

5th Workshop

Shaping Low Carbon Areas

Inventory compilation



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SMART-MR SHAPING LOW-CARBON AREAS

Background and objectives

Station areas as transportation nodes based on rail transportation offer a low-carbon basis for urban development. Land use principles which guide land use efficiency and infilling of urban structure within station areas are derived from SMART-MR WS4 Transit oriented development.

Low-carbon housing requires zero energy building in new building stock, retrofitting in existing stock and renewables as a energy source. In transport planning, low-carbon planning principles consist of supporting walkability, bikeability and interchanges in travel chains, but also giving constraints or strategic principles for parking and private car use.

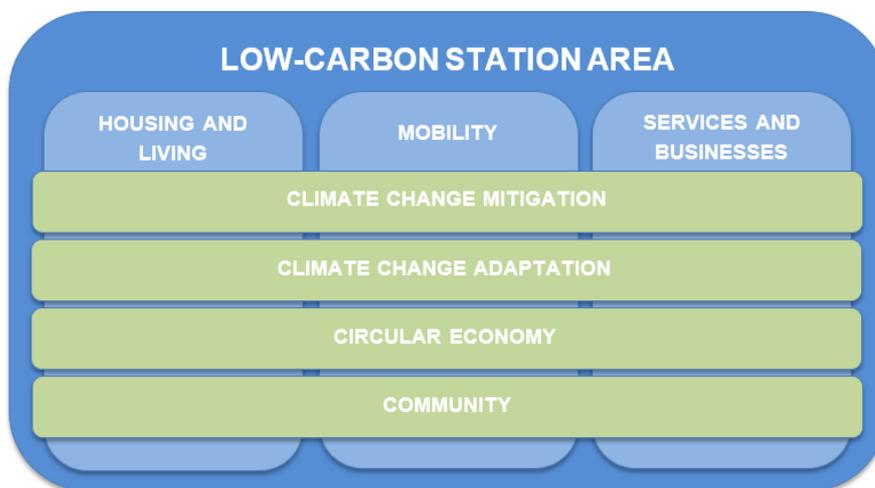
Circular economy and resource efficiency will be vital parts of carbon neutral society and saving raw materials. Also, a livable community will make sharing economy possible, with assistance of digitalization. Developing low-carbon community is an important part of decarbonization of society, while it still needs both awareness raising and assisting in behavioral changes.

An adequate service level in transportation nodes will serve both interchange travelers and local residents giving more attractiveness to rail transportation. Investment in low-carbon urban infrastructure is an important method facilitating transition to low-carbon society in every sector.



For the purposes of Workshop 5, a concept for Low Carbon Station Areas in Helsinki region will be developed. The concept will help cities develop low-carbon areas both within the existing urban structure as well as in planning of new station communities. The concept will set targets for low-carbon station areas and compile measures which can be used for reaching the targets.

In the concept, there are three perspectives of low-carbon station areas: living and housing, mobility, and services and businesses, and four cross-cutting themes: climate change mitigation, climate change adaptation, circular economy and community.



In Workshop 5, we will mainly concentrate on climate change mitigation. We would like to learn about the experiences in shaping low-carbon areas from your region, either regarding station communities, or other low carbon project areas.



Inventory

Background objectives to the inventory of **Shaping Low-carbon areas** and to the workshop held in Helsinki. A short description of a Low Carbon Station Area –concept which is being developed in the Helsinki region is provided as background information and as a frame of reference.

- A. **Open questions on Shaping low-carbon areas:** a set of ‘open questions’ intended for regions about procedures, opinions and practices.
- B. **Data monitoring and other tools** for managing and updating climate strategies and shaping low-carbon areas.
- C. **Good/Bad practice presentation:** detailed presentation of the procedures adopted in **Shaping low-carbon areas** in your respective region/municipality.
- D. **Current experiences:** short presentation of your development processes of/for **low-carbon areas**, methodology and results.

BARCELONA

5th Workshop

Shaping Low-carbon areas

Inventory – PP10: AMB (Barcelona Metropolitan Area)



Questions

In the inventory for shaping low-carbon areas, the SMART-MR Partners should draw on the experience gained at the previous workshops and from expertise gained in their own metropolitan region.

A) Open questions on shaping low-carbon areas

1. **Does your region have set regional greenhouse gas emission targets and do you have a regional climate action plan? If yes, what kind of targets do you have (e.g. reduction percent in CO₂ emissions, target year for carbon neutrality)? Are the targets for total emissions or per capita emissions?**

Catalonia, and thus the metropolitan area of Barcelona, is strongly engaged with the European climate change policies. Both, Catalonia and the metropolitan area of Barcelona are developing plans aligned with the European policies for 2020, which are trying to reduce in a 20% the GHG emissions.

In the regional frame, Catalonia is developing the plan called “**Pla de l’Energia i Canvi Climàtic de Catalunya 2012-2020**” (Catalonia’s Energy and Climate Change Plan 2012-2020), which principal targets are:

- A 20% reduction of primary energy consumption for the year 2020 in comparison to a trending scenario.
- Getting a 20% share of renewal energies for the overall energy consumption, by 2020.
- Getting a 10% share of renewal energies for the overall transport energy consumption by 2020.
- Reducing GHG emissions to 20% by 2020 in comparison to 1990.

Besides, in the metropolitan context of Barcelona, there is another plan being developed the “**Pla de Sostenibilitat de la AMB (PSAMB)**” (Sustainability Plan for the Metropolitan Area of Barcelona), that is the environmental policies reference instrument for the metropolitan area. The related targets are:

- Reduce the unitary energy consumption of road transport (2.70%).
- Decrease consumption of fossil fuels (-10.0%).
- Decrease CO₂ emissions (-6.0%).
- Decrease NO_x emissions (-17.00%).
- Decrease NO₂ emissions (-11.40%).
- Decrease PM₁₀ emissions (-17.00%).
- Decrease PM_{2.5} emissions (-17.00%).

- Reduce the population exposed (%) to values of pollutants NO₂ above those legally established by the EU (-100.00%).
- Reduce the population exposed (%) to values of pollutants PM₁₀ above those legally established by the EU (-25.00%).

2. Does your region have any other strategy, e.g. energy transition strategy, urban renewal strategy, which steers towards low-carbon area development?

As it has been said, Catalonia is committed to European policies for climate change. It is worth mentioning that the region is currently developing an **Air Quality Action Plan** and has a **National Pact for Energy Transition**.

The Air Quality Action Plan aims to achieve the air quality European established levels for the 10 microns particles (PM10) and nitrogen dioxide (NO₂).

The Plan is structured in eight areas, subdivided into 14 objectives that contain 46 general actions and another five to be implemented if an environmental pollution episode is declared. Thirty-two measures are proposed to the local authorities and five to the municipalities with more than 100,000 inhabitants, of which three are compulsory.

These actions focus in a wide range of aspects:

- Integrated mobility management promoting a model based on public transport and active mobility (walking and cycling).
- Advocating for clean fuels and electric vehicles in private daily mobility.
- It urges the Catalan automotive industry to lead the manufacture low-emissions vehicles.
- It supports the use of the best available technologies (BATs) to reduce industrial emissions.
- It strengthens continuous emissions monitoring at the main emitting sites.
- It includes new environmental taxation measures tied to the emissions of nitrogen oxides, particulate matter and other atmospheric pollutants generated by commercial aviation, industry and vehicle traffic.
- It aligns with the Catalan Public Health Plan (PINSAP), giving priority to prevention over intervention and also with the European Union's Cleaner Air for Europe Programme.

On the other hand, the Catalan National Pact for Energy transition, is born by the need of an agreement to find a new Catalan clean energy model. This model must be democratic, sustainable, based on renewal energy and aligned with European Union energy targets.

The main objectives followed by the plan are:

- To abandon nuclear energy.
- To reduce dependence on fossil resources.
- To improve citizens' participation.
- To open the energy market to regulated competition.

And the specific long-term objectives are:

- A 100% renewal-based energy model by 2050.
- The fulfilment of the European targets set in the “Clean Energy for all Europeans” pack.

3. Which organizations/decision making bodies are responsible for these strategies? Are the same organizations responsible for implementation? What kind of metropolitan governance do you have in your region and does it include land use planning?

In Catalonia the competent authority is “*Generalitat de Catalunya*” – the regional government – and within the organisation, compound of different departments are responsible for these strategies. The responsible department for applying sustainable mobility actions is the Sustainability and Territory Department. This department works in the fields of mobility, environment, urbanism and territory, designing and implementing plans and actions.

In Barcelona’s metropolitan territory, there are several decision-making bodies. On one hand, the Barcelona Metropolitan Area (AMB), the metropolitan decision-making public authority, has some powers in key issues such as transport and mobility, environment and sustainability, housing, economic development, and social cohesion. This entity is called to become the communication link between municipalities.

On the other hand, there are the city councils of the metropolitan municipalities, like Barcelona Council, that are the ones responsible for their own territories and try to follow the “*Generalitat de Catalunya*” guidelines.

4. Do you have a low-carbon area or station area as a development project in your region? How do you define it?

We have 2 types of projects. At the metropolitan level, a Low Emission Zone (ZBE). It is an extensive area where circulation is restricted to the most polluting vehicles.

At the local level, we are developing different projects of low local emissions areas. The most renowned example is the Superblock (*superilla*) project. It’s an urbanistic redistribution project to create green spaces for the pedestrians.

5. What kind of a project is it and how large is the area (e.g. Climate Street, low-carbon district, low-energy block or other)?

The Low-Emission Zone (LEZ) is a structural wide-scope project to improve the air quality in the urban districts. The project called “*Zones de Baixes Emissions (ZBE) rondes de Barcelona*” (Metropolitan Low Emission Zone in the Barcelona ring roads), aims for a reduction of the number of running vehicles in the metropolitan area. It is the most effective measure to act against pollution. Nowadays (since December 2017) the

covered area is about 100 km², but when the complete metropolitan LEZ will be finished it will cover 636 km² (the whole 36 municipalities that perform the Barcelona metropolitan area).

Besides, the project plans to promote different initiatives in order to create a more sustainable city:

- Increment the number of public transport users by increasing its offer.
- Minimize the suspended particles.
- Give priority to green spaces and proximity facilities for the citizens.
- Promote the use of both, electric and less contaminants vehicles.

The project is divided in 4 phases to be able to progressively address all the involved subjects to adapt to the measures. At the end of the project, the low-carbon area will concern an approximate total area of 636 km².

At the local level, we are developing many different projects of low local emissions areas and different sizes. For example, Superblocks are made up of a grid of basic roads forming a polygon, some 400 by 400 meters, with both interior and exterior components. Counting only in Barcelona city there will be 500 superblocks.

6. Are you developing new low-carbon areas or transforming the existing urban structure?

The majority of projects that we are developing are for the urban transformation.

7. What are the main measures to implement low-carbon areas (e.g. traffic free zone, low-carbon buildings)?

Circulation restrictions within the metropolitan Low Emissions Area of Barcelona began on December 1, 2017 on days of pollution episode by NO₂, working from Monday to Friday from 7:00 am to 8:00 pm. In subsequent years, the restrictions will be progressively extended until they become permanent after 2020.

Initially the restrictions will affect cars without Traffic General Directorate (DGT) label and vans before Euro1. During 2017 motorcycles, trucks, coaches, buses and vans Euro 1, Euro 2 and Euro 3 are exempt from this restriction.

By 2020 restrictions will affect all unlabelled vehicles of the DGT (gasoline before Euro 3 and diesel before Euro 4)

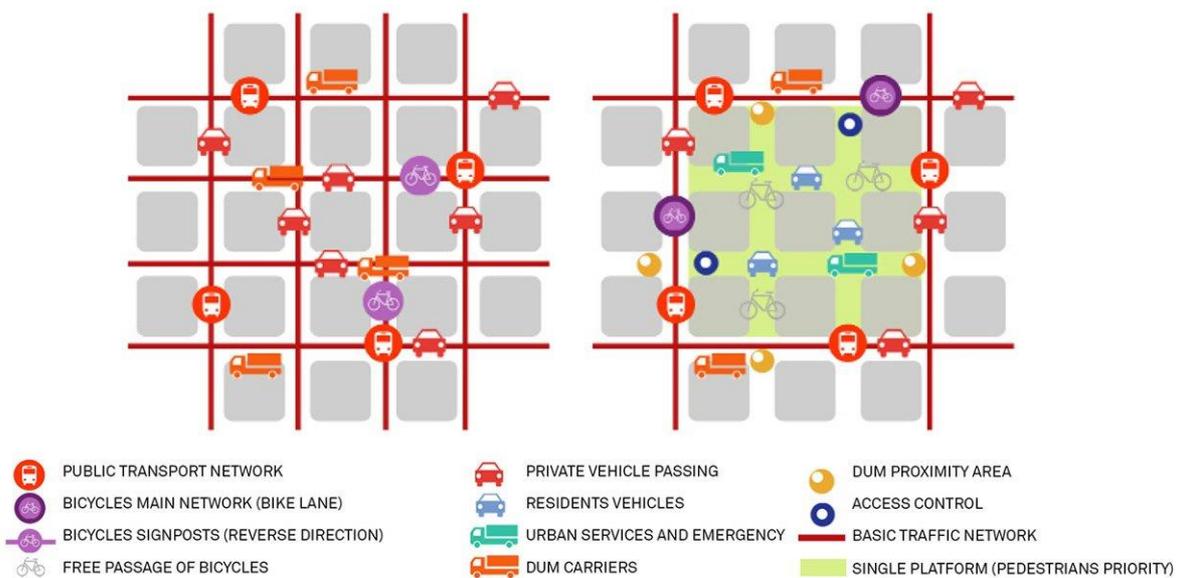
In a third phase, the low-carbon area will concern the whole metropolitan area of Barcelona by the year 2025.

