretely the question of unsustainable behaviour and lifestyles					
1.3. Political vision					
Follow a long-term approach					
Cope with political changes					
Ensure commitment and motivation to the low-carbon strategy					
1.4. Implementation					
Use of proper indicators					
Build a sustainable financial strategy					
Evaluate economic and social aspects					
Select actions that have highest "low carbon" potential					
Test replicable pilot projects					
Make action attractive					

a consolidation of the results showed that a number of obstacles were selected by nearly all the partners (7 of them) – highlighted above)

Local Obstacles' Analyses

Each of the five city partners then conducted an analysis of their city context in relation to these obstacles. In this analysis, they were encouraged to select the 10 most important obstacles they would like to address. These analyses were often conducted with a partner or consulting organization. Going through this analysis helped to surface tensions that are present among stakeholders in each city and helped to identify areas in which they could focus the actions of their action plans.

It became evident from this consolidation that while each of the five cities is very different, some similar challenges arose during their local analyses. These point to the general difficulty in influencing urban morphology in today's democratic societies. Furthermore, **the two obstacles chosen unanimously by all five partners were from the "changing behaviors" pillar and reflected a difficulty in ensuring stakeholder and citizen/user involvement.**

Other more general obstacles such as ensuring commitment, cooperation and communication across services towards a low-carbon strategy also **show how inter-departmental and diversified strategies must be put in place to make impact**. Finally, in the “implementation” pillar, the three top obstacles highlight very pragmatic roadblocks in the process, namely **informational, financial, or in prioritization**.

Obstacles’ Analyses to Action Plans

The obstacles analysis was not meant to focus on problems but as an instrument to highlight space for improvement and focus. The analyses aimed to provoke discussion with MOLOC partners, on how to address the obstacles with the actions of their action plans. This proved to be at times challenging, as issues proved abstract and at times daunting. While recognizing the challenge in connecting these at times disconnected and negative factors to more actionable, practical initiatives, the early visible successes of city actions shows that steps can be made toward overcoming these obstacles.



➤ MOLOC Cities Identity Cards

The five cities in the MOLOC project are **diverse and varied in aspects such as scale, culture, geography, legal status, and political organization**. There is representation across Europe and across different situations of low-carbon, sustainable orientation. Despite differing languages, cultures and histories of their respective countries and cities, exchange was constant and active among them.

As this document synthesizes the major processes and events of the urban pathways to low-carbon models, each city will be highlighted individually for its unique context. Some basic information will help to paint the picture of each city along with their MOLOC actions and stakeholders. These identity cards focus on the cities and give the necessary background to appreciate the stories of their trajectories toward low-carbon morphologies.

Each city's identity card contains:

- › Low-Carbon Context
- › MOLOC Actions
- › Stakeholders Involved
- › Key Initiatives
 - past and present projects that inspired other MOLOC cities
 - initiatives that will be presented in depth in the thematic areas

To summarize:

City	Problem Addressed	Policy Instrument Targeted
LILLE	Work on the energy efficiency of a private park, adaptation to climate change, and sustainable urban planning	ERDF Regional Operational Program, Axis 3: energy transition, nature in the city, urban experiments
KATOWICE	Addressing energy and air quality issues related to the consumption of coal (or derivatives)	City of Katowice's Low Carbon Economy Plan (LCEP)
HAMBURG	Involve companies (in a commercial area) in a process to reduce GHG emissions, as part of a CO ₂ Climate Adaptation Plan	Climate plan of the Altona district (mixed district + industrial zone) and the Regional ERDF Operational Program
TURIN	Develop a sustainable urban strategy through the modification of the Turin Master Plan, a regulatory tool	Turin General Master Plan
SUCEAVA	Develop low carbon mobility through soft and electric modes and to improve the energy efficiency of buildings	Regional ERDF Operational Program, Axis 3: supporting the transition to a low-carbon economy

LILLE, FRANCE



Population: 232,440



Geography: fourth-largest metropolitan area of France, oceanic climate and flat terrain



Low-Carbon Context

The morphology of Lille draws on a history of several particular eras of its urban fabric which include: medieval structures, the Royal City of Lille, 19th century industrial, 1970s Bauhaus, and finally most recently, 1990s contemporary. The city of Lille heavily implicated their **urban planning, housing, buildings, and sustainable development departments** for MOLOC, working directly with 10 operational urban planners over the course of the project to determine their needs and challenges.

Today Lille is undergoing **a surge of inhabitants and tertiary activities** as its population and economic demands grow. To meet this need, the Mayor of Lille announced the creation of **10,000 new housing units** during her third mandate 2014-2020 (known as the “Club des 10 000”⁵). The city is working on various urban projects to meet the demand for housing, open spaces, public transport and other urban amenities, all within a low-carbon model that preserves a high quality of life for its citizens.



MOLOC Actions

- 1 Ensuring the convergence of territory’s data and develop a tool to dynamically process this data
- 2 Lay the foundations for taking action on new buildings – constructing a sustainable urban strategy for Lille
- 3 Monitor urban construction delivered
- 4 Promote the use of sustainable and circular materials
- 5 Capitalize upon the victory of the “Habiter 2030” association at Solar Decathlon Europe 2019 by boosting energy retrofits in the private built environment

Stakeholders Involved

- ▶ Relevant departments of the city of Lille will work with the Lille European Metropolis (MEL), Lille Metropolis Urban Development Agency, the Regional Resource Centre for Sustainable Development (CERDD), the National Environment Agency (ADEME) and ATMO HdF.
- ▶ Urban planning, housing, sustainable development and communication departments of the city of Lille will be in particular implicated. Selected deputy mayors will also give their inputs and support for prioritization.
- ▶ The city will work again with the Metropolitan Area, public planning agencies, and the Regional Council. The Builders Federation will also be involved to follow up on the project and to get the information needed for follow-up evaluations.
- ▶ The city of Lille’s relevant departments for decisions and knowledge on building materials will be involved; training institutions and universities will be actively sought out as vital partners. CD2E will consult on the best materials to be used and a communication expert will help with methods for the dissemination of necessary knowledge.
- ▶ The urban planning and housing departments of the City of Lille will work in collaboration with all the members of the Inhabit 2030 association.


Key Initiatives

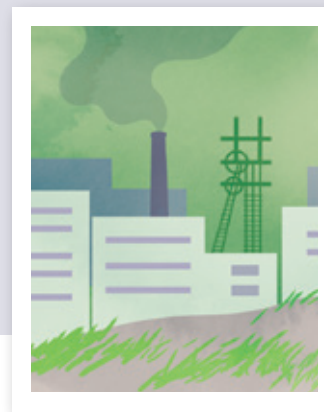
- **Solar Decathlon Competition** in Budapest, Hungary with the Inhabit 2030 association
- **Toolbox for Sustainable Urbanism** (Boîte à Outils d’Urbanisme Durable) project
- **Maison de L’Habitat Durable (MHD)** – inspiration to Katowice’s MCE

KATOWICE, POLAND

CENTRAL MINING INSTITUTE – SILESIA VOIVODESHIP

 **Population:** 302,400 with ~ 2 million in metropolitan area

 **Geography:** urban, with 40 adjacent cities, and highly urbanized; high population density (372 p/km²)



Low-Carbon Context

The Central Mining Institute (Główny Instytut Górnictwa or GIG) in Katowice was a uniquely positioned partner for the MOLOC project. As a research institution in a traditional mining region of Poland, the institute has been deeply connected to the mining industry with branches in an experimental mine “Barbara”, environmental radioactivity, conformity & assessment, and a clean coal technology center. The institute is a scientific research institution but worked closely during the MOLOC project with the city of Katowice and the greater Silesian region to attack goals for low-carbon initiatives.