Regarding local low-emission zones, the main purpose of the projects is to reduce the number of vehicles running in the city, but also to convert the urban land into green, cultural and social meeting points.



Current Model

Superblocks Model

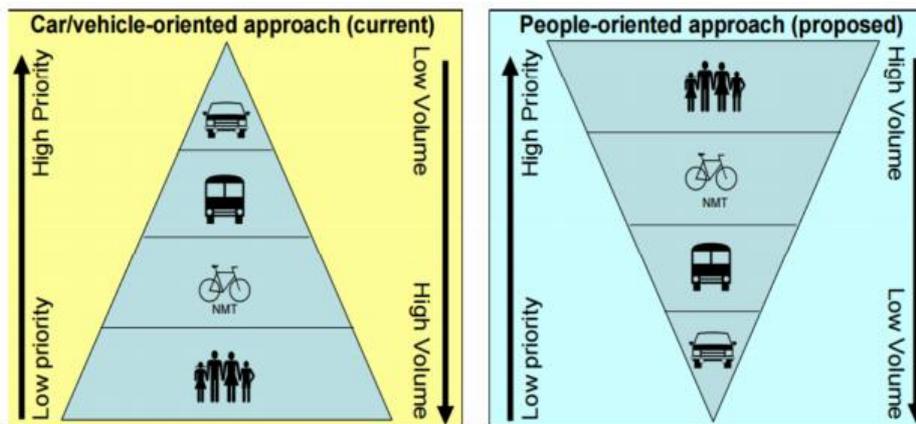


The project is focussed on restricting vehicle passing through a square perimeter of street blocks converting the restricted area or Superblock (*superilla*) in a green space for the pedestrians.

- Land use targets were analysed in workshop 4: Transit oriented development. If you have any special climate targets in land use planning related to low-carbon areas, please describe them.**

The implementation of low-carbon areas as well as Superblock - *Superilles* project is outlining a more sustainable city model. These actions are steered to draw a new transport landscape. This new scene looks for a more environmentally friendly city transport. The set targets represent a complete change in the mobility priorities:

- Public transport increase in 109.438 more trips (+3.5%).
- Private transport decrease in 438.553 trips or 350.842 vehicles in Barcelona (-21%).
- By foot transport increment in 250.020 trips (+10%).
- Cycle transport: increment in 79.161 trips (+67%).



Link to the current Urban Mobility Plan of Barcelona city:

http://mobilitat.ajuntament.barcelona.cat/sites/default/files/1_pdfsam_PMU_BCN_2013-2018_definitiu2.pdf

9. Housing and its heating and cooling in low-carbon areas should be energy efficient and utilize renewable energy sources. Do you have special targets or recommendations for low-carbon building stock? What measures do you have for this? Are the measures for new housing or for retrofitting the existing stock?

In Catalonia, the domestic sector has contributed to both NO_x and PM₁₀ emissions in a 5% and 2% from the total emissions respectively. The domestic sector does not have a very significant weight in total emissions; however, it is important because of its spatial concentration in highly densely-populated urban areas where pollutant dispersion is very slow. In this sector, a large part of the emissions are concentrated in the coldest months, in a short period of time and, for this reason, their real weight in total emissions during this period is higher than its annual percentage would lead one to think.

The guidelines followed to reduce the impact of domestic sector are collected in the Catalan building renovation Strategy that aims to improve energy efficiency by 14.4%. In brief, the taken actions focus on two points:

- Improve domestic energy efficiency and savings and provide incentives for less polluting fuels.
- Renovation of existing buildings stocks.

10. What kind of restrictions or incentives are you using for limiting car use in low-carbon areas / zones?

As it has been explained, the Metropolitan Area of Barcelona is facing a progressive change into the use of green energy and the reduction of private transport, especially those that pollute more.

The current restrictions focus on diesel vehicles with Euro 3 or older versions, and petrol vehicles with Euro 2 or older versions, during the contamination episodes. In the near future, as it has been exposed, these restrictions will become permanent.

Besides this, the AMB is promoting the reduction of car use in low-carbon areas through the following initiatives:

- Giving 3 years of free access to the public transport network to those citizens who dismantle their old car and commit to not buying a new one, at least during this 3 years period.
- Promoting the use of the electric cars with new charging stations and free charging for Barcelona's residents.
- Creating P&R to reduce the entrance of vehicles into the low-carbon areas.
- Increasing the number of cycle lanes in the metropolitan connections.

In the Superblocks or local LEZ, the measures are different, the use of the private vehicle is banned, parking is eliminated, road loops are created, etc.

11. Are there special parking standards for low-carbon areas / stations in terms of CO2 emissions? Are there limitations to parking in low-carbon areas / stations (places/apartment)? How are park and ride areas implemented in station areas?

There are no parking costs for zero-emission vehicles in the city of Barcelona and in many cities of metropolitan area.

The Metropolitan Area of Barcelona (AMB) has developed a model of decrees that will be extended to the 36 municipalities to promote the use of electric vehicles and low emissions under a common framework for the whole metropolitan territory.

The most relevant measure is that electric cars will be able to park for free in the regulated parking areas of each metropolitan municipality, regardless of where they are registered. Those cars with the "Zero emission" label (electric cars) will be exempt from



paying, Vehicles with a label "Eco" (hybrids, natural gas, liquefied gas and biogas) will have a 50% discount.

Regarding municipal car parks, the decree model states that recharging must always be free and the city councils may choose to offer up to four hours of parking at no cost. It also establishes the commitment to enable three charging stations for every hundred places in public car parks.

Furthermore, a project to promote the park and ride areas has recently started. These areas have been established near train stations to provide a quick access to the city entrance by public transport.



AMB's Park & Ride.

12. **What are the planning principles for bicycle parking in station areas (or other low-carbon areas)? Are there special bicycle parking standards for these areas and for housing units/flats? Do you have any targets regarding dimensioning or the amount of parking places?**

Catalan Mobility Law (9/2003) and its regulation 344/2006 establishes bicycle parking standards for different new land uses, including housing and train and bus stations:

ANNEX 2

Aparcament de bicicletes

S'estableixen les següents reserves mínimes d'aparcament de bicicletes situats fora de la via pública en funció de les activitats i usos del sòl llevat d'aquells supòsits en què es justifiqui l'adopció de valors inferiors:

Places mínimes d'aparcament per a bicicletes

Ús d'habitatge	màx. de 2 places/habitatge 2 places/100 m ² sostre o fracció
Ús comercial	1 plaça/100 m ² sostre o fracció
Ús d'oficines	1 plaça/100 m ² sostre o fracció
Ús industrial	1 plaça/100 m ² sostre o fracció
Equipaments docents	5 places /100 m ² sostre o fracció
Equipaments esportius, culturals i recreatius	5 places/100 places d'aforament de l'equipament
Altres equipaments públics	1 plaça/100 m ² sostre o fracció
Zones verdes	1 plaça/100 m ² sòl
Franja costanera	1 plaça/10 ml de platja
Estacions de ferrocarril	1 plaça/ 30 places ofertes de circulació
Estacions d'autobusos interurbans	0,5 places/30 places ofertes de circulació

Decree 344/2006, for Evaluation studies of generated mobility.

In terms of bicycle parking, Barcelona has created a Bicycle Strategic Plan to analyse the future parking needs of the city bikes. These measures are implemented in Barcelona's city council mobility plan for 2013 – 2018, as follows:

- Increase the urban bicycle parking spaces (from 22.350 to 30.000).
- Increase the bicycle parking spaces located in underground parking (from 1157 to 1500)
- Create 1200 new bicycle parking spaces located in underground stations and public buildings.
- Improve the offer of the public bicycle service (Bicing).

In AMB we promote the Bicibox system (www.bicibox.cat), 7 or 14 bike places boxes that cover 19 from the 36 municipalities. Bicibox offers in total more than 1.700 bike parking units, distributed in 155 different locations. Almost 50% of bike boxes are located next to train, metro or tram stations, and nowadays from AMB we are developing new bike parks to offer higher capacity in order to promote intermodality. We have studied how many bike parks are needed depending on the demand of the train / metro / tram station.



High capacity bike parking project in Gavà train station (left)
14 spaces Bicibox (right)

13. What kind of low-carbon solutions have you created for last-mile dilemma in station areas?

Currently there isn't an implemented solution for the last-mile dilemma. Nonetheless, the city council of Barcelona, in collaboration with the SME Vanapedal, has started a pilot with the first urban micro-logistics platform. Actions like this can reduce transport vehicles in a 5.4% in the city centre.

More information about the Barcelona / Vanapedal pilot:

<http://bcncl.es/vanapedal-eco-logistica-para-la-distribucion-urbana-de-mercancias-en-barcelona/>

The Metropolitan Area of Barcelona (AMB) is developing an action-programme to promote eco-logistics. Three actions stand out:

- Development of a technology platform of intelligent management of loading and unloading areas (for goods delivery).
- Incorporation of signalling and information systems
- Elaboration and dissemination of model-type ordinances to promote eco-logistics
- Support for the deployment of micro platforms and business initiatives related to eco logistics based in Cargo-bike based micro-distribution

14. Adaptation to climate change includes management of storm water and urban heat islands. What kind of measures do you have for cooling and for management of storm water?

Barcelona's city council collaborates with the meteorological services of Catalonia and Barcelona to prevent the effects of climate change. Besides, the AMB and the ACA (Catalan Water Agency) have planned the Director Plan of Fluvial Water. A plan that prevents the city from flooding by planning urban drainage. This drainage, key to fight Mediterranean torrential storms, has been deployed to counter the urbanization effects.

Link to Director Plan of Fluvial Water:

<http://www3.amb.cat/ema/docum/PlaDirector.pdf>

Link to Barcelona Council's Energy Department:

<http://ajuntament.barcelona.cat/ecologiaurbana/ca/que-fem-i-per-que/ciutat-productiva-i-resilient>

15. In your low-carbon area, do you have circular economy related criteria (such as requirement for using recycled building materials or requirement for optimizing public space usage, space sharing)? What are the best practices you would like to share regarding circular economy/ resource efficiency?

Circular economy is a metropolitan priority and has been in the AMB Strategic Guidelines for a while. There are a few good examples of successfully implemented projects:

- **Districlima:** This project takes place in the Barcelona city areas of Fòrum and 22@. The project creates a system that takes advantage of the residual vapours from the waste-management plants to heat and cool 89 buildings of the area.
<http://www.districtlima.com/ca>
- **Parque Agrario del Llobregat:** In that case, the agricultural stakeholders of the Llobregat river delta have a collaborative agreement with the Ecoparc1 (the organic waste-treatment plant). The plant provides the farmers with organic compost, and they give a new use to this waste.
<https://parcs.diba.cat/web/BaixLlobregat>
- **Ecoindústria:** In the municipalities of Gavà and Viladecans, the Ecoindustria collaborative and sustainable industry project brings together 80 companies that share and optimise their resources and recycle waste.
<http://ecoindustria.net/>

16. What kind of recommendations or regulations regarding sustainable procurement do you have and on what level? (Region, city, area)

All the regulative bases in terms of sustainable procurement are collected in the Ajuntament de Barcelona MAYORAL DECREE S1/D/2017-1271, of 24 April, on the City Council's sustainable public procurement.

Link to MAYORAL DECREE S1/D/2017-1271:

<http://ajuntament.barcelona.cat/contractaciopublica/pdf/Sustainable-Public-Procurement-Decree.pdf>

17. Good service level in station areas can create an attractive urban node. Do you have any service concepts for station areas, or recommendations of commercial or transport-related services? Within the urban structure, where are the public services concentrated in? (city centre, station areas)

The mobility paradigm is changing and the implementation of services has not yet fully taken on transport. There is a lack of reflection on this casuistry in our territory.

18. How do you motivate citizens to take action for low-carbon objectives?

Citizen participation has been an indispensable path for great part of the implemented projects. For instance, the Superblock (*Superilles*) plan was created in collaboration with the neighbourhood councils and involved private entities.

In addition, the platform *Barcelona + Sostenible* is promoting an initiative to commit citizens with the challenge of creating a more sustainable city. As a result of the initiative, a report has been issued: [Compromís Ciutadà per la Sostenibilitat 2012-2022 \(Citizen's Commitment to Sustainability 2012-2022\)](#). The document collects all the commitments taken and it has been signed by a large number of entities, companies, associations, municipalities, schools and citizen-associations, all of them united for a sustainable city.

19. Which organizations, authorities or other partners are the main stakeholders in developing low-carbon areas / stations? How is co-operation arranged?

First of all, the different levels of the administration are:

- Generalitat de Catalunya and the Department of Territory (DTES) - regional level
- AMB – metropolitan level (local)
- Municipal governments – local level

Moreover, and just to give just a few examples of collaborative partners:

- ATM (Metropolitan Transport Association)
- ICAEN (Catalan Institute for Energy)
- AEDIVE (Business Association for the Development and Impulse of the Electric Vehicle)
- Cluster of Energy Efficiency in Catalunya
- Cluster Solartys (Spanish Cluster of Solar Energy and Energy Efficiency)
- Research centres like TECNIO (ACC1Ó – Regional Development Agency of Catalonia).

Form AMB, cooperation is arranged by the promotion of workshops, conferences and work-sessions about the different subjects that have to do with low carbon areas. These are the basic strategies to create a productive participation environment. The leadership of development is in the municipalities

20. How is funding for low carbon measures organized?

The Government of Catalonia approved a Law on climate change that proposed new funding instruments. Currently, this law is not operative, due to the current political situation in Catalonia.

The financing of low-emission zones is borne by the municipalities. The Metropolitan Area also collaborates economically.

B) Data monitoring and other tools for shaping low-carbon areas

1. How and with which method do you calculate greenhouse gas emissions on metropolitan (or city) level and what is your reporting cycle (e.g. annually, once in two years...)?

On the one hand, the Oficina Catalana del Canvi Climàtic - OCCC (Catalan Office for Climate Change) from Generalitat de Catalunya (regional government) offers a guide and a calculator to estimate the GHG emissions associated to an activity, with the aim to be useful for any organization, public administration, company, association, and for the general public. The OCCC's guide is based on ISO 14064 and ISO/TR 14069, which are developed in tune with the Greenhouse Gas Protocol (GHG Protocol) and the World Business Council for Sustainable Development. The guide is updated every year. OCCC also publishes a *Progress report on the fulfilment of the objectives of reduction of emissions of GHG gases*, annually since 2010.

AMB's carbon management strategy:

http://www.amb.cat/documents/11818/2864349/Resum+executiu+2011-2015_informe+2017.pdf/1276f829-3226-4699-b640-b2e4db8bae59

On the other hand, the Metropolitan Area of Barcelona and Generalitat de Catalunya (Territory and Sustainability Department) uses an own tool (EMIMOB) to calculate the evolution of mobility and emissions of greenhouse gases. The report is updated every two years, since 2006. Both mechanisms, the OCCC guide and EMIMOB tool, use the EMEP/EEA air pollutant emission inventory guidebook (<http://www.eea.europa.eu/publications/emep-eea-guidebook-2016>) as the main source of reporting motorized vehicles emission factors.

2. Do you have any indicators for monitoring the development of greenhouse gas emissions and/or the implementation of climate action plan?

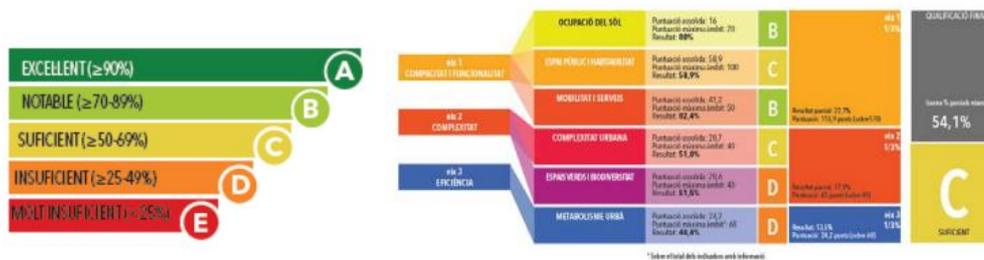
The OCCC's guide is useful to calculate emissions for a specific actuation, and the Progress report on the fulfilment of the objectives of reduction of emissions of GHG gases is useful to monitor the implementation of the climate action plan. On the other hand, AMBIMOB tool is an instrument to facilitate the strategic environmental assessment of the urban mobility

plans of Catalonia, and the EMIMOB assesses the environmental analysis of the Mobility Director Plan of AMB.

3. Do you have indicators for monitoring the development of low-carbon areas in your region?

The Superblock or *Superilles* has an evaluation system based on sustainability indicators that measure the impact of the actions which are proposed throughout the process, with the same degree of coding which is used in energy certification: A (excellent), B (remarkable), C (sufficient), D (inadequate), E (very insufficient).

At the beginning of the program, the degree of sustainability will be measured from one exhaustive diagnosis, with indicators that evaluate areas such as occupation of the ground; public space and habitability; mobility and services; urban complexity; spaces green and biodiversity, or urban metabolism. At the end of each process will be carried out a new diagnosis to know and certify the degree of urban sustainability achieved.



Also, the City Council of Barcelona is working with some Sustainability Indicators such as:

- Green surface
- Biodiversity of birds
- Eco mobility
- Road safety
- Air quality
- Acoustic quality
- Quality of the water of human consumption
- Renovation of the housing stock
- Water consumption
- Penetration of ICT in homes
- Responsible consumption
- Generation of municipal waste
- Selective waste collection
- Destination of municipal waste
- ..

On the other hand, AMB is working with an Evaluation Model of Measures of the Metropolitan Plan of Urban Mobility in relation to Air Quality in the Metropolitan Area of Barcelona. This model also analyses the impacts of the metropolitan LEZ. The novelty of the model is that, in a free edition to assessing the impact on traffic, energy consumption, CO₂ emissions, NO₂, PM, and other pollutants, the impact assessment on public health is also taken into account.

4. Are low-carbon concepts for shaping low-carbon areas, such as BREEAM Communities, LEED or One Planet Living, used in your region?

The Metropolitan Area of Barcelona is working with the **LEZ** and specifically, the Council of Barcelona has implemented some **Superilles** -an urban unit larger than an island of houses but smaller than a neighbourhood, with pedestrian streets..



Figure 2 Low Emission Zone

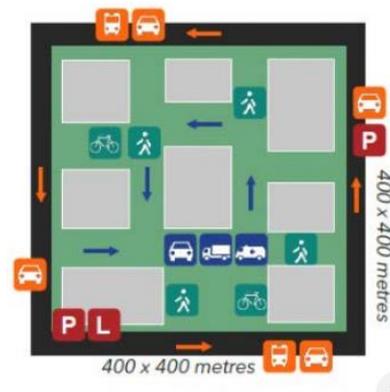


Figure 1 Superilles in Barcelona

Self-evaluation of Low-carbon Area / Station Area projects (if there is one), or of any other low carbon local plans/projects, that demonstrate how climate targets are conducted.

Name a specific plan, project or case that incorporates the development of low-carbon station area (or other low carbon area project):
Zones de Baixes Emissions (Metropolitan, Inside ring-road and ZUAP)

5. What are the objectives of the plan/project in regard to climate change mitigation?

The metropolitan plan for the development of Low Emissions Zones is focused to reduce the population exposed to the effects of polluting gases produced largely by the traffic of vehicles in the metropolitan area of Barcelona.

6. What is the time frame for carrying out the plan/project?

Progressive from 2017 to 2025 (preliminary studies from 2015).

7. Who has the legal responsibility for the plan/project?

Àrea Metropolitana de Barcelona and the municipalities' councils.

8. What kind of planning principles are there in the plan concerning climate targets?

Establish traffic restrictions for the most polluting vehicles in the area of 36 which they make up the Metropolitan Area of Barcelona.

9. What are the main measures for shaping low-carbon area?

- Reduce the entry of vehicles
- Promote the renewal of the fleet
- Reform the public space
- Improve and promote public transport

10. Is the population and workplace density higher in the low-carbon area compared to the rest of the region? Is densification considered as an objective in the development of the area?

Yes, it is. In the city of Barcelona there are almost 6,000 cars per km². This is the double than Madrid City (3,000 cars per km²) and more than three times London, which has 2,000 cars per km². If motorcycles are added to the calculations, 9,000 vehicles per km² are exceeded, and vehicle density is three times the one of Madrid and 5.5 times London's. Every day more than one million vehicles circulate through the accesses of Barcelona, about eight hundred thousand do so along the main roads of the city and almost 270,000 circulate around the ring-roads.

Barcelona concentrates more than one third of the total of local atmospheric pollutants emitted in the metropolitan territory: it is estimated that Barcelona concentrates 36.1% of NO_x emissions and emphasizes the districts of the Eixample and Sants Montjuïc (for being the ones that they concentrate more mobility) that alone surpasses the volume of emissions of any other metropolitan municipality.

11. What are the tools in developing low-carbon areas a) if the land is public owned and b) land ownership is private? Are there differences in tools depending on the land ownership?

The land is publicly owned, and the tools for developing low-carbon areas are the Urban Mobility Plans of each municipality and the Metropolitan Urban Mobility Plan (PMMU). Above PMU, there is the Mobility Director Plan of the Region Area (RMB), which is an instrument for mobility management that includes determinations for Urban Mobility Plans.

These plans are the regulatory framework and of planning, and introduce actions or measures, structures or bases in order to improve air quality, given the high levels of emission of atmospheric pollutants with a negative impact on the health of the population.

Other initiatives to improve air quality are:

- Pla de sostenibilitat de l'AMB 2014-2020, Eix 4 Salut ambiental (AMB's sustainability Plan 2014-2020 – Axis 4: environmental health). <http://www.amb.cat/web/medi-ambient/sostenibilitat/pla-de-sostenibilitat>
- Reflexió Estratègica Metropolitana (REM) (Metropolitan Strategic Reflection). <http://www.amb.cat/es/web/amb/actualitat/publicacions/detall/-/publicacio/reflexio-estrategica-metropolitana--versio-completa-/1134488/11696>
- Compromís Metropolità per la Mobilitat Neta (Metropolitan Commitment to Clean Mobility) <http://www.amb.cat/web/mobilitat/mobilitat/consell-de-la-mobilitat>
- Consell de Municipis Metropolitans per a la Lluita contra la Contaminació Atmosfèrica (Metropolitan Municipalities Council against Atmospheric Pollution). <http://www.amb.cat/web/amb/actualitat/noticies/detall/-/noticia/lluita-contra-la-contaminacio-atmosferica/4160631/11696>
- Pla de Millora de la Qualitat de l'Aire de Barcelona 2015-2018 (PMQAB) (Barcelona's Plan for Air Quality Improvement 2015-2018). <http://ajuntament.barcelona.cat/ecologiaurbana/ca/que-fem-i-per-que/ciutat-productiva-i-resilient/pla-de-qualitat-de-l-aire-de-bcn>

12. How is the development of the low-carbon areas monitored? Do you calculate emissions for smaller development areas? Are there other indicators?

AMB, together with Barcelona City Council and the Royal Automobile Club of Catalonia (RACC), has characterised the emissions of vehicles from Barcelona and the Barcelona metropolitan area, with the objective to:

- Characterise the park in the metropolitan area.
- Characterise emissions according to type of vehicle

At present, AMB is working with an Evaluation Model of Measures of the Metropolitan Plan of Urban Mobility in relation to Air Quality, in order to monitor the implementation of the *Zones de Baixes Emissions* (LEZ).

C) Good examples/bad examples

Give examples of good and bad development plans of low-carbon areas (preferably a station area, if there is one). Briefly describe why the examples are good or bad. Please exemplify with links or images (Max 1 page)

Good practice 1
<p>Name: Barcelona + Sustainable program</p>
<p>Context: The Local Agenda 21 in Barcelona is reflected in the Barcelona + Sustainable program. The frame of reference for the 2012-2022 period was agreed by nearly 1,000 organizations in the city, and it is the Citizens Commitment for Sustainability.</p>
<p>Main authorities and stakeholders involved: About 1,000 companies, organizations, professional colleges, universities, institutions and educational centres have signed the Citizen Commitment for Sustainability, becoming part of a network of actors for sustainability, which cooperate with each other, They inform and exchange information, share results and participate in a learning and collective change process.</p>
<p>Web links: http://lameva.barcelona.cat/barcelonasostenible/es/entitats-i-empreses?page=4</p>
<p>Why is the practice considered as 'good'? It is an instrument of participation and public-private collaboration aimed at reducing emissions. The collaborative work network has allowed to strengthen all the entities and promote new projects</p>

Good practice 2
<p>Name: Low Emission Zone</p>
<p>Context: An area measuring over 95 km² that includes Barcelona and the municipalities around the city's ring roads. It is planned to progressively restrict the circulation of the most polluting vehicles within this area, from 1 December 2017 onwards. Within the Barcelona's ring road low emissions zone, traffic restrictions will be applied from 1 December 2017 onwards, during days with NO₂ pollution episodes, working days from Monday to Friday from 7 am to 8 pm. These restrictions will be progressively expanded until they become permanent in 2020. These restrictions will not apply to the vehicles of people with reduced mobility, emergency services (police, firefighters, ambulances) or essential services (medical and funeral services).</p>

<p>Throughout 2017, motorcycles, lorries, coaches, buses and vans with Euro 1, Euro 2 and Euro 3 emission standards will also be exempt.</p> <p>Traffic restrictions for the most polluting vehicles will be progressively applied using the Traffic Department's (DGT's) classification for vehicles: no label (the most polluting vehicles), and then following a decreasing order of pollution: with yellow, green, Eco and Zero Emission labels.</p>
<p>Main authorities and stakeholders involved:</p> <p>The Barcelona Low Emission Zone is centred on the municipality of Barcelona, except for the neighbourhoods of Vallvidrera-el Tibidabo-les Planes and Zona Franca Industrial. It also includes areas of the surrounding municipalities of Sant Adrià del Besòs, L'Hospitalet de Llobregat, Esplugues de Llobregat and Cornellà de Llobregat.</p>
<p>Web links:</p> <p>http://ajuntament.barcelona.cat/qualitataire/ca/zones-de-baixes-emissions http://www.amb.cat/es/web/mobilitat/projectes-oberts/detall/-/projecteobert/implantacio-de-zones-de-baixes-emissions/6576610/11704 http://canvidhabits.com/ca/zona-baixes-emissions-lambit-rondes-barcelona/</p>
<p>Why is the practice considered as 'good'?</p> <p>It is the most important action to promote the change towards low emission mobility. It is considered a good practice because it is a measure coordinated by the AMB with the active participation of 5 municipalities. It is also one of the largest LEZ in Europe. In 2020 it will affect 5 municipalities and around 95 km² and in 2025 it will extend to 36 municipalities and more than 630 km².</p> <p>Besides, AMB is promoting the reduction of car use in low-carbon areas through the following initiatives:</p> <ul style="list-style-type: none"> • Giving 3 years of free access to the public transport network to those citizens who dismantle their old car and commit to not buying a new one, at least during this 3-year period. • Promoting the use of the electric cars with new charging stations and free charging for Barcelona's residents. • Creating P&R to reduce the entrance of vehicles into the low-carbon areas. • Increasing the number of cycle lanes in the metropolitan connections.