Due to its strong mining culture, Katowice and the greater Silesian region are deeply affected by problems of poor air quality. For this and additional reasons of sustainable development, GIG and the city of Katowice were tasked with coming up with actions that could help to support the **Low Carbon Economy Plan (2014-2020)** – a plan to transition Katowice and the region to a low-carbon city model through strong economic and social actions. This plan seeks to increase the efficiency of energy and fuel use in buildings – not only in public buildings, but also in buildings owned by citizens. To influence this, GIG chose to work on directly **supporting and educating citizens** about thermomodernization of their homes. They also sought to work closely with the **Energy Department** of the city hall in order to open an information point and to continue to monitor important data for the further implementation of measures.



MOLOC Actions

- 1 Development of a comprehensive model to implement a system of energy consumption monitoring of public buildings
- 2 Creation of an information point (Municipal Energy Center) - Miejskiego Centrum Energii (MCE)

Stakeholders Involved

- ▶ Various governmental, financial (WFOŚiGW), research, scientific and non-governmental institutions interested in topics related to energy, environment, air contamination and carbon dioxide emission were involved as the stakeholder group during the MOLOC project, namely: Municipality of Katowice, Marshal's Office Silesian Voivodeship, Silesian Union of Municipalities and Districts including representatives of communes and cities of Silesia Voivodeship with Local Energy Policy Committee, Polish Association of Ecology (PIE), Polish Foundation for Energy Efficiency (FEWE), Voivodeship Fund for Environmental Protection and Water Management (WFOŚiGW), Silesian University of Technology, Euro-Center Science Technology Park Ltd.
- ▶ For the development of the monitoring and control of energy consumption systems in municipal buildings, there is heavy cooperation with the Silesian Union of Municipalities and Districts
- ▶ Cooperation with the Foundation for the Effective Use of Energy

Key Initiatives

- **Polish nationwide advisory support system for the public and housing sectors as well as entrepreneurs in the field of energy efficiency and renewable energy** for cooperation of Energy Advisors
- **POLREFF** – Polish Program for Financing Energy Efficiency in Residential Buildings

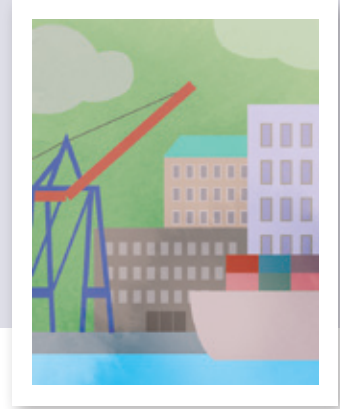
FREE AND HANSEATIC CITY OF HAMBURG, GERMANY



Population: 1,8 million



Geography: natural sheltered harbor/internal river delta on the river Elbe with high tidal influence



Low-Carbon Context

Itself a **federal land (Bundesland)**, the city of Hamburg was the largest city involved in the MOLOC project. As a port city connected to the North Sea (first in Germany and third in Europe), it is an important node of transport, trade and commerce. The city is also itself not a stranger to the dangerous effects of climate change as a huge part of the city is at risk of flooding in case of storm surges. In response to the **ERDF Operational Program (2014-2020) & the Hamburg Climate Plan of 2015**, Hamburg partners look to make a substantial impact on carbon reduction for the city by **targeting industrial and commercial players**.

As a bustling port city with a strong culture of participation and climate adaptation achievement, working towards a low-carbon city was decidedly about finding a specific project and focus within the city. For this, they chose to focus on the sectors of the commercial area of “**Schnackenburgallee**” (crafts, logistics, business, etc.). The plan for the commercial area, which spans across two districts, **Altona and Eimsbüttel**, was to be studied and discussed among larger stakeholders. Important stakeholders included the **Chamber of Crafts & Trades and Commerce** along with companies and employees who work in and commute to the commercial area daily. By focusing on the urban morphology of one specific area, the city could focus its resources to determine the optimal mobility, heat/electric supply and climate adaptation measures needed.



MOLOC Actions

- 1 Development of a CO₂ reduction plan for the commercial area “Schnackenburgallee” in the District of Altona and the District of Eimsbüttel
- 2 Establishment of a Neighborhood Management

Stakeholders Involved

- ▶ The districts of Altona & Eimsbüttel were directly involved in discussions about the commercial park
- ▶ The Chamber of Crafts & Trades and the Chamber of Commerce represented the interests of companies that are housed in areas affected
- ▶ External expert ZEBAU GmbH (Center for Energy, Construction, Architecture and the Environment) consulted on the important areas of focus for the climate adaptation plan through two studies of the commercial area
- ▶ In the long-term, consideration of the “users” of Schnackenburgallee will help identify the optimal working conditions and commuting patterns for the area

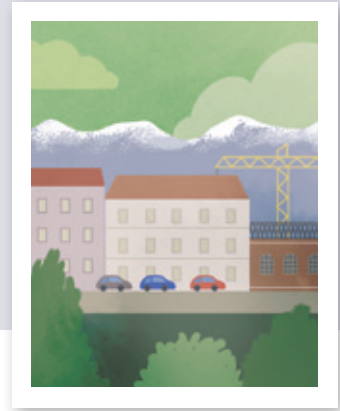
Key Initiatives

- Urban planning of commercial area “Schnackenburgallee”
- **Focus in Hamburg: energy savings, renewable energies and energy efficiency in companies including measurements of building and urban planning and neighborhood development** – study by ZEBAU GmbH

TURIN, ITALY

 **Population:** ~ 889,000 (urban area), ~ 2,270,000 (metropolitan area)

 **Geography:** chief town of the Piedmont region and the capital of the province; situated at the confluence of the Dora Riparia with the river Po



Low-Carbon Context

Turin has undergone a massive process of urban transformation in the last 20 years due to a substantial fall in industrial production – one of its key sectors. The urban area of the city was largely characterized by industrial plants (highly polluting heavy industry) and residential neighborhoods designed for workers. Being a former capital of the production of cars due to **Italian automotive company Fiat**, the use of private vehicles was embedded in the citizens' lifestyles and the road system was designed for car traffic.

The General Master Plan delivered in 1995 foresaw a regeneration process aimed at: reconverting industrial areas, stopping soil consumption, a more interconnected urban tissue, and giving new functions to transform the «factory town» into a city of culture, knowledge and education. Now, Turin is in the midst of **revision of the General Master Plan** to focus on low carbon policies. The city has focused heavily on improving city-wide indicators and on change at the neighborhood scale, selecting actions that will help with better data collection, monitoring and communication across stakeholders.