Good practice 3
<p>Name: Application of the first Superblock</p>
<p>Context: The Superblocks project in Barcelona is one of the biggest urban transformations ever planned. They are conceived as units of urban organization. The inner streets of the super-spaces are spaces where the right of passage of vehicles is no longer the main function, but they become space to stay and exchange, space for games, leisure, etc.</p>

The objective of these Superblocks is to free certain routes from passing traffic, in order to humanize them and gain them for citizens' activities. The Superblocks model organizes the city so that pedestrians are the ones with real priority, followed by bicycles and public transport.

In September 2016 the first Superblock was implemented in the district of Sant Martí, on the perimeter formed by the streets of Badajoz, Pallars, Llacuna and Tanger.



Basic mobility measures have been applied, with temporary, reversible and fast execution actions that allow us to visualize the new uses that can be achieved. As a result of its implementation, a process of assessment and proposals was launched in the neighbourhood, to promote working together on the necessary adjustments to improve the operation and strengthen its potential. This was implemented through open-discussion sessions (street debates, events at the nearby University Pompeu Fabra...) and a Working Committee was created with the main associations and organisations, which conducted periodic meetings.



Listening to the complaints and proposals and thorough the work done within the framework of the Working Committee, the pilot test is now closed: the final mobility scheme was implemented (January 30, 2017) and the actions on the public space to adapt the model to the territory, its inhabitants and their activities have begun.

<p>Main authorities and stakeholders involved: Barcelona City Council</p>
<p>Web links: http://ajuntament.barcelona.cat/superilles/ca/content/el-poblenou</p>
<p>Why is the practice considered as ‘good’? The benefits of the implementation of the Superblock model in Barcelona can be summed up in the following four ideas:</p> <ul style="list-style-type: none"> • Improvement of the habitability of public space; • Progress towards a more sustainable mobility; • Increase and improvement of urban green spaces and biodiversity; • Promoting the participation and co-responsibility of citizens. <p>That being said, it is worth noting that the implementation of the first superblock had some deficits in the last of the 4 elements: a lack of citizen information triggered certain social difficulties for its correct implementation. After this experience, several efforts are being made in the new projects, to improve this aspect.</p>

D) Current experience

1. Does your own organization have a climate strategy or is it included in your general strategic approach? Do you have a climate action plan? If yes, what are the targets?

The AMB proposals related to climate strategy has to be elaborated in accordance with the existing legal framework at different scales, from the European to the local. More directly, it is adapted to the criteria and guidelines established by the Mobility Master Plan of the Metropolitan Region of Barcelona (PDM), which at the same time integrates the National Mobility Guidelines (DNM) in the metropolitan territory.

Specifically, AMB has drafted the Environmental Sustainability Plan (PSAMB 2014-2020) that establishes a roadmap to improve the environmental sustainability of the territory, and the Metropolitan Strategic Reflection (REM) as a strategic document in the medium and long term. Moreover, AMB has worked with the Pla Metropolità per a la Mobilitat Neta (Metropolitan Plan for Clean Mobility), and is currently developing the Urban Metropolitan Mobility Plan (PMMU).

The related targets are:

ENVIRONMENTAL OBJECTIVES OF THE PMMU REGARDING 2012	% TARGET 2012
Reduce the unitary energy consumption of road transport	-2.70%
Decrease the consumption of fossil fuels	-10.0%
Decrease CO ₂ emissions	-6.00%
Decrease NO _x emissions	-17.00%
Decrease NO ₂ emissions	-11.40%
Decrease PM ₁₀ emissions	-17.00%
Decrease PM _{2,5} emissions	-17.00%
Reduce the population exposed (%) to values of pollutants no2 above those legally established by the EU	-100.00%
Reduce the population exposed (%) to values of pollutants PM10 above those legally established by the EU	-25.00%

2. Is your organization involved in shaping low-carbon areas? What are the main measures in your organization?

Yes, it is. AMB is responsible for the implementation of LEZ - *Zones de Baixes Emissions*. It's a structural wide-scope project to improve the air quality in urban districts. The project called "*Zones de Baixes Emissions (ZBE)*", looks for a reduction of the number of running vehicles in the metropolitan area. It is the most effective measure to act against high contamination episodes.

Besides, the project plans to promote different initiatives in order to create a more sustainable city:

- Increment the number of public transport users by increasing its offer.
- Minimize the suspended particles.
- Give priority to green spaces and proximity facilities for the citizens.
- Promote the use of both, electric and less contaminants vehicles.

The project, is divided in 4 phases to able to the involved subjects to progressively adapt to the measures. At the end of the project, the low-carbon area will concern an approximate total are of 95 km².

The area also promotes areas of low local emissions, providing economic and technical support to the municipalities and, establishing criteria for the homogenization of signage.



Local Low Emission Zone in municipality of Sant Just Desvern

3. Has an evaluation been conducted?

The metropolitan LEZ has been implemented since the 1st of December 2017, only in episodes of atmospheric pollution. At the moment there has not been any evaluation because have not occurred any episode up to now.

4. Do you have experience in using a Low-Carbon -concept (BREEAM, LEED, One Planet Living etc.)? If yes, what kind of experience do you have?

AMB has experience in **Zones de Baixes Emissions (ZBEM, ZBEU, and ZUAP)** since the 1st of December 2017.

5. Does your organization have questions about shaping low-carbon areas that you would like to be discussed in the forthcoming workshop?

The most interesting topics are:

- Citizen participation
- EU labelling criteria (The lack of a European environmental labelling system for vehicles)
- EU funding for low carbon areas
- Low-carbon vs air pollution
- The urban transformation of the city: hard or soft measures

6. **What experiences from workshop 5 do you want to bring to the next workshop? The question will be distributed under WS 5 and will complement the inventory.** (Answered after workshop 5)

BUDAPEST

5th Workshop

Shaping Low-carbon areas

Inventory

Questions

In the inventory for shaping low-carbon areas, the SMART-MR Partners should draw on the experience gained at the previous workshops and from expertise gained in their own metropolitan region.

A) Open questions on shaping low-carbon areas

1. Does your region have set regional greenhouse gas emission targets and do you have a regional climate action plan? If yes, what kind of targets do you have (e.g. reduction percent in CO₂ emissions, target year for carbon neutrality)? Are the targets for total emissions or per capita emissions?

Budapest has a SEAP (Sustainable Energy Action Plan), while a climate strategy is currently being developed; both have greenhouse gas emission targets. These targets are reduction percent in CO₂ emissions and for total emissions. We also have indicators for the share of low carbon areas compared to the total city area, where the target values are the following: for 2025 5%, for 2030 20% and for 2050 100%.

2. Does your region have any other strategy, e.g. energy transition strategy, urban renewal strategy, which steers towards low-carbon area development?

Budapest has a long-term urban development concept (so called Budapest 2030), an integrated urban development strategy (so called Budapest 2020), an environmental program (so called Budapest 2021) and a green infrastructure concept etc.

These papers rely on laws accepted by the Hungarian Parliament as well as on national strategies and programs (Environment-protection act, National Environment-protection Program (2015-2020, so called NKP-4), National Sustainable Development Frame Strategy, National Development and Land use Concept (so called Nemzeti Fejlesztés 2030))

3. Which organizations/decision making bodies are responsible for these strategies? Are the same organizations responsible for implementation? What kind of metropolitan governance do you have in your region and does it include land use planning?

The Municipality of the City of Budapest is responsible for these strategies and for the implementation.

The metropolitan governance consists of the Municipality of the City of Budapest and the 23 independent city districts.

Land use planning is dedicated to the Municipality of Budapest, but generally, districts are responsible for zoning plans.

4. Do you have a low-carbon area or station area as a development project in your region? How do you define it?

We do not yet have any low-carbon areas, but the climate strategy suggests to establish it. One of the current developments, the City Park project can be considered, as a low carbon area development. Please find the description of the project later.

5. What kind of a project is it and how large is the area (e.g. climate street, low-carbon district, low-energy block or other)?

The City Park is around 100 ha big and includes among green fields important institutions, museums, zoo, bath, etc. as well as a big cross road.

6. Are you developing new low-carbon areas or transforming the existing urban structure?

At the City Park project the existing structure is being developed.

7. What are the main measures to implement low-carbon areas (e.g. traffic free zone, low-carbon buildings)?

Low-carbon buildings, renewable energy sources, public transport and cycling infrastructure development, incentives for the use of low emission vehicles, climate protectional traffic zone, increasing green areas and improve their quality, sustainable waste management.

8. Land use targets were analyzed in workshop 4: Transit oriented development. If you have any special climate targets in land use planning related to low-carbon areas, please describe them.

Climate targets are the development of green infrastructure and brownfield areas, ensuring adequate airspace ratio for sufficient ventilation.

9. Housing and its heating and cooling in low-carbon areas should be energy efficient and utilize renewable energy sources. Do you have special targets or recommendations for low-carbon building stock? What measures do you have for this? Are the measures for new housing or for retrofitting the existing stock?

We have some measures for achieving low carbon building stock, e.g. energy modernization of municipal and residential buildings, development of district heating system, smart energy distribution and measurement systems, using renewable energy sources.

10. What kind of restrictions or incentives are you using for limiting car use in low-carbon areas / zones?

Current regulations limit the entrance and use of lorries in Budapest generally according to a zoning system, based on the weight and environmental category of the vehicles. Some highly protected areas in the city limit the car usage by using special permits for entrance, or public transport and bicycles only.

11. Are there special parking standards for low-carbon areas / stations in terms of CO₂ emissions? Are there limitations to parking in low-carbon areas / stations (places/apartment)? How are park and ride areas implemented in station areas?

There are no special parking regulations for low carbon areas in Budapest. For e-vehicles (including some hybrids), parking is currently free in public areas. At station areas the principle for P+R is that PT stops and B+R stands should be located as close as possible to the railway, then the P+R at the next closest area. In Budapest the majority of P+R sites are surface parking places.

12. What are the planning principles for bicycle parking in station areas (or other low-carbon areas)? Are there special bicycle parking standards for these areas and for housing units/flats? Do you have any targets regarding dimensioning or the amount of parking places?

According to the building act, on station areas number of bicycle places should be equivalent to 5 % of the number of regional passengers using the station. In reality, the number of bicycle spaces is much less. Newly built B+R places should be sheltered and supervised with CCTV cameras. For housing

and offices, the same act regulates the number of bicycle spaces according to the number of flats, or the surface of the offices. Usually new office buildings have bicycle stands for workers in the underground garages, while for visitors on the street in front of the building.

13. What kind of low-carbon solutions have you created for last-mile dilemma in station areas?

In station areas usually we have some kind of feeder lines of public transportation. If there are park and ride facilities, we will equip them with electric chargers in order to enhance electric mobility. We also try to install bike and ride parking spaces, and at some stations in the inner city there are bike sharing stations a swell. As carsharing is currently developing, there will be soon more and more carsharing possibilities near the stations, where electric propulsion is preferred.

14. Adaptation to climate change includes management of storm water and urban heat islands. What kind of measures do you have for cooling and for management of storm water?

For cooling and management of storm water, we have the following measures: increasing the proportion of green and water surfaces, stream revitalization, trees and alleys protection and development, green areas monitoring, brownfield area developments, adequate airspace ratio for sufficient ventilation, urban regeneration, using climate-friendly building materials and technologies, protection of the infrastructure network, rainwater retention, assessing the vulnerability of housing estates, architectural and natural values.

15. In your low-carbon area, do you have circular economy related criteria (such as requirement for using recycled building materials or requirement for optimizing public space usage, space sharing)? What are the best practices you would like to share regarding circular economy/ resource efficiency?

The Municipality of the City of Budapest tries to run the city according to the circular economy principles. Projects should be realized according to the current legislation, strategies and programs. Good practices are the introduction of selective waste collection at every house and the setting up of two new awareness rising and recycling centers.

16. What kind of recommendations or regulations regarding sustainable procurement do you have and on what level? (Region, city, area)

National level

National legislation on procurements and environmental protection makes sustainable procurements possible. In this regard national legislation is innovative. The Hungarian act on public procurement adopted the regulations of the directives 2004/18/EC and 2004/17/EC making it possible to validate sustainable aspects. This act contains sustainable aspects in the following fields:

- in setting the subject of the procurement, in the disposition description,
- in setting the aptitude conditions,
- in setting the performance conditions of the contracts, among the evaluation conditions.

City level:

The Municipality of the City of Budapest approved its sustainable procurement regulations in June 2006., but it is no longer in force. A new regulation is under preparation. Current public procurements of the Mayor's Office are prepared according to the so called "sustainable procurement directives".

BKK:

There are no dedicated sustainable procurement regulations; BKK prepares its public procurements according to the current legislations, taking into account sustainable principles as well.

17. Good service level in station areas can create an attractive urban node. Do you have any service concepts for station areas, or recommendations of commercial or transport-related services? Within the urban structure, where are the public services concentrated in? (city center, station areas)

There are no service concepts for station areas in Budapest. Public services are mainly concentrated in the city center or in the sub-centers of the districts.

18. How do you motivate citizens to take action for low-carbon objectives?

There are more and more awareness campaigns for citizens. We draw attention to the fact, that these measures are cost-cutting and good for the health of the citizens.

19. Which organizations, authorities or other partners are the main stakeholders in developing low-carbon areas / stations? How is co-operation arranged?

Main stakeholders for developing low-carbon areas are municipalities, public service companies, citizens, etc. There is not much experience yet in this field. At the City Park Project a national act dedicated for the project regulates the roles of the stakeholders.

20. How is funding for low carbon measures organized?

Different projects may be funded from state budget, municipal budget, EU funds, private investments or a mixture of them. The City Park project is mainly a state financed project, which involves some EU funding as well.

B) Data monitoring and other tools for Shaping low-carbon areas

1. How and with which method do you calculate greenhouse gas emissions on metropolitan (or city) level and what is your reporting cycle (e.g. annually, once in two years...)?

There is a method made by “KBTSZ - Klímabarát Települések Szövetsége” (Hungarian climate friendly cities), and another one by SEAP (Covenant of Mayors). Emissions of CO₂, CH₄ and NO₂ are calculated yearly for example for the industry from energy consumption, industrial activities, raw material consumption, etc. For the transport sector emissions are calculated from statistical data (number and type of vehicles, mode of propulsion, etc.).

2. Do you have any indicators for monitoring the development of greenhouse gas emissions and/or the implementation of climate action plan?

There are different indicators dedicated to the different goals, which help to monitor the implementation of measures towards the set goals. The units of the indicators, the data sources, the frequency and responsible institutions as well as base and target values are set in the methodology. We have indicators for example for the share of low carbon areas compared to the total city area, where the target values are the following: for 2025 5%, for

2030 20% and for 2050 100%. In some cases (i.e.: awareness rising) exact indicators could not be set.

3. Do you have indicators for monitoring the development of low-carbon areas in your region?

We do not yet have any low-carbon areas in our region, but a planned indicator is the share of low carbon areas compared to the total city area.

4. Are low-carbon concepts for shaping low-carbon areas, such as BREEAM Communities, LEED or One Planet Living, used in your region?

Some new projects use these concepts (for more see the description of the City Park project below).

Self-evaluation of Low-carbon Area / Station Area projects (if there is one), or of any other low carbon local plans/projects, that demonstrate how climate targets are conducted.

Name a specific plan, project or case that incorporates the development of low-carbon station area (or other low carbon area project):

The name of the project is: Liget Budapest Project (City Park Budapest Project)

This 100 ha big city park and its institutions are visited by millions over a year for cultural, leisure and sport purposes or to relax.

1. What are the objectives of the plan/project in regard to climate change mitigation?

Traffic will be heavily reduced, as the cross road will be completely closed for traffic, however new functions will create new traffic as well. New buildings are aiming to receive BREEAM excellent certificates. Although the buildings cannot be considered carbon neutral, beneath central heating/cooling there will be ground wells also used for tempering the buildings. The CO₂ absorption of the park will be higher due to greenfield renovation, enlarged water surfaces, reduction of artificial coverage, demolition of unused buildings. Planned pavements will be covered with pervious materials, which ensure the backflow of the local precipitation.

2. What is the time frame for carrying out the plan/project?

The project has been started in 2016, and is planned to be finished in August 2019.

3. Who has the legal responsibility for the plan/project?

The responsible for the project is the newly established (in 2014.), state owned project company, called Városliget Ltd.

4. What kind of planning principles are there in the plan concerning climate targets?

Energy supply: achieving adequate energy efficiency in each type of design area, favoring the use of renewable heat energy, designing energy-qualified low-specific heating / cooling energy-intensive facilities,

Environment: Increasing the proportion of green areas and plants,

Transport: Exclusion of vehicles using fossil fuel

5. What are the main measures for shaping low-carbon area?

Transport: the complete modification of the road network and parking system, the use of electric vehicles and the ban of vehicles using conventional fuel,

Energy supply: possible use of renewable energy (e.g. earth heat), use of high-efficiency district heat and cooling utilization instead of local equipment, planning and application of low-specific heating / cooling energy facilities where it is needed

6. Is the population and workplace density higher in the low-carbon area compared to the rest of the region? Is densification considered as an objective in the development of the area?

The project area is very special, thus in the City Park the density is much lower, than in the rest of the region. There are no residents living in this area and the number of workplaces is very limited. People will use the area much more as visitors. One of the objectives was not to densify the site more than before in order to keep it as leisure area with as much green and as few buildings as possible.

7. What are the tools in developing low-carbon areas a) if the land is public owned and b) land ownership is private? Are there differences in tools depending on the land ownership?

The project area is publicly owned. Main tools are electric charging stations for cars, undersurface car parking places with intensive green roofs at the borders of the area, eliminating transit traffic from the City Park. We do not have any experience with privately owned low carbon areas.

8. How is the development of the low-carbon areas monitored? Do you calculate emissions for smaller development areas? Are there other indicators?

Monitoring tools will be developed during the implementation and operation phases according to the regulations of the relevant authorities. The installation of smart monitoring equipment is under planning.

C) Good examples/bad examples

Give examples of good and bad development plans of low-carbon areas (preferably a station area, if there is one). Briefly describe why the examples are good or bad. Please exemplify with links or images (Max 1 page)

Good practice	Bad practice
<p>Name: Liget Budapest project (City Park Budapest)</p> <p>Context: Budapest's Városliget to be renewed – the Liget Budapest Project</p> <p>Városliget (City Park), which was one of the world's first public parks, is the pride of Budapest. The capital's most frequented park has earned itself recognition not only by virtue of its age and for being among the first of such facilities, but also through its unique historical heritage and a clear mission from its very conception that makes it unrivalled in Europe. The 'Liget' is an urban public park for relaxation, a green oasis, and a home to institutions of culture, entertainment and recreation. This place was envisioned as a venue for the Museum of Fine Arts, the Hungarian Transport Museum, the Museum of Hungarian Agriculture and the Múcsarnok (Kunsthalle). Other establishments built here include the Budapest Zoo, the ice rink and Széchenyi Thermal Baths. These popular institutions attract millions of visitors per year; the park also offers nice and calm leisure time for its visitors in the middle of the capital city. With most of its institutions being in need of renovation, Városliget has reached a condition in the past few decades that make it unfit to live up to its calling. The park cannot fulfil its true mission: it has grown drab, its vegetation is well past its prime, its facilities and equipment are outdated and its air is being polluted by tens of thousands of vehicles on a daily basis. The comprehensive renewal of Városliget could not be delayed any further. Such rehabilitation can only be implemented at a 21st-century standard, while fully respecting the park's</p>	<p>Name: József nádor square undersurface garage</p> <p>Context:</p> <p>A 3 storey, 525 car sized undersurface garage is being built in the heart of Budapest under a nice square in a historic neighbourhood. The project is mainly financed by private investors, the surface refurbishment is managed by the local district municipality.</p>

<p>150-year-old heritage. The institutions in Városliget must be renovated, while the park's green area must be rehabilitated and enlarged. As a result, by 2020 Városliget will be more liveable, modern and much greener than it is now, enriched with attractive institutions, making it worthy of its old fame.</p>	
<p>Main authorities and stakeholders involved: Városliget Ltd, different institutions, museums affected, Hungarian State, Municipality of the City of Budapest, XIV. district municipality, BKK.</p>	<p>Main authorities and stakeholders involved: Private investors, local district municipality</p>
<p>Web links: http://ligetbudapest.hu/setLang/en</p>	<p>Web links: http://magyarepitok.hu/mi-epul/2017/05/latvanyosan-halad-a-jozsef-nador-terimelygarazs-epitese</p>
<p>Why is the practice considered as 'good'? This project is unique in Budapest for its complex measures achieving less pollution. Car usage will be almost completely eliminated in the whole project area, only deliveries and people with reduced mobility will be allowed in certain places. The Park will be accessible by electric public transport, bicycle and by foot. Arriving visitors can park their vehicles in the newly built under surface garages at the edges. Using green walls and green roofs, less asphalt, less concrete and installing more plants and trees, will reduce the urban heat effect. No sources of air pollution will be generated in connection with the heat and power supply of the buildings. A heat pump for each building is used to provide a bigger renewable share of energy during heat and energy supply.</p>	<p>Why is the practice considered as 'bad'? Increasing the parking capacity in the city centre is against the goal of reducing car traffic and air pollution in the city. It not only makes private transport easier and more attractive, it generates additional traffic and GHG emission in the city. This is one of the bad examples, where projects do not match the goals set in the transport strategy of the city.</p>

D) Current experience

1. Does your own organization have a climate strategy or is it included in your general strategic approach? Do you have a climate action plan? If yes, what are the targets?

BKK does not have any climate strategy, or climate action plan. Our mobility strategy (BMT) includes some general sustainable goals. For Budapest, the Municipality of the City of Budapest is responsible for climate strategy and action plan (see also the previous answers).

2. Is your organization involved in shaping low-carbon areas? What are the main measures in your organization?

BKK is primarily involved in the transportation issues of the city developments. In this regard, BKK tries to emphasize the sustainability principles (enhancing public transport, limiting car usage, promoting walking and cycling, e-mobility, etc.).

3. Has an evaluation been conducted?

The mobility strategy (BMT) went through a strategic environmental evaluation, which is obligatory for transport development plans since 2005.

4. Do you have experience in using a Low-Carbon -concept (BREEAM, LEED, One Planet Living etc.)? If yes, what kind of experience do you have?

We do not have any experience in low-carbon concepts.

5. Does your organization have questions about shaping low-carbon areas, that you would like to be discussed in the forthcoming workshop?

How difficult is it to convince politicians about climate targets and what method do you use?

6. What experiences from workshop 5 do you want to bring to the next workshop. The question will be distributed under WS 5 and will complement the inventory. (Answered after workshop 5)

GÖTEBORG

5th Workshop

Shaping Low-carbon areas

Inventory

Questions

In the inventory for shaping low-carbon areas, the SMART-MR Partners should draw on the experience gained at the previous workshops and from expertise gained in their own metropolitan region.

A) Open questions on shaping low-carbon areas

1. Does your region have set regional greenhouse gas emission targets and do you have a regional climate action plan? If yes, what kind of targets do you have (e.g. reduction percent in CO₂ emissions, target year for carbon neutrality)? Are the targets for total emissions or per capita emissions?

Yes. The regional greenhouse gas emissions target (set by Västra Götalands Region, VGR) is to become a fossil independent region by the year of 2030. This means a 80% reduction of total greenhouse gas emissions compared to 1990 within the region but even a 30 % reduction of emissions related to consumption compared to year 2010 regardless of where the emissions occur. This action plan set for VGR and will be even adapted for GR.

2. Does your region have any other strategy, e.g. energy transition strategy, urban renewal strategy, which steers towards low-carbon area development?

Yes, we have in our political consultation process developed the Structural Illustration. This Agreement on Joint Responsibility for a Sustainable Regional Structure was formed in 2008. In the agreement, the municipalities take local responsibility for their territorial parts of the regional structure and even support other municipalities in their sustainable development. This means that unwanted environmental effects and/ or other negative effects such as congestion can be avoided if new settlements and facilities are located in areas with already well built-up or planned infrastructure. Conditions for a sustainable growth improve if the expansion of housing, work places, trade, education, health care etc is concentrated to

- the core,
- the metropolitan districts, and
- neighbourhoods situated in, or strongly connected to, the regional main corridors.

3. Which organizations/decision making bodies are responsible for these strategies? Are the same organizations responsible for implementation? What kind of metropolitan governance do you have in your region and does it include land use planning?