MOLOC Actions

- 1 Development of an environmental performance certification for the transformation areas (brownfield) and for the single buildings foreseen in the General Master Plan of the City of Torino to improve its environmental quality
- 2 Environmental assessment of the General Master Plan of the City of Torino: application of multi-criteria assessment model
- 3 Awareness Raising and Communication regarding updated environmental actions of the General Master Plan of the City of Torino
- 4 Apply for energy CERTIFICATION ISO 50001 to ensure sustainable management of Torino's public buildings

Stakeholders Involved

- ▶ Territorial entities having the datasets that allow the multi-criteria model and the choice of proper indicators such as the Piemonte Region, the Metropolitan City, AMIAT and IREN - waste collection & electricity & gas distribution, ARPA – the Regional Agency for Environmental Protection, SMAT - Metropolitan Water Company and research bodies.
- ▶ City of Turin units - Environment, Urban Green, Mobility, Smart City, Private Building, Infrastructures, Urbanism, Urban Green, Mobility, Public Building, IT, Social Policies, Civil Protection, Energy Management.
- ▶ Research bodies: Politecnico di Torino, Energy Center, CSI (IT Center – Centro Sistemi Informativi)
- ▶ Interdepartmental Group (established in 2018) and an interdisciplinary working group involving the Piemonte Region, the Metropolitan City, the City of Turin
- ▶ Citizens, professionals, economic operators, and professional associations

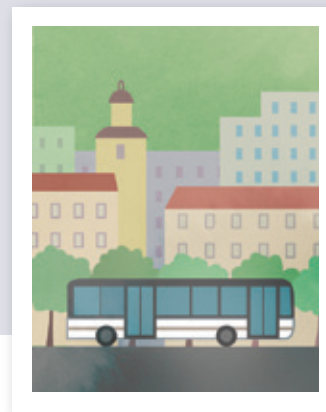
Key Initiatives

- **Interreg Europe Project CESBAMED** for low-carbon indicator analysis
- **Mercoledì del Piano** – Masterplan Wednesdays for public consultations
- **Rail City Lab** for the repurposing of brownfields

SUCEAVA, ROMANIA

 **Population:** 106,000

 **Geography:** two geographical areas located on hills and in a river valley with two groves on the Zamca and Șipote communes



Low-Carbon Context

The municipality of Suceava is experienced in participating on European projects such as MOLOC. As a rather peaceful, familial city, it is looking through its MOLOC action plan to continue to modernize. As a goal to influence the **Regional Operational Program 2014-2020** policy instrument, the municipality works off the foundation of the **Sustainable Energy Action Plan** designed in 2012 to make strides in low-carbon actions around mobility and energy efficiency.

The municipality looked to MOLOC partners for inspirations as it aspires to become a **smart city** to improve the quality of life and energy efficiency for citizens. Much of the challenges in mobility in Suceava come from very high levels of pollution that comes from **traffic**. In terms of building energy efficiency, past projects have not been concerned with **private and public building renovations**. Suceava looks to develop these systems to achieve a critical scale and to be able to serve as a model to other similar municipalities in the region.



MOLOC Actions

- 1 Reduction of CO₂ emission through implementation of a new integrated and ecological public transport system of the public transport system
- 2 Supporting the energy efficiency of residential and municipal buildings
- 3 Management of public space through development of green areas

Stakeholders Involved

- For the MOLOC project, there was a regional working group created with representatives of the 6 other cities from the northeast region
- Regional Development Agency, which is in charge of ERDF coordination for 6 counties in the north part of Romania, to advise the creation and implementation of actions.
- For matters of electrification of buses in the public transport system, the municipality must work with the owner of the local public transport company
- For the energy efficiency project in municipal and tertiary buildings, there will be implication of local NGOs, the environmental protection agency, and private operators in the public heating domain. For residential buildings, there will be implication of owners associations.
- Private companies which are working in the field of central heating, waste collection, recycling and water supply to address the action related to energy efficiency of public utilities.

Key Initiatives

- **Modern and efficient public lighting management in Suceava Municipality** within Swiss-Romanian Cooperation Programme
- **Increasing the energy efficiency of the Suceava City Hall building**
- **Modernization of public lighting on the main thoroughfare in Suceav**



MOLOC Thematic Areas

A large part of Interreg Europe's goals in the MOLOC project was to facilitate exchange and inspiration among partners. Ideas action plans were to originate from both the obstacles' analyses as well as from the natural exchange amongst project partners. During study tours and visits, partner cities were able to find inspiration in the approaches other cities take toward building low-carbon models.

For the purpose of this work, Energy Cities analyzed the ways in which partner cities went from obstacles to solutions. From this, **four major thematic areas were created to structure these various processes** of how cities could approach low-carbon morphologies. These areas include: healthy city and low-carbon culture, enterprise engagement, municipalities as a model, and citizen engagement.

We will deep dive into each theme with examples from our partner cities to illustrate the various strategies that yield low-carbon urban models.



➤ Theme 1.

Healthy City and Low-Carbon Culture

Overview:

Internally at the city governing level and externally amongst the greater public, establishing a low-carbon culture requires a focused goal or strategy.

Cities can establish goals around a concept or award and can likewise mobilize citizens through private building renovation and retrofitting initiatives.

When referring to low-carbon cities, it is evident that a unified approach is strongest. At the core of any city is its overall culture – that which permeates into the way of life and the day-to-day of citizens. Ideally, a strong culture of carbon reduction would be present across strata of urban populations to promote the low-carbon strategies in place. Due to the diverse populations of cities and the challenges of engaging all citizens in matters of low-carbon strategies, cities must find ways to create such a **low-carbon culture** – one in which decisions of low-carbon buildings, renovations, and approaches become second-nature.

While climate change and hence carbon reductions are strong parts of European discourse today, it remains a somewhat abstract term for everyday citizens, especially when it relates to urban morphology. Something that cities and citizens can get behind, however, is the idea of a **healthy city** in which the quality of life is best for all citizens in terms of healthy lifestyles and environments. As an umbrella strategy, there was a common thread among MOLOC partners to spread the idea of healthy living to promote the low-carbon strategic measures in place, shifting perspectives slightly to relate to the average citizen.

ESTABLISHING A HEALTHY CITY GOAL

► Air Quality Challenges – Katowice

For Katowice, the **air quality is a real problem**. Especially in cold, Polish winters, people are accustomed to heating their homes with coal-boilers, and sometimes even household trash, in order to keep warm. Especially in Silesia, the heartland of the mining industry in Poland, it is normal to see clouds of smog in wintertime when the pollution becomes trapped inside the city due to the cold. The resulting particulate matter (PM2.5) results in health risks associated with respiratory disease and premature deaths. Coal remains the dominant form of energy production, nevertheless, accounting for 80% of fuel used⁶.

With these very present and visible effects of carbon-based industry and energy production, air quality is a central factor by which Katowice has communicated and targeted its low-carbon strategy. In addition, the city of Katowice is engaged in numerous initiatives on the topic of air quality such as the AWAIR Interreg Central Europe project⁷, which aims to define new indicators for air quality and to evaluate the effectiveness of measures applied during Severe Air Pollution Events (SAPEs). As this topic already forms the basis for the protection of the health of citizens, especially those most disadvantaged and affected, the dialogue around low-carbon is a natural continuation of such goals. By linking the low-carbon strategies in MOLOC to such discussions, it becomes more commonplace to discuss other measures that ultimately impact the citizens' day-to-day lives and culture.

USING AN AWARD TO UNITE THE CITY TOWARD ONE STRATEGY

At the city level, it can also be pertinent to work towards an award or common goal in the shape of an award or status as a city. For many, this goal can help with communicating a message for common goals and strategies. This can also help to structure the transition to low-carbon models and to rally citizens and other city stakeholders behind a common goal.

► Pursuing the European Green Capital – Lille

The **European Green Capital Award** was an initiative started by a group of 15 European cities in 2006⁸. In 2008, the award was taken over by the European Commission to recognize one European city each year for “leading the way with environmentally friendly urban living”. As over two-thirds of Europeans live in towns and cities this remains a well-known award for developing deep change for a city. Selected cities have the opportunity, through friendly competition, to be showcased as model cities for the effective measures they partake in to attain a green, healthy city culture. The award also provides the structure by which to influence urban morphology in a multifaceted and wholistic way.

For these reasons, the City of Lille decided to apply to be in the running for the European Green Capital Award in 2021 under the slogan: **“Together Towards Green Capital Lille.”** The city aimed at using the award as the platform by which to have engaging events with citizens and to demonstrate the city's motivation and commitment to a low-carbon agenda. In the end, Lille did not win the European Green Capital award, but as a finalist they nevertheless gained the benefit of pursuing initiatives in its name and thus strengthened low-carbon projects as pillars of municipal policies. In this case, not winning still leaves a city with the added benefit of low-carbon impact.

► Structuring around the European Energy Award – Suceava

Instead of a yearly competition or award, there are also awards that act as a certification of attaining a certain level of renewable energy transition. The **European Energy Award (EEA)**⁹ is an ongoing energy certification of a city or municipality. The award is more of an ongoing process requiring a high level of commitment with a dedicated energy team and energy review management process.

The original EEA has more than 25 years of experience and was set up by a core group of central and western European countries. As the idea for the EEA expands, there are a number of pilot countries for which the EEA is being adapted. Suceava was one of the four municipalities selected for the pilot in Romania, tested in 2011 to 2013, after which a tender was made to determine a Romania EEA executive office.

Although it is not the site of the executive EEA office, Suceava was also able to benefit from the EEA as a structure to steer its low-carbon actions. By partaking in the EEA as a pilot municipality, it learned from the structure and legacy of the EEA network. This helped to shape its energy transition strategies and low-carbon goals, ultimately showing what kind of recognition a low-carbon, healthy city could aspire to reach in the coming years.

PRIVATE BUILDING RENOVATION AND RETROFITTING



Other than finding a collective strategy to build low-carbon culture, initiatives can also look to engage private citizens to influence something central to their own urban morphology: their homes. In order to make impact for carbon reduction at a large scale, helping citizens to renovation and **retrofit inefficient private buildings** can implicate citizens in different ways. This way, the everyday citizen can embody the shifting low-carbon culture themselves by being part of the healthy city building and renovation process.

► Grants for residents – Katowice

After many analyses of the air pollution in Poland from studies by the World Bank on behalf of the Polish Government and European Union, it was concluded that the main source of air pollution is low-stack emissions from burning coal and other solid fuels in single-family buildings. The most effective strategy to reduce this pollution, then, is to replace old, sub-standard boilers with those that run on gas, new-generation solid fuel boilers, or heat pumps. This strategy can also be accompanied by thermal retrofitting of single-family homes for more modern and efficient systems.

As a response to air pollution issues, the governmental **Clean Air Program** launched last year, providing financial support and incentives to implicate 4 million households in Poland over the next 10 years¹⁰. Taking this initiative to heart, the city of Katowice has set up a **municipal “donation” program** to help citizens take the step to renovate their homes or private buildings with systems that are better for the environment. Each single-family unit is eligible to be reimbursed for 6,000 PLN (~ 1,400 EUR) by the city for doing renovations for heating pumps and biomass or for renewable energy technologies such as PVC and solar power. Families must pay upfront for the equipment and installation costs.

In 2018, the municipal program was effective in aiding the replacement of 1,082 obsolete heating systems to more efficient systems such as gas, heating networks, electricity, etc. and the installation of 130 renewable energy systems. Challenges for attaining these private household renovations come from practical obstacles. To begin, it must be the citizens that initiate the process to change their heating systems, thus a concerted effort is required by them. Another practical issue is that the city is not the owner of the distribution system for energy, and thus sometimes it is the gas or electric company that is not willing to facilitate the upgrade. Of course, for lower income citizens who are not able to front the costs associated with renovating their homes, the program now presents hurdles for their participation.

Nevertheless, the mayor of Katowice announced this year the creation of a **special council for clean air** in which these challenges would be overcome. Special collaborations with associations for social assistance will also help them find ways to reach people that they have not yet helped to switch to low-carbon systems. Special subsidies may be in order for low-income families in order to help to cover the differences between old and new energy bills in the short-term. In the end, the success of the municipal “donation” program in Katowice depends on an exceptional institutional effort, technical competence, sheer determination and political will at all stages of the process, demonstrating the need for a strong city-wide culture of low-carbon lifestyle as well as the active involvement of residents.

► The Solar Decathlon Europe 2019

This year, the Solar Decathlon Europe 2019 took place in Szentendre (near Budapest) in Hungary on 13 to 27 July. 11 teams took part during the 15 days of exposition, with 200,000 visitors passing through. As the only team representing France, the **Lille-based Habiter 2030** association took part in the competition and ultimately won with their project “**Inhabit 2030**”. The association worked along with students from the Lille National School for Architecture and Landscape, the Compagnons du Devoir (craftsmen institution), various other universities, public and private stakeholders¹¹.

ZOOM: The Solar Decathlon Competition

The Solar Decathlon is a biennial competition that started in the US in Washington D.C. in 2005 by the US Department of Energy. The international competition, based in the fields of architecture, design urbanism, and engineering, is open to interdisciplinary university teams for the best construction of a solar-powered home. Since 2010, a European version was started, debuting in Madrid, Spain.

During the competition, project teams construct and show homes to the larger public and are judged on 10 criteria.

The 10 criteria are:

- | | |
|--------------------------------------|---------------------------------|
| 1. Architecture | 6. Innovation & Viability |
| 2. Engineering/Construction | 7. Circularity & Sustainability |
| 3. Energy Efficiency | 8. House Functionality |
| 4. Communication & Social Awareness | 9. Comfort Conditions |
| 5. Neighborhood Integration & Impact | 10. Energy Balance |

→ Habiter 2030's Winning Strategy

The team had a very specific goal: the mass rehabilitation and thermal improvement of the housing of the industrial era. The goal stemmed from the need to rehabilitate in large numbers and to improve thermally the townhouses and city houses of the industrial period by 2030. **More than 700,000 1930s houses of this kind exist** in the Hauts-de-France region, with 80% of them needing to be renovated. Houses built between 1850 and 1950 make up most cities in the north of France (more than one million in the region) and challenges exist to renovate them (renewal rate less than 1%/year). Since work on these houses and their settlement pose questions about the resorption conditions of unfit housing and energy poverty, the team's object of study had a clear social dimension.