GR are, as a regional planning authority, responsible for developing the Structural Illustration strategy as mentioned in Q2. By applying a multi-level regional governance each organization is responsible for that the region is

developed sustainably. The GR regional mandate does not include direct land use planning duties. Local municipalities are responsible for implementing regional strategies in their comprehensive planning.

4. Do you have a low-carbon area or station area as a development project in your region? How do you define it?

GR does not have a specific mandate to develop a station area but is one of the main partners in the project Urban Station Communities which focus on sharing knowledge and experiences in co-creation processes. The definition of a low-carbon area and station lies in the concept of urban station communities where sustainable mobility is an important part.

5. What kind of a project is it and how large is the area (e.g. climate street, low-carbon district, low-energy block or other)?

In the Urban Station Communities knowledge process, the focus is on the interface between town/community planning and transport planning. Each participating municipality bring their own case to the project, such as Ytterby in Kungälv. Therefore the Urban Station Community is a project that can focus on a specific place or a specific route and should be seen as a process of developing urban station communities.

6. Are you developing new low-carbon areas or transforming the existing urban structure?

From a regional perspective, GR is engaged in various projects in collaboration with public actors, the industry, research institutes and universities. "Urban station communities" aims to increase knowledge of and create conditions for the development of station communities. Gothenburg-Borås corridor is one of five transport corridors defined in the Structural Illustration for the Gothenburg region. Together, the municipalities, GR and the Borås region have decided upon a common vision for Gothenburg-Borås 2035 and the development of a sustainable regional structure.

At a local level, a new city called Landvetter Södra (located within the Gothenburg/Borås transport corridor) is to be built in the municipality of Härryda where expected 25 000 inhabitants will be living. It is a unique opportunity to meet the challenge of housing shortages and to build a sustainable society from scratch. One prerequisite for enabling this new town development is that the highspeed train connection between Gothenburg and Stockholm will be realized and that Landvetter Södra is granted a station.

Another local example is Frihamnen, one of the RiverCity Gothenburgs vision's most vital components. Frihamnen is developed into a dense inner-city area in central Gothenburg connecting the city across the river functioning as a test-bed for modern mobility amongst other things.

- 7 What are the main measures to implement low-carbon areas (e.g. traffic free zone, low-carbon buildings)?

At GR we are regarding the Structural Illustration as an agreement, with the local Municipalities, regarding where to locate new development such as housing, infrastructure and services.

In addition to using the Structural Illustration we have several projects within the field of Mobility Management. Within the West Sweden infrastructure package one of the most important tools for behavior change is the congestion tax. The Congestion tax favors mobility by Public Transport.

On a very local level Gothenburg has implemented a ban of cars using studded tires on certain streets with the aim to limit spreading of micro particles. The important thought behind the multi-level governing model, we have adopted, is that each level and each organization work towards a shared insight about objectives but with but using their own measures achieving this.

- 8 Land use targets were analyzed in workshop 4: Transit oriented development. If you have any special climate targets in land use planning related to low-carbon areas, please describe them.

No special climate targets are set in the land use planning. GR are at present developing new ideas regarding regional analysis. These ideas are based on the concept of setting up guidelines for sustainable density in station communities. The guidelines will be implemented in the forthcoming SMART-MR Action plan and influence the Structural Illustration described in Q2. Guidelines for sustainable density in maybe up to seven different typologies regarding different forms of communities will be developed. Next step could be to analyse resilient mobility within these community typologies. And if possible with resulting political regional agreements or recommendations as a result.

- 9 Housing and its heating and cooling in low-carbon areas should be energy efficient and utilize renewable energy sources. Do you have special targets or recommendations for low-carbon building stock? What measures do you have for this? Are the measures for new housing or for retrofitting the existing stock?

No, only at the national level. New housing etc. must comply to set building standards BBR (Boverket, National Board of Housing).

- 10 What kind of restrictions or incentives are you using for limiting car use in low-carbon areas / zones?

At a regional level, a project called the West Sweden Agreement is financing rail investments, bus lanes, Park&Ride schemes etc. The project aim is meet environmental challenges and provide better Public Transport system. The project is financed nationally and by a local Congestion Tax. Mobility Management incentives are used both at the regional and local level. The Urban Station Community project is a test arena for different initiatives that has an aim at reducing car use and creating attractiveness within the station community.

- 11 Are there special parking standards for low-carbon areas / stations in terms of CO2 emissions? Are there limitations to parking in low-carbon areas / stations (places/apartment)? How are park and ride areas implemented in station areas?

In the project “Charging infrastructure in the Gothenburg region for electric vehicles” the participants have been sharing experiences inspiring each other to adapt similar solutions in different municipalities and create common standards.

Gothenburg has adopted a new policy regarding parking. They move away from a minimum number of parking spaces for cars needed in new developments and instead focus on mobility options provided. This means that costly investments in parking for cars can be substituted if for instant car sharing schemes, bike sharing or bike parking or Public Transport are provided. Some housing developments in good location can with this policy have zero number of car parking spaces with an added bonus of lower cost for rented or bought apartments.

- 12 What are the planning principles for bicycle parking in station areas (or other low-carbon areas)? Are there special bicycle parking standards for these areas and for housing units/flats? Do you have any targets regarding dimensioning or the amount of parking places?

VGR and Västtrafik (Public Transport provider) Planning principles:

- The bicycle parking should be close to the destination point, in this case the terminal or the bus stop. The walking distance between the transport area and the bicycle area should not exceed 25-50 meters.
- The bicycle parking should be separated from the main road och directly located to the walkway.
- The walkways between the bicycle parking and the transport area should be as safe as possible. Bicycle parking should be placed at the same side of traffic as the stop.
- Take under consideration the surrounding cycle network before the location of the bicycle parking is decided.
- Plan for a well-lit and visible bicycle parking lot to avoid theft risks.

There are special bicycle parking standards for the stations areas. The standards are developed by the Public transport provider and are described in the “Manual for bicycle parking in the station areas.

The targets for dimensioning or the amount of parking places differ from one year to another. The reason for this is that the budget for investment and reinvestment of parking places is annual and therefore may vary from year to year.

13 What kind of low-carbon solutions have you created for last-mile dilemma in station areas?

- Bzzt (a project provided as a good example in WS3)
- Styr och Ställ is a bike sharing solution. The platform is a collaboration between the city of Gothenburg and Västtrafik which is the public transport provider in the region of Västra Götaland. The public transport card is connected to the bike sharing. Today there are 1000 bikes available in 68 stations. The long term plan is to provide 1700 bikes by the year of 2020.

14 Adaptation to climate change includes management of storm water and urban heat islands. What kind of measures do you have for cooling and for management of storm water?

Adaptation to climate change includes management of storm water and urban heat islands. What kind of measures do you have for cooling and for management of storm water?

Storm water and urban heat islands are issues managed by local authorities through spatial planning, and for storm water also through sewage planning. GR hosts a professional network for water and sanitation professionals on strategic and/or managerial levels in the municipalities, where a project for benchmarking and identifying best practice for storm water management has recently been initiated. In projects within the research center Mistra Urban Futures, of which GR is a founding partner, tools for incorporating ecosystem services in urban planning have been developed, partly to manage the effects of climate change. GR is actively promoting knowledge about the issues and existing tools through our professional networks and through educational projects for both students and professionals.

15 In your low-carbon area, do you have circular economy related criteria (such as requirement for using recycled building materials or requirement for optimizing public space usage, space sharing)? What are the best practices you would like to share regarding circular economy/ resource efficiency?

We have no criteria for defining circular economy, but the regional climate strategy encourages a broad spectra of circular economy solutions. One example of best practice is the project MatTaket (the food roof top), which encourage commercial cultivation of the roof top of a garage building in central

Göteborg. The aim is to create a visiting site and at the same time enable schools an area for educational cultivation.

Another example is the planning of a center for circular trade in the municipality of Kungsbacka, where repairs and redistribution of used goods will be located to commercial districts, and where the buildings can be used for educational and recreational purposes after opening hours.

- 16 What kind of recommendations or regulations regarding sustainable procurement do you have and on what level? (Region, city, area)

According to the decided regional purchase/procurement policy (VGR) all different kinds of purchases on the metropolitan level should promote an economic, social and environmental sustainability. The following guidelines/recommendations are set:

- The regional environmental program must be considered to minimize the environmental impact of a particular purchase
- Procurement within the transport section must contribute to national and regional development

One of the political goals, in the decided regional environmental plan, is that both the passenger and the freight transports should be fossil free by the year of 2020. This goal is to be achieved by an 80% reduction of carbon dioxide emissions (the comparison year is 2006). The environmental plan lists a variety of measures to accomplish this goal.

17. Good service level in station areas can create an attractive urban node. Do you have any service concepts for station areas, or recommendations of commercial or transport-related services? Within the urban structure, where are the public services concentrated in? (city center, station areas)

In the Gothenburg region, the first Airport City in the western parts of Sweden is under construction. The Airport City will include logistics, trade, attractions and commercial services, business and office facilities, hotels and conferences within land side area of Landvetter Airport.

GR's regional trade strategy is an agreement to jointly take responsibility for the long-term sustainability of the regional trade structure contributing to strengthening the Gothenburg region and Gothenburg as a center for trade.

At the local level, Gothenburg City, in cooperation with Business Region Göteborg, has developed a business strategy program that outsots on the central role of the city in the development of the Gothenburg region. The program will be decided upon in the City Council in 2018.

18. How do you motivate citizens to take action for low-carbon objectives?

Regarding waste related circularity topics the region coordinates and arrange waste preventing actions. A project, Count to 10, focus on consumption awareness. Promoting reuse and second hand. Another project called, Masters of minimizing, cooperates with NGO actions to prevent waste and promotes waste prevention by behavioral changes by precursors competing to minimize waste. A third example is the projects that supports municipalities in waste minimization within the organization by using developed methods for “the waste free office” and “the waste free elderly care”

19. Which organizations, authorities or other partners are the main stakeholders in developing low-carbon areas / stations? How is co-operation arranged?

The main stakeholders in developing new areas or adding density to an existing agglomeration are many. The inhabitants, the people and services now using the area but also newcomers, The municipality as in charge of land use planning, The County Administration Board as a regulating authority, The Public Transport Administration & the Region Västra Götaland and the Public Transport Provider & Västtrafik, National Transport Administration. Sharing a common vision for the different perspectives of the stakeholders is essential.

20. How is funding for low carbon measures organized?

The low carbon measures on the regional level are financed by public funding. The funds can be distributed in a number of ways depending on who the applicant is. Part of the funds are used within the regional organization itself while other parts are open for project applications both from the public and the private sector.

B) Data monitoring and other tools for Shaping low-carbon areas

1. How and with which method do you calculate greenhouse gas emissions on metropolitan (or city) level and what is your reporting cycle (e.g. annually, once in two years...)?

Greenhouse gas emissions are calculated on the regional level with help from the national database for emissions. The national database statistics are available on both the regional and the municipal level. The emissions from the transport sector are presented on the different transport modes and the reporting cycle is annual.

2. Do you have any indicators for monitoring the development of greenhouse gas emissions and/or the implementation of climate action plan?

One of the political goals on the regional level (VGR) is to decrease the transport emissions. The task is led by appointed coordinators and is evaluated annually.

The following indicators are monitored:

- Number of new networks or collaborative projects
- Number of companies and organizations that collaborate
- Number of innovations- and demonstrations projects

3. Do you have indicators for monitoring the development of low-carbon areas in your region?

Not at the present. But using indicators connected with Agenda 2030 is being developed.

4. Are low-carbon concepts for shaping low-carbon areas, such as BREEAM Communities, LEED or One Planet Living, used in your region?

Voluntary use of such concepts.

Self-evaluation of Low-carbon Area / Station Area projects (if there is one), or of any other low carbon local plans/projects, that demonstrate how climate targets are conducted.

Name a specific plan, project or case that incorporates the development of low-carbon station area (or other low carbon area project):

As GR is not directly involved in developing a low-carbon station area we cannot give an adequate answer to these questions. Instead we give just general observations.

1. What are the objectives of the plan/project in regard to climate change mitigation?

Local detail plans have often sustainable ambitions but the density for example might be influenced due to local stakeholder's interventions.

2. What is the time frame for carrying out the plan/project?

Normally detail plans has a time frame of 3-5 years.

3. Who has the legal responsibility for the plan/project?

The Local Municipality as responsible for land use planning.

4. What kind of planning principles are there in the plan concerning climate targets?

The regulation for new housing are set nationally. As a result, from the ws4, GR has the ambition to implement, through SMART/MR Action plan, recommendations in the next version of the Structural Illustration. No political decisions are made presently.

5. What are the main measures for shaping low-carbon area?

Density, accessibility by Public Transport and high level of mobility measures rather than low individual and private ownership of cars.

6. Is the population and workplace density higher in the low-carbon area compared to the rest of the region? Is densification considered as an objective in the development of the area?

Yes, if we consider Station Communities as a low-carbon area.
Yes, but no common recommendation is agreed.

7. What are the tools in developing low-carbon areas a) if the land is public owned and b) land ownership is private? Are there differences in tools depending on the land ownership?

No difference

8. How is the development of the low-carbon areas monitored? Do you calculate emissions for smaller development areas? Are there other indicators?

At present there is no monitoring.