In the competition, their design objective was to **build a house that produced 495 Kwh per year along with reduced energy consumption**. The goal was also to counteract energy waste and other energy hazards, e.g. 43% energy loss by the roof and rain or cold temperatures, in their optimal townhome design.

→ Results of Inhabit 2030 – Guiding Private Renovations in Lille

The winning design is expected to become a basis for Lille to inspire change in their city through private home renovations. As part of their action plan, Lille plans to capitalize on the results of the competition to improve thermal performance of existing buildings in Lille. In Phase II of MOLOC, the City of Lille aims to support the Habiter 2030 association in its ambition to create a replica, at least in part, of the Inhabit 2030 project home. The replica would serve as both a learning space to train students and professionals, but also to showcase to homeowners possible energy efficiency renovations for their homes. The final aim is to feed this into the municipal policy on energy renovation of industrial houses.

This action is decisive for reaching Lille's objectives of saving energy and reducing greenhouse gases to attain their low-carbon city objectives. The activation of a virtuous process of rehabilitation is shown here to be not only technical, but to also demands answers to urban, social, economic, and operative questions. When it comes to reaching a low-carbon culture, each actor taken alone presents skills insufficient to assess the whole situation and propose solutions. Instead, as the Solar Decathlon competition shows, a wholistic and interdisciplinary approach can help to reach low-carbon city goals.



➤ Theme 2.

Enterprise engagement

Objective:

Companies, industrial zones, and office buildings have become a major fabric of any city. City governments are tasked with finding new ways to engage companies, industry and their employees in order take advantage of the emissions savings and influences of such actors and commercial spaces.

INCLUDING COMPANIES IN A LOW-CARBON CITY PLAN

Companies and their employees make for very important and influential actors in many urban cities. Often, the goals and scale of such organizations are different than those of private citizens or even of public agencies. In the context of low-carbon models, cities must consider both what impact companies make on the carbon emissions of a city and in what ways they can include and work together with commercial actors.

While offices often try to reflect modern workplace culture, many industrial workspaces remain housed in barren industrial parks or commercial areas of cement buildings with little greenery or urban development. The importance of such areas is evident to both the city's economy and to the employees of the spaces, yet their integration into low-carbon city plans remains a challenge. Although a few examples of enterprise engagement were demonstrated across MOLOC partners, here we explore in-depth one example of urban city planning of an industrial area in the city of Hamburg.

➤ CO₂ reduction plan for the commercial area Schnackenburgallee



Hamburg has focused its MOLOC actions on one commercial area called **Schnackenburgallee** in order to dig into the low-carbon possibilities for companies and employees implicated in the area. Their major MOLOC action will be the **creation of a CO₂ reduction plan** for the commercial area, integrating approaches for better and more active involvement of companies. This intervention was also motivated by the need to address the scale of such urban development planning of commercial parks, especially those constructed in the 1960s and 1970s that have been long neglected.

Under the larger policy umbrella of the Hamburg Climate Plan of 2015¹², a strategic cluster was made to target the transformation of urban spaces, with a particular focus on the city and neighborhood development level. The commercial area Schnackenburgallee proposed an ideal candidate to work with the infamously experimental district of **Altona** and the neighboring district of **Eimsbüttel** for an urban plan.

→ Zebau GmbH Studies for the CO₂ Reduction Plan

As specialists in the fields of climate mitigation and resource efficiency, Zebau GmbH consultants performed two studies of the commercial area to frame the work for the MOLOC project. The first study focused on accessing the district in detail while the second took to more concrete recommendations of focus for the commercial area's plan, entitled, „Focus in Hamburg: energy savings, renewable energies and energy efficiency in companies including measurements of building and urban planning and neighborhood development.“ From this second study a number of areas of focus surfaced to be addressed in the future CO₂ reduction plan of the area.

These areas of focus were:

- 1. Mobility:** limited access to public transport, few safe bike lanes, no e-charging stations, no car sharing
- 2. Heat supply:** no access to district heating, no photovoltaic installations
- 3. Climate adaptation:** heavily sealed surfaces, no quality green areas

These findings identified the issues to be addressed in the CO₂ reduction plan as **(1) limited non-fossil mobility alternatives for employees, (2) fossil fuel heat sources, and (3) high bioclimatic exposure**. As the plan is written in Phase II of the MOLOC project, these problems will be the primary focus for mitigation measures for implementation in the area.

→ Hamburg Eco-Partnership or “UmweltPartnerschaft”

An important starting point for companies in Hamburg as it relates to low-carbon agendas is an alliance of the Senate and Hamburg to support sustainable business management through the *Hamburg Eco-Partnership*¹³ initiative. With the motto, “*Business and government working for our future*”, the groundwork was laid for a group of businesses that voluntarily came together with cooperating partners: **the Chamber of Commerce, the Chamber of Crafts and Trades, the Industry Association, and the City of Hamburg**.

The partnership had objectives of ecobalance, sustainable business management, and cooperation between the city and its business community for protecting the environment while also reducing the administrative burden for attaining these objectives. The partnership symbolizes the give-and-take conversation between businesses and the city in which investment aid, advisory services, consideration of client's needs and favorable consideration of those with EMAS verification¹⁴ shows the mutual interest and compromises these actors are willing to make for environmental protection purposes. This partnership set the precedent for a conversation about low-carbon actions in the city between businesses and the city.

→ The Chamber of Crafts & Trades and Chamber of Commerce as Primary Actors

As a port city with a tradition of independence, the primary influential actors of Hamburg have long been businesses and their aggregate organizations. The **Chamber of Commerce**¹⁵ started in 1665 and for a long time was one of the three political entities in Hamburg. Currently it has 150,000 businesses which the chamber represents on political, legal, and financial matters. Similarly the **Chamber of Crafts and Trades**¹⁶ is a self-governing body of the skilled crafts sector. The sector, which includes work such as management consulting, legal consultancy, assistance in foreign trade is the biggest employer in the city-state of Hamburg.

Due to the scale and large representation of these two organizations, Hamburg MOLOC partners have worked closely with them during the course of the project. As these organizations offer many services to partner businesses such as on-site advice and consulting or help with permits and other legal and government matters, they are in tune with the needs and desires of companies working in the commercial area. In the end, they could give insights that fed the findings of the Zebau GmbH urban planning studies for the area.

From the Zebau GmbH study II, it was found that the area has about 6,200 total employees working there at about 460 different companies (300 represented in the chamber of commerce, and 160 in the chamber of crafts & trades). In terms of climate mitigation, 6 of the companies are part of the Hamburg Eco-Partnership while one is part of the „Ökoprofit Club“ or Ecoprofits club. Although consultation with individual companies or employees was not possible, the active participation of the chambers was pivotal for shedding light on the businesses' needs in the area that could be reflected in its urban morphology.

→ The Districts of Altona & Eimsbüttel: Neighborhood Management of “Schnackenburgallee”

After getting input from commercial partners in the area, the next step for Hamburg MOLOC partners was to find administrative partners. As the “Schnackenburgallee” commercial area spans over two districts, those of **Altona and Eimsbüttel**, it was imperative to include these districts into the process. Especially because the Hamburg Climate Plan promotes city district level planning, the potential is there to co-create with the districts the plans they foresee for the commercial area.

Long-term cooperation and coordination is necessary for both districts and thus a MOLOC action for Phase II of the project will be to establish **Neighborhood Management** in the commercial area. This management would occur in the form of one employee of the city who would act as a climate protection manager. He or she would have two primary roles in the CO₂ reduction plan: as a contact person for businesses and as a spokesperson for those businesses back to the city.

The tasks of these roles would boil down to:

Contact Person	Spokesperson
make personal contacts at companies in the area	bring concerns of companies to authorities
advise companies on CO₂ reduction measures	inform both parts about upcoming planning
negotiate contacts and to bundle information	establish transparency
to support businesses with expert knowledge	perform official work and documentation

Ultimately neighborhood management will act as a future liaison of the city to the commercial park. Their role would connect the urban planning department to the implementation of measures from the Zebau GmbH regional study and climate protection concepts.



➤ Theme 3.

Municipalities as a model

Overview:

Municipality governments have two roles in the low-carbon morphology of cities: (1) they themselves focus on being a role model as they represent the low-carbon aspect of their own projects and buildings, and (2) they provide models and tools to empower urban planning departments and stakeholders to take on low-carbon actions.

MUNICIPALITIES SETTING AN EXAMPLE OF LOW-CARBON MODELS

► Public buildings and lighting – Suceava

In 2014, the municipality of Suceava performed an in-depth audit of its public lighting system. Their studies showed that a modernization of the public lighting system was needed in order to be more efficient and to save energy. They started a project in 2015 to replace over 9,000 outdated lighting units distributed across 18 educational units (schools, kindergartens and high schools) with new, energy-efficient LED units¹⁷. This project was financed through the Swiss Romanian Cooperation Program with a total amount of 2,343,260 EUR and was implemented in September 2019.

By using a tele-management system for the public lighting, they were able to attain additional reductions in electricity consumption. For example, they could establish programmed reduction of luminous intensity in set intervals to 75% of the maximum operating intensity. The tele-management system also enabled real-time identification of non-functional lighting units and correction of nonconformities.

The new lighting system expects electricity consumption savings the first two years after installation of a total of 4,452 Mwh, which translates to about 324,000 EUR, or about 52% of the total energy budget. This also amounts to a reduction of CO₂ emissions for the first two years of ~ 1,2 t CO₂.

→ A First Step for More Low-Carbon Measures

The significance of the lighting modernization was first to show a commitment of the municipality towards new technologies. As the municipality also lacked the budget to implement this measure on their own, it was also an example of needing to find an external source of funding for the project (here the Swiss-Romanian Cooperation Programme).

Using LED systems for public lighting means many benefits such as significant reduction of energy consumption and CO₂ emissions, an improved quality of the life in the city, and local development of new technologies (also into the private sector). Even though significant investment is required for such an infrastructure project, it is a quick win and shows citizens and stakeholders a willingness to set an example for low-carbon measures.

► Building Management System (BMS) – Katowice

In Katowice, one action is dedicated to the development of a **comprehensive model of monitoring and control of energy consumption** in municipal public buildings.

They will achieve this through the creation and testing of a **building management system (BMS)** to demonstrate replication potential to city stakeholders. Through the successful implementation of BMS systems, they hope to inspire other actors to create similar monitoring systems in their own buildings. Katowice plans to implement this action with a mix of public and private capital through ESCO.



ZOOM: Katowice's Inspiration - Turin's BMS Process

As inspiration for Katowice's BMS, interactions during the MOLOC project with Turin helped to lay out the process and groundwork by which a municipality could attain such a system.

Turin's process can be described in **7 steps**:

- 1. BIM MODELS:** Development of digital models, using Building Information Modeling (BIM), of 30 city buildings. Collaboration with the DISEG of the Politecnico di Torino
- 2. ENERGY AUDITS:** Energy audits of 160 buildings in the city
- 3. PRE ENERGY DIAGNOSIS:** From an energy point of view, an overall review of the city's real estate assets. Identification of the most energy-intensive buildings in the city
- 4. REVAMPING 1-2-3:** energy redevelopment project for thermal power stations in more than 200 city buildings
- 5. FACTOTUM ENERGY DASHBOARD:** Integrated Facility Management software with particular focus on aspects of Energy Management
- 6. BUILDING MONITORING:** installation of sub-meters in the city buildings for monitoring energy consumption
- 7. ISO 50001 CERTIFICATION¹⁸:** the City of Turin decided to acquire the ISO 50001 certification for the development of an energy management system (EnMS) – also an action of their MOLOC action plan

A BMS is to serve many purposes, in particular to:

1. control and reduction of energy consumption and GHG emissions
2. provide data enabling monitoring
3. assess replication potential and demonstrates benefits of efficient technologies to building users and stakeholders
4. make an impact on users of public buildings by increasing awareness of the possible ecological benefits and financial savings, which comply with the strategic aims of the LCEP

→ Demonstrating the benefits of BMS

The idea for the BMS in Katowice is to demonstrate the potential for the system for other city stakeholders. To achieve this they will go through a series of steps:

1. Mapping of the energy consumption in the public buildings of the City of Katowice

- Identification of consumption patterns
- Estimation of costs and potential savings

2. Implementation of the BMS system in 25 municipal buildings

- Choice of implementation scope for individual facilities depending on their consumption patterns – monitoring and control system or solely monitoring
- Comparison of costs related to different financing mechanisms (3 scenarios: city budget, ESCO or mix of both)
- Securing funds in the city budget
- Description of the subject of the contract
- Commencement of the tender procedure
- Contractor selection
- Signing of a contract
- Implementation of the system

3. Monitoring and promotion of results of the action among building users

- Energy saving monitoring
- Assessment of financial and environmental effects
- Development of a promotion and education strategy
- Raising awareness among users and visitors of buildings

Using themselves as the model of a successful BMS launch, they will be able to both demonstrate their dedication to low-carbon models as well as to later consult other public entities, citizens, and businesses on how to implement such systems in the future.

LOW-CARBON CAPACITY BUILDING WITHIN THE MUNICIPALITY


► A toolbox for urban planners – Lille

During Phase I of MOLOC, Lille started a project for an urban planner “toolbox”. This toolbox was created as a MS Excel dashboard to formalize the first step of a process of reflection for a sustainable urban strategy. More specifically, a toolbox can enable planners to make low-carbon design decisions in their projects, especially when they may have to prioritize the best low-carbon practices available or possible for them. Ultimately the toolbox aims **to serve urban planners of the city**, the Métropole Européenne de Lille (MEL), and public developers.


Inspiration for the toolbox came from a few places. First, as a finalist in European Green Capital competition 2021, Lille received feedback that it had a lack of strategic vision on the integration of climate issues in the city fabric regarding adaptation to climate change. Next, from the obstacles identified in the low carbon city obstacles analysis of MOLOC, they noted their particular obstacles as: a lack of political involvement, need for improvement of internal governance between services, and external governance with the institutional partners. Finally, needs of the planners expressed during the «urban planning» workshop in July 2019 (led by LGI, external expert selected by the City in MOLOC) revealed a desire by these actors for an iterative approach to urban operations and an evolutionary catalog of technical solutions.