C) Good examples/bad examples

Give examples of good and bad development plans of low-carbon areas (preferably a station area, if there is one). Briefly describe why the examples are good or bad. Please exemplify with links or images (Max 1 page)

Good practice	Bad practice
<p>Name:</p> <p>Gothenburg-Borås</p>	<p>Name:</p> <p>Landvetter Södra</p>
<p>Context:</p> <p>Gothenburg-Borås is one of Sweden's largest commuting areas and one of five transport corridors in the Structural Illustration for the Gothenburg region. Together, the municipalities, GR and the Borås region have decided upon a common vision for Gothenburg-Borås 2035 and the development of a sustainable regional structure.</p>	<p>Context:</p> <p>A new city called Landvetter Södra is to be built in the municipality of Härryda. According to current plans, the overall structure of the new town will enable 25 000 inhabitants. Pending a decision at the general assembly of the Härryda Municipality. The construction is planned to start in 2022.</p>
<p>Main authorities and stakeholders involved:</p> <p>The Göteborg Region Association of Local Authorities (GR) and the Borås region together with the municipalities of Gothenburg, Mölndal, Härryda, Bollebygd, Mark and Borås. Joint work is carried out in close collaboration with Region Västra Götaland and Swedavia (The Airport Administration).</p>	<p>Main authorities and stakeholders involved:</p> <p>The Municipality of Härryda</p>
<p>Web links:</p> <p>www.grkom.se/goteborg-boras</p>	<p>Web links:</p> <p>www.landvettersodra.se</p>
<p>Why is the practice considered as 'good'?</p> <p>Gothenburg-Borås is an example of implementing community planning across municipal borders in line with the</p>	<p>Why is the practice considered as 'bad'?</p> <p>The idea of Landvetter Södra is based on the unique opportunity to meet the challenge of housing shortages within</p>

<p>Structural Illustration of the Gothenburg region.</p> <p>The potential for strong social development and growth is great if it is planned jointly. The cooperation enables a common holistic view of the future development. Co-operation between municipalities, GR and Borås region consists of a collaborative group for community planning to enable the participants to overcome administrative boundaries.</p>	<p>the region and to build a sustainable society from scratch.</p> <p>Landvetter Södra's opportunity for sustainable connections to the major neighbouring cities, such as Gothenburg and Borås, is dependent on the construction of a commuter train station along the proposed new railway, Götalandsbanan. However, as the plans of the new railway are being compromised in the ongoing process of establishing a new national infrastructure plan, an alternative solution for sustainable commuting for the future residents in Landvetter Södra is still to be found.</p>
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D) Current experience

1. Does your own organization have a climate strategy or is it included in your general strategic approach? Do you have a climate action plan? If yes, what are the targets?

GR supports the climate strategy set for VGR. GR have no specific climate action plan. Application of the regional climate strategy for GR is under construction.

2. Is your organization involved in shaping low-carbon areas? What are the main measures in your organization?

Yes – “Urbana Station Community” project (see previous questions) and the project “Energy Aspects of the Structural Illustration”.

3. Has an evaluation been conducted?

No – but there is a tool –GR has developed a GIS tool that planners in municipalities within the region can use when planning new housing construction. The project is called “Energy Aspects of the Structural Illustration”. The tool allows you to measure transport-related energy consumption and carbon dioxide emissions based on location of housing and the type of building. The overall aim of the project was to improve the ability of municipalities to follow regional agreements, such as the Structural Illustration

for the Göteborg Region and political climate objectives, in order to achieve energy-efficient and sustainable regional development.

During the autumn of 2017, Ale and Lerum were pilot municipalities, which meant that planners and GIS engineers in the municipalities have acted as test users during the development of the tool. The tool is a beta version and is now being tested by urban planners within the region in order to be evaluated.

4. Do you have experience in using a Low-Carbon -concept (BREEAM, LEED, One Planet Living etc.)? If yes, what kind of experience do you have?

No

5. Does your organization have questions about shaping low-carbon areas, that you would like to be discussed in the forthcoming workshop?

GR would like to further the discussion in adopting common indicators for low-carbon area and station areas.

One aspect that has not yet been discussed in relation to developing and or densifying existing low-carbon area is the implication that regulation or restrictions will have on affordability to live in the area. Will low-carbon area development be exclusive for the part of the population that can afford electric vehicles or flats in green platinum buildings vs will the low-carbon area lower the cost of mobility due to better Public Transport and then make it an attractive place to live regardless of income? This issue could be condensed to a question of whether regulation or deregulation will benefit Livability Oriented Area Development, LOAD.

6. What experiences from workshop 5 do you want to bring to the next workshop. The question will be distributed under WS 5 and will complement the inventory. (Answered after workshop 5)

HELSINKI

5th Workshop

Shaping Low-carbon areas

Inventory

Questions

In the inventory for shaping low-carbon areas, the SMART-MR Partners should draw on the experience gained at the previous workshops and from expertise gained in their own metropolitan region.

A Open questions on shaping low-carbon areas

1. Does your region have set regional greenhouse gas emission targets and do you have a regional climate action plan? If yes, what kind of targets do you have (e.g. reduction percent in CO₂ emissions, target year for carbon neutrality)? Are the targets for total emissions or per capita emissions?

Yes, we have Helsinki Metropolitan Area Climate Strategy 2030, which seeks to reduce the per capita carbon dioxide emissions of the Helsinki Metropolitan Area by 39 per cent of the 1990 level by the year 2030. The reviewed target of the Climate Strategy for the Helsinki Metropolitan Area to 2030 is carbon neutrality by 2050 and the intermediate goal is set on emission reduction of 20 % by 2020.

In addition, the cities of Helsinki metropolitan area have set several objectives aiming at mitigating climate change. The strategy programmes of the cities have additionally their own targets. Helsinki has set ambitious climate targets and it will reduce its greenhouse gas emissions by 30 % until 2020 and aims to carbon neutrality by 2035, adopted by the City Council in September 2017. The cities of Espoo and Vantaa aim at carbon neutrality by 2030.

The recently revised target for the Helsinki-Uusimaa Region is carbon neutrality by 2035 (Dec 2017).

Also recently set national and regional target for transportation sector is 50 % by 2030 (from 2005). The national target includes the targets to raise walking and cycling up to 30 % in modal split.

2. Does your region have any other strategy, e.g. energy transition strategy, urban renewal strategy, which steers towards low-carbon area development?

No.

3. Which organizations/decision making bodies are responsible for these strategies? Are the same organizations responsible for

implementation? What kind of metropolitan governance do you have in your region and does it include land use planning?

The Helsinki-Uusimaa Regional Council is responsible of regional land use planning at the Uusimaa level (26 municipalities), the Council prepares the regional land use plan, and development plans for the region. The development plans are prepared by the council in cooperation with the municipalities. The climate targets are included in the development plans and are one of the guiding cross cutting principles in the land use planning. The plans are approved by the board of the council, the board consists of politicians/decision makers of the member municipalities.

The Helsinki Metropolitan area cities, Helsinki, Espoo, Vantaa and Kauniainen, are responsible and have the monopoly for land use planning (master plans and detailed plans) in their municipalities. The cities also prepare their climate action plans and are mainly responsible for their implementation. Though the focus may vary from climate plans to resource efficiency or overall city strategy including climate targets in all sectors. The new climate change mitigation targets of the cities are/will be approved by the city councils. The cities of Espoo and Vantaa aim at carbon neutrality by 2030 and Helsinki by 2035.

The Helsinki Region Environmental Authority HSY and its predecessor YTV have been responsible for creating the joint climate strategy for the four cities in the metropolitan area and the coordination of the climate strategy preparation work at the Helsinki Metropolitan Area level. HSY is also responsible for the monitoring of the strategy and calculating annually the GHG emissions of the metropolitan area. HSY also contributes to climate work through joint projects with the cities and other regional and national actors. HSY has also calculated the GHG emissions for the Uusimaa County (26 municipalities).

The cities of Helsinki, Espoo, Vantaa and Kauniainen and HSY has set up in 2009 a new organization, Climate Info, to provide climate information, guidance and energy counselling for residents and SMEs. Now it has been joint to HSY and the main focus is on energy efficiency counselling for residents and ECO certifications (local concept, called Ekokompassi) for SMEs and public sector.

4. Do you have a low-carbon area or station area as a development project in your region? How do you define it?

City of Helsinki is developing Kalasatama as a Smart-city area including the targets in energy efficiency, sharing economy and low carbon transportation, including development of MaaS. Helsinki has also the Climate Street project in which the residents and companies

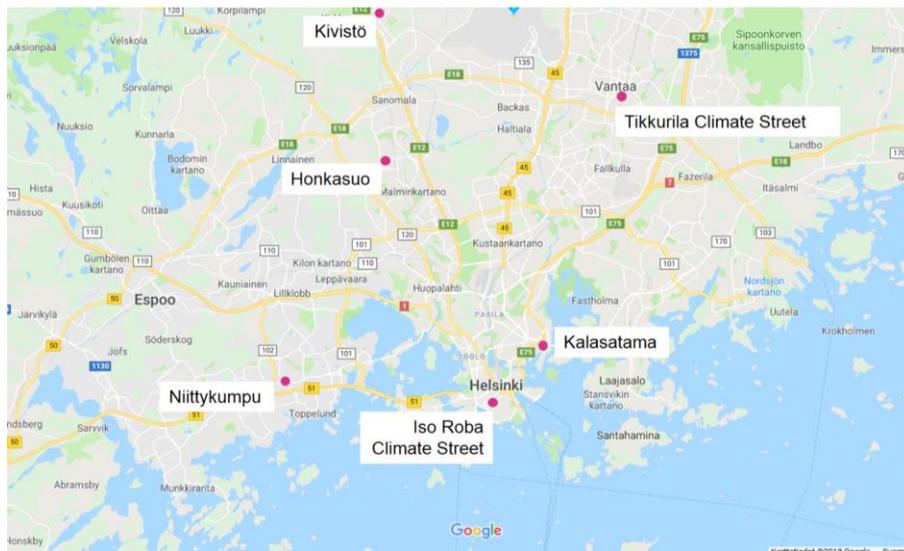
were involved in climate change mitigation actions like energy savings in lightning. Helsinki is also developing carbon neutral Zoo in Korkeasaari. Honkasuo -project is presented in part B.

City of Espoo has used BREEAM Communities as an assessment and developing tool in Niittykumpu Metro Station Area. In the project there was prepared an ecological strategy and energy strategy.

City of Vantaa has used One Planet Living concept in a planning project of Kivistö station area detail plan (near Kivistö station). Vantaa has also Climate Street project area next to Tikkurila Station.

Within SMART-MR project, HSY is developing a planning concept for low carbon station areas in broad cooperation with cities and other key stakeholders. Within development network we are developing the LCD concept definition for the station communities with our cities and researches and stakeholders.

In all projects the definition of low carbon station area is not exact but it includes new energy solutions, energy efficiency and sustainable modes of transport.



5. What kind of a project is it and how large is the area (e.g. climate street, low-carbon district, low-energy block or other)?

All of these regional development projects are aiming at more sustainable urban structure, increased energy efficiency and low carbon transportation. These areas vary from one street (and blocks around it) to neighbourhoods. For example, Smart Kalasatama is one of the largest area and it will be built for 25 000 inhabitants in 2040

6. Are you developing new low-carbon areas or transforming the existing urban structure?

Both. The chosen areas include station areas that are mainly built already and some areas, eg. and old logistics/ industrial area that will be developed into residential and business station areas.

7. What are the main measures to implement low-carbon areas (e.g. traffic free zone, low-carbon buildings)?

It depends on the project. In new urban development projects the low carbon buildings and new energy solutions are in important roles.

In this LCD project the core of the concept will be the station communities, (walking and biking distance).

8. Land use targets were analyzed in workshop 4: Transit oriented development. If you have any special climate targets in land use planning related to low-carbon areas, please describe them.

Climate challenge has been recognized in land use planning but in general and specific climate targets aiming at low carbon areas have not been set widely, only in some detail plans. The main measures are infilling the urban structure to reduce needs for transportation and increase the efficiency of urban structure. For example the Master Plan of Helsinki includes the planning principle which prioritises walking and cycling and also targets to change some of the main entrance roads into city boulevards. Lately also the target of resource efficiency is included in the latest plans, like the Master plan of Vantaa. Also capital region cycling network, planned by HSL, has been taken into account in planning.

9. Housing and its heating and cooling in low-carbon areas should be energy efficient and utilize renewable energy sources. Do you have special targets or recommendations for low-carbon building stock? What measures do you have for this? Are the measures for new housing or for retrofitting the existing stock?

The Ministry of the Environment has published voluntary recommendations for low carbon building for public buildings (2017)

The National Building norm of Finland has requirements and regulations for energy efficiency of buildings (from EU-level).

In addition to these regulations, there are tools to increase the energy efficiency of buildings such as energy certificates, environmental permits and voluntary energy agreements.

10. What kind of restrictions or incentives are you using for limiting car use in low-carbon areas / zones?

Cities are reserving parking places for car sharing. Also, the parking norm in detail plans is reducing the amount of parking places per floor area (m²). Stricter recommendations are 0,5 car parking place/apartment or 1 parking place/125 k-m² and for office buildings 1 parking place/200 k-m²

11. Are there special parking standards for low-carbon areas / stations in terms of CO₂ emissions? Are there limitations to parking in low-carbon areas / stations (places/apartment)? How are park and ride areas implemented in station areas?