→ Choosing thematic areas

When embarking on such a toolbox, the areas of focus needed to be selected. The selection of thematic areas for the toolbox came from a few sources. Some themes came from the European Green Capital competition framework¹⁰. Other thematic areas were inspired by the Paris Urbanism Agency (APUR¹⁹) and from the Grenoble Metropole.



ZOOM: Inspiration outside MOLOC – Grenoble's Air Climate and Urbanism Toolbox



Another inspiration of thematic areas for Lille's toolbox came from a similar toolbox used by the Grenoble Metropole²⁰ called the **Air, Climate, and Urbanism Toolbox**. In it, thematic areas are organized as larger chapters and include:

1. Winter comfort
2. Summer comfort
3. Greening
4. Water cycling
5. Energy production methods
6. Accessibility and parking
7. Reduction of urban nuisances

The final list of thematic areas was optimized to be nearly exhaustive in its topics, to easily handle the synthesized technical indicators, and to allow an overview of the issues in a wholistic manner. In the end, the goal was to allow users to easily move from PCAET²¹ to operational urban planning.

The final product is a MS Excel table that summarizes the thematic indicators with various descriptors: thematic, indicator code, indicator name, performance levels (high, moderate, low), time of verification, source documents, extraction calculation mode, indicator objectives, and remarks.

→ Future use for the toolbox



The toolbox makes it possible to concretize the work undertaken with the city's construction partners (developers, promoters, federations, departments of the Metropolis, the Region and the State) within the framework of the MOLOC project and the "Club des 10 000" bringing together the actors of new construction. The toolbox will make it possible to define action priorities for a low carbon strategy for Lille, involving the municipality and development partners. In the near future, the Mayor of Lille is expected to define priority criteria for a low carbon strategy, based on the toolkit's proposals.

Cross-cutting indicators with the CesbaMED tool – Turin

Over the course of the MOLOC project, the city of Turin will develop a low carbon energy strategy through the activities of the new city masterplan. The duration of the master plan is around 10 years according to regional legislation. The city is defining an integrated and comprehensive environmental plan which is aligned with the environmental policies defined within the **General Master Plan**. The integrated environmental plan is characterized by different sectorial environmental components:

- ▶ Green area
- ▶ Environmental pollutions
- ▶ Public lighting
- ▶ Climate change strategic plan

In the first phase of the MOLOC project, the city of Turin worked closely with the Interuniversity Department of Regional and Urban Studies and Planning (DIST)²² of Politecnico di Torino. DIST provided in-depth analysis about energy transition and adaptation to climate change in order to systemize information and define a territorial urban strategy toward energy transition and resilience. Furthermore, in the context of the obstacles analysis, they chose to zero in on one particular obstacle, that of the **lack of proper indicators** in order to lay the foundation for future work in MOLOC on revising the master plan.

The new master plan will use the **Strategic Environmental Assessment (SEA)**. The **SEA indicators** will be measured through the decisional CesbaMED tool, developed in the **CESBA MED Interreg project**²³ in 2019. The tool will allow for indicators to be used in many quantitative ways (e.g., land use, CO₂ emissions, energy consumption, transport, and mobility). The CesbaMED tool also helps in measuring the baseline status, and consequently, in monitoring process regarding urban policies in the long-term horizon. The overall goal became to determine indicators, originally created for the district level, to be useful at the city level and to even aid in building and neighborhood analysis of sustainability.

→ Indicator Selection Process

Key Performance Indicator(KPI) selection and calculation depended on the development of a decision-making process for the definition of sustainable strategies at the city level. The model, which refers to the one developed in the Interreg project CESBA MED, will adopt multicriteria evaluation systems and both quantitative and qualitative indicators.

The general process of indicator selection started with the basis of the 178 indicators in the CesbaMED project. Then the indicators were reduced to 25 by the experts of the DIST and the city of Turin to boil down indicators to those for which data exists and it is realistic to expect tangible results.

Finally through a questionnaire to public administrators, the city aimed to reduce again the number of indicators to only those of high quality. The indicators varied but were in the fields of: **urban planning, greenery, major works, energy, innovation, and the environment**. Respondents prioritized which of the 25 indicators were most important to them on a scale of not important to very important.

→ Workshops for Prioritization of Indicators

Discussing and identifying the best evaluation criteria for the revision of new master plan with a perspective of energy transition and sustainable city planning must consider social, energy, environmental and technical criteria. As indicators were selected and reduced to 11, the importance of criteria needed to be determined. Through the support of **multi-criteria analysis** methodologies, the DIST team led a series of workshops to discuss prioritization and actionability of the new indicators.

Among the different methods available for weight allocation, the technique introduced by J. Simos (1990) proved to be particularly effective, proposing a fairly simple procedure based on the use of a set of cards. This is currently known as the Simos-Roy Figueira method or method of card packs (or the SRF method).

Workshops brought together 30 stakeholders from public administration and companies with different backgrounds were divided into 2 groups. Each group had to rank the proposed indicators, one group by the SRF method and the other without. Most importantly, participants came with the knowledge of the data they could contribute to such indicators, so that the conversation was sure to be centered on the data that could be collected to make the indicators useful in further analysis.

The final indicators:

Issue	Indicators	Description	Unit of measurement
BUILT URBAN SYSTEM	Conservation of land	Undeveloped land considered to be of value for ecological or agricultural purposes	%
	Intermodality facilities	Proximity to intermodal platforms of public transport system	%
ENERGY	Total primary energy demand for building operations	Ratio of average total primary energy consumption of all buildings to the local minimum value	kWh/m ²
ATMOSPHERIC EMISSIONS	GHG emissions from energy used for all purposes in building operations and transport system	GHG emissions from primary energy	CO ₂ /1000 Mq
ENVIRONMENT	Ambient air quality with respect to particulates <10 mu (pm10)	Atmospheric PM10 concentration detected by control units	%
	Tree coverage for shade and management of local ambient temperatures.	Percentage of shaded surface compared to the total territorial surface	%
SOCIAL ASPECT	Availability and proximity of key public human services	Percent of residential buildings located within a different distances to emergency and basic municipal services	%

The Future Use of the CESBAMED tool and indicators

The final indicators were a large victory for Phase I of Turin's MOLOC project. Going forward, the idea is to use the CesbaMED tool's idea of a sustainability passport to start to identify some key scenarios for the future master plan. For this, the benchmark can be changed to make the tool useful at different scales, such as at the district level or even neighborhood and building level. In the next steps, the goal is for a sustainable neighborhood or sustainable building passport tool to be of use. This will be especially important when incorporating the weights of priority determined in the indicator selection process.



Theme 4.

Citizen engagement

Objective:

In modern democratic cities the engagement of all parts of society is necessary for making decisions. Municipal cities have the challenge of informing, rallying, and appealing to citizens through municipal projects, neighborhood-level engagement, associations and ICT technologies.

In Europe today, there is a large notion of increased citizen participation and involvement in political processes. In democratic political systems, it is natural for citizens to feel that their voice and needs are being heard and taken into account for important decisions. Cities have the increasingly complex task of hearing the voices of their diverse populations and incorporating them meaningfully into urban planning decisions.

In many cities, especially those with long traditions of active citizen participation, citizen involvement may be mandated or institutionalized through citizen councils and participatory charter or budgets as is the case for Lille. In other cities like Suceava, there may be organizations such as building representation for high-rise, single-family units or neighborhoods. Even with these bases there to guide citizen participation, cities must continue to find new ways to engage with citizens for transformational low-carbon actions.

► Citizen information points: Municipal Energy Center – Katowice

The realization of the low-carbon economy plan (LCEP) in Katowice depends on the active involvement of all participants in the energy market. The LCEP is largely based on raising energy users' awareness of the ways and opportunities of improving energy efficiency and the possibility of using renewable energy sources. As a part of their financial strategies, long term incentives of renewable energy sources for users should be identified and assessed. Information concerning such benefits, as well as funding options, legal and technical requirements, and regulations should be easily available. For Katowice, this spurred the **creation of Katowice's own information point**: the Municipal Energy Center (Miejskiego Centrum Energii, MCE).

→ Creation of the Municipal Energy Center (Miejskiego Centrum Energii, MCE)

After inspiration from Lille's Maison de L'Habitat Durable (MHD)²⁴, Katowice embarked upon the creation of its only citizen information point: the Miejskiego Centrum Energii (MCE) or Municipal Energy Center²⁵.

🔍 ZOOM: Lille's Sustainable Housing Center (Maison de L'Habitat Durable - MHD)²⁶

A primary inspiration for Katowice's MEC came from Lille's MHD. The MHD is an established information point that opened in October 2013 by the City of Lille and the Métropole Européenne de Lille (MEL). It is a place to get advice for constructing, renovating or better living in your home. It is accessed primarily by citizens, owners or co-owners of homes and buildings in Lille looking to reduce energy and water bills, to insulate their home, and to upgrade to renewable technology or high performance equipment.

Advice is given by professionals who work independently and give advice for free. Those include architects, energy, technology or financial specialists, jurists, and mediators of energy and water. They help citizens renovate their homes through free workshops and meetings, advice and personalized consultation. Personalized consultations occur in the form of: home visits for a diagnostic of the building, a definition of the work that can be done, explanations of subsidies, information on qualified companies who may perform the work, and help with management of the charges and fees of such projects.



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The MHD also hosts many events in the forms of lectures or workshops to teach or demonstrate ideas for renewable energy to citizens. Yearly, the MHD helps 5,500 homeowners with their renovation projects in which 1,200 have home visits for personalized consultation²⁷. This also amounts on average to 16,600 EUR in financial aid for 25,000 EUR of engaged work for very modest households.

With nearly 12,000 touchpoints with citizens each year, 5,600 visitors to the center, 200 architecture consultations, and 7,000 legal or financial consultations, is it no question that the MHD has become a cornerstone of citizen engagement when it comes to the low-carbon models of renewable energy transition in the city of Lille.

The idea was to mirror Lille's MHD in creating a physical space that was an extension of the city for all that concerned renewable energy. The process for the creation of the point took four steps:

- 1. Application for creation of information point:** development of the project of the center and exhibition part, application for funding from the city budget
- 2. Creation of the MCE,** inclusion of employees for the needs of the center, implementation of the investment, officially opening the center
- 3. Operation of MCE:** consultation for visitors, assistance in completing applications for financing replacement of heating systems, renewable energy installations, building thermo- insulation
- 4. Promotional and educational activities:** launching the Facebook profile for the center, organization of meetings with experts, meetings with residents

In the end, the MCE was created in a space just steps away from city hall. Managed by members of the Energy Department in the city and with one full time staff member, the MCE opened in September 2018 to the public. Although it has only been open for about one year, the MCE has already started to make waves in the community of Katowice with 1,424 personal consultations made with citizens.

In the future, the center hopes to expand its reach as much as possible by lengthening opening hours to the afternoon to accommodate those who work. The center also looks to organize informational meetings in districts of Katowice outside the city center to engage more citizens. More educational events and collaborations with energy companies are also on the horizon for the MCE.

Partnering with a City Agency: Urban Lab Torino

In Turin, the city has chosen to support an association as a partner in citizen engagement – the **Urban Lab Torino** (renamed from its previous name Urban Center Metropolitan Torinoiv). The Urban Lab Torino is an autonomous association created to describe the transformation processes of Turin and the metropolitan area. It is a communicational, research and promotional tool, as well as a place for discussion and information to be made available to citizens, experts, and economic operators.

→ Mercoledì del Piano – Masterplan Wednesdays

The urban planning department of the City of Turin, along with the support of the Urban Lab Torino, organized 5 weekly public meetings in 2018 called «**I mercoledì del piano – the Masterplan's Wednesdays**» to consult the public on 5 of the main themes that emerged during the preliminary revision phases of the Master Plan²⁸. Three more mercoledì del piano also followed in 2019.

The five themes of public debates:

1. Environment, green areas and land protection
2. Cultural heritage, landscape, culture and quality of urban space
3. Mobility, housing and services
4. Research, innovation, education and University
5. Business and trade

The meetings were held in front of the City Hall in the open air to encourage citizens to listen and interact, and broadcasted by the local Radio Flash to reach a wider audience. After a first introduction by Guido Montanari, the Vice Mayor in charge of urban planning, three Q&A sessions moderated by a radio anchorman were launched to encourage the debate. Each meeting was also attended by the Deputy Mayor in charge of the topic.

More than 500 people attended the initiative, including policy makers, civil servants, local associations, students, journalists and private citizens. The reports, podcasts and a photo gallery of each meeting were made available online following the events.

→ Rail City Lab for repurposing of brownfields

Spanning over the Borgo San Paolo to Lingotto districts in Turin, seven disused railway areas cover an area of over 500,000 square meters. The area's transformation will be crucial to make the city more livable, sustainable and connected. Italy's train company, the FS Sistemi Urbani, has taken on the task of enhancing the brownfields for tourist-accommodation, commercial and tertiary use.

This extraordinary development opportunity was placed at the center of public debate in Turin in May 2019 for the three-day Rail City Lab²⁹ workshop. In the workshop, investors, professionals, academics, administrators, representatives of institutions, organizations and local communities discussed the future of these areas.

The Rail City Lab event took place in collaboration with the Order of Architects of Turin with alternate plenary sessions and working sessions. Two sessions were open to the public (plenary sessions), where the public was presented the objectives of

the workshop and the seven railway areas with the three analysis themes: sustainability, connections, and living. The following work sessions were reserved for technicians, who analyzed the outcomes of the topics discussed.

As a follow up to the Rail City Lab event in May 2019, a broader public consultation took place in October 2019³⁰. The event was promoted by Urban Lab Torino and the city of Turin and was an opportunity to continue the discussion on the future of these areas starting from the results of the workshop. The consultation took place in an open dialogue involving the City of Turin, Ferrovie Sistemi Urbani, economic and social actors, experts and technicians. The discussion was communicated and moderated by the Urban Lab Torino.

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