The City of Helsinki will grant a 50 percent discount on parking fees to low-emission passenger cars and light quadricycles run entirely by electricity. The discount will be granted if the car meets the emission criteria set by the City of Helsinki. In order to receive the discount, the parking must be paid for by using a smartphone application. The discount is also available to people not living in Helsinki and for resident or corporate parking.

The City of Helsinki has guidelines and regulations concerning station areas. These are collected into a web portal <http://kaupunkitilaohje.hel.fi/kortti/asemaymparistoja-koskevat-maaraykset-ohjeet/> (Guidelines for City space). The guidelines also include part and ride areas .

The Helsinki Region Transport has published guidelines for planning park and ride areas (2010).

12. What are the planning principles for bicycle parking in station areas (or other low-carbon areas)? Are there special bicycle parking standards for these areas and for housing units/flats? Do you have any targets regarding dimensioning or the amount of parking places?

City of Helsinki has prepared planning guidelines for bicycle parking (2016) which also include dimensioning guidelines for station areas. The Kaupunkitilaohje -portal includes also guidelines and planning principles for bicycle parking.

In the City of Vantaa, the responsibility to organise bicycle parking is mainly with the private enterprises. The city organises and builds bicycle parking for station areas and for public services.

13. What kind of low-carbon solutions have you created for last-mile dilemma in station areas?

There are no working solutions yet. There has been a pilot of autonomous bus as a part of the travel chain. <http://sohjoa.fi/sohjoa-in-english>

14. Adaptation to climate change includes management of storm water and urban heat islands. What kind of measures do you have for cooling and for management of storm water?

The cities of Helsinki, Espoo and Vantaa have their storm water management strategies or programmes, which also consider climate change impacts and adapting to their consequences. The Helsinki strategy is currently being updated.

There are few measures for cooling, so far. District cooling network already exists in parts of Helsinki and Espoo and there are plans to expand the network. District cooling is a new way to use heat recovery, collecting the heat during summer and reserving it for winter. <https://www.helen.fi/en/cooling/homes-and-companies/district-cooling2/>

15. In your low-carbon area, do you have circular economy related criteria (such as requirement for using recycled building materials or requirement for optimizing public space usage, space sharing)? What are the best practices you would like to share regarding circular economy/ resource efficiency?

Cities have defined some areas, which are profiled climate friendly/ material efficient. Those areas have low carbon and/or circular economy related criteria written in for example planning regulations. The detail plan of Kuninkaantammi area in Helsinki requires to use the stone material mined from the area in constructing at the Kuninkaantammi area. There are no commonly used requirements regarding optimization of public space usage or space sharing.

Some of the best practices for low carbon areas regarding circular economy/ resource efficiency in Helsinki area:

- City of Helsinki has a coordinator for soil/landmass use and logistics. Helsinki region is developing a tool for better management of soil/landmass over city borders.
- Waste trainer -service for citizens
- Parking space for shared cars
- Car sharing and city bike system
- Liiteri: Home supplies & sustainable lifestyle as a service 24/7 <http://liiteri.net/en/>
- Clothing as a service
- Public libraries provide spaces and small equipments (sport equipment, renovating tools etc)

- ResQ service: Finds meals that otherwise would go to waste. <https://www.resq-club.com/en/>

16. What kind of recommendations or regulations regarding sustainable procurement do you have and on what level? (Region, city, area)

Cities in Helsinki Metropolitan area are still developing their sustainable procurements. The first step has been to add environmental criteria into procurement processes. Now the environmental criteria have been taken into account concerning centralized procurements, mainly in material purchases. The goal of the cities was to have environmental perspectives in 50% of the procurements by 2015. This target has been reached. There is still a need for strong development to be efficient in reducing GHG emissions in purchase processes.

17. Good service level in station areas can create an attractive urban node. Do you have any service concepts for station areas, or recommendations of commercial or transport-related services? Within the urban structure, where are the public services concentrated in? (city center, station areas)

No, we don't have any service concepts for station areas. There are many kind of service levels depending the situation in urban structure. So called cold stations have only ticket automates but larger transportation nodes have even shopping centres nearby.

18. How do you motivate citizens to take action for low-carbon objectives?

In Helsinki region we have many active operators, both public actors and NGOs. HSY's Climate info helps the residents to make climate-friendly choices. It arranges active campaigns for sustainable transportation and life styles and gives energy counseling. The latest action is a national subsidy for electric bikes, which will be put into operation in 2018.

19. Which organizations, authorities or other partners are the main stakeholders in developing low-carbon areas / stations? How is co-operation arranged?

20. How is funding for low carbon measures organized?

There is no special way to organize funding, they are funded by the cities or other actors case by case.

B) Data monitoring and other tools for Shaping low-carbon areas

1. How and with which method do you calculate greenhouse gas emissions on metropolitan (or city) level and what is your reporting cycle (e.g. annually, once in two years...)?

GHG emissions are calculated annually for the four cities in the metropolitan region. Methodology is Scope 1+2 – energy consumption based approach plus emissions from waste treatment and agriculture. GHGs included are CO₂, CH₄ and N₂O. Sectors included: District, electric and oil heating, electricity, road, rail and marine transport, industry, waste and waste water treatment, agriculture.

2. Do you have any indicators for monitoring the development of greenhouse gas emissions and/or the implementation of climate action plan?

Nine climate key indicators, incl. energy consumption, district heating fuel mix, urban structure, transport modal split, household waste and recycling rate. Updated every second year, as well as a larger indicator set incl. 55 indicators related to progress in climate work of the cities.

3. Do you have indicators for monitoring the development of low-carbon areas in your region?

No.

4. Are low-carbon concepts for shaping low-carbon areas, such as BREEAM Communities, LEED or One Planet Living, used in your region?

City of Espoo has used BREEAM Communities in Niittykumpu Metro Station Area. City of Vantaa has used One Planet Living concept in a planning project of Kivistö station area. There are some LEED certified buildings in the region.

Self-evaluation of Low-carbon Area / Station Area projects (if there is one), or of any other low carbon local plans/projects, that demonstrate how climate targets are conducted.

Name a specific plan, project or case that incorporates the development of low-carbon station area (or other low carbon area project):

Detail plan of Honkasuo area, Helsinki

1. What are the objectives of the plan/project in regard to climate change mitigation?

The main objective for the plan was the lowest possible CO₂ emissions from the construction phase of the area and also the emissions caused by the use. Honkasuo is located at the regional center and good public transport possibilities near two stations give its residents better choices than usual to choose only one car or none car living.

2. What is the time frame for carrying out the plan/project?

2013-2025

3. Who has the legal responsibility for the plan/project?

The City of Helsinki

4. What kind of planning principles are there in the plan concerning climate targets?

The climate impacts of Honkasuo area are planned to kept as low as possible and the target is zero energy level.

5. What are the main measures for shaping low carbon area?

The main measures of Honkasuo plan are 1) location of the area near two train stations to avoid emissions from transportation, 2) low energy buildings, 3) on-site renewables, 4) wood as a main building material, 5) mass balance of the region, 6) services and communal spaces for remote work on the area to minimize transportation, 7) good biking routes and facilities, 8) parking spaces for car sharing and 9) possibilities for local urban farming.

The detail plan steers to construct low energy buildings and prepare for utilization of renewable energy. When the needed heating power of buildings is small, will renewable energy solutions lead region towards the target state, the zero energy level, in which the amount of energy produced would be equal to the amount of energy consumed in the area. The possible ways of renewal energy production in Honkasuo are photovoltaic panels, air and ground heat pumps and small scale wind power plants. Low energy buildings allows a modern low temperature district heating network to be built in the area.

As the construction itself is a major producer of greenhouse gas emissions. The amount of emissions depends largely on the building materials used. Wood is the most sustainable building material. For example, a concrete element manufacturing loads the climate multiple times in comparison to the tree structure. The detail plan steers that in all blocks building material must be wood and wood must be used as facade material. As a supplementary requirement, some of the buildings should be built from solid wood.

In the area, there has already been completed a very energy efficient wooden block with 116 apartments. It is the first building block project for wooden construction of passive energy in Helsinki.

The region aims at local mass balance to avoid long distances and emissions of transportation of land masses.

6. Is the population and workplace density higher in the low-carbon area compared to the rest of the region? Is densification considered as an objective in the development of the area?

The Honkasuo area is not very densely planned (density rate/plot ratio $e=0,52$) because the target is to offer also row houses and detached houses for new residents.

7. What are the tools in developing low-carbon areas a) if the land is public owned and b) land ownership is private? Are there differences in tools depending on the land ownership?

Helsinki owns the Honkasuo land area. The tools are mainly the same and come from detail plans prepared by cities.

In other projects in region, there has been seen a tendency that private investors and building companies are prioritizing more the budget than the climate targets.

8. How is the development of the low-carbon areas monitored? Do you calculate emissions for smaller development areas? Are there other indicators?

There is not yet monitoring in low carbon areas.

C) Good examples/bad examples

Give examples of good and bad development plans of low-carbon areas (preferably a station area, if there is one). Briefly describe why the examples are good or bad. Please exemplify with links or images (Max 1 page)

Good practice	Bad practice
Name: Detail plan of Honkasuo area, Helsinki	Name: Separate urban islands in Helsinki region
<p>Context: In the planning and construction of the Honkasuo area, the emphasis is on ecologically sustainable and climate-smart construction. The ecological sustainability of construction projects and housing is addressed in many ways, throughout the lifecycle of buildings. The detail plan contains provisions on low energy construction and renewable energy utilization. All the houses in the area are built of wood. Storm water are delayed by natural methods and the construction of additional excavation and land masses are used in construction areas. The area is situated near two rail road stations and needs for mobility are reduced by offering services and communal spaces for remote work, social needs and sharing economy. School, kindergarten and playground are within walking distance. Good facilities are provided for biking: optimal network and good parking solutions in buildings. There are also possibilities for local urban farming.</p> 	<p>Context: In the Helsinki region there is several plans to built separate urban islands without good connections, like rail roads, to city centres.</p>

Main authorities and stakeholders involved: The city of Helsinki, building companies, investors.	Main authorities and stakeholders involved: Cities and municipalities in Helsinki region.
Web links: https://en.uuttahelsinki.fi/honkasuo	Web links:
Why is the practice considered as 'good'? There is an ambitious attempt to develop new low carbon area with low energy buildings, on-site renewables and wood as a construction material. The area offers good connections with public transportation and for walking and biking. There are spaces for the use of community to reduce mobility.	Why is the practice considered as 'bad'? As the areas are loosely situated from the existing urban structure, these areas will create a bigger amount of greenhouse gas emission from transportation.

D) Current experience

1. Does your own organization have a climate strategy or is it included in your general strategic approach? Do you have a climate action plan? If yes, what are the targets?

HSY is implementing the Helsinki Metropolitan Area mitigation and adaptation strategies in its own operations. HSY also has own action plans for energy efficiency and adaptation to climate change and responding to climate change is included in the new strategy (so far not approved, undergoing the decision making processes of the member cities).

2. Is your organization involved in shaping low-carbon areas? What are the main measures in your organization?

As a part of the SMART-MR project HSY is developing low carbon station areas. HSY is developing a planning concept for low carbon station areas and is also in wide cooperation promoting green businesses and SME's to produce climate friendly solutions for everyday life. The wide cooperation network has been established from key actors in station areas to promote the climate targets in planning and implementation.

3. Has an evaluation been conducted?

Not yet.

4. Do you have experience in using a Low-Carbon -concept (BREEAM, LEED, One Planet Living etc.)? If yes, what kind of experience do you have?

While developing Low carbon concept for station areas, we have carefully examined the criterias of BREEAM Communities, LEED and One Planet Living.

5. Does your organization have questions about shaping low-carbon areas, that you would like to be discussed in the forthcoming workshop?

What is the public opinion and the level of political will to develop low-carbon areas in partner regions?

6. What experiences from workshop 5 do you want to bring to the next workshop. The question will be distributed under WS 5 and will complement the inventory. (Answered after workshop 5)

LJUBLJANA

Workshop in Helsinki – (10th – 12th April 2018)

5th Workshop

Shaping Low-carbon areas

Inventory

Questions

In the inventory for shaping low-carbon areas, the SMART-MR Partners should draw on the experience gained at the previous workshops and from expertise gained in their own metropolitan region.

A) Open questions on shaping low-carbon areas

1. Does your region have set regional greenhouse gas emission targets and do you have a regional climate action plan? If yes, what kind of targets do you have (e.g. reduction percent in CO₂ emissions, target year for carbon neutrality)? Are the targets for total emissions or per capita emissions?

On the regional level we do not have a regional climate action plan and consequently we haven't set regional greenhouse gas emission targets. We do have it on a national level: Operational program of measures to reduce greenhouse gas emissions by year 2020. It includes targets of reduction percent in CO₂ emissions per individual sector for total emissions (Figure 1).

Figure 1: Targets of reduction percent in CO₂ emissions per individual sectors for total emissions (Operational program of measures to reduce greenhouse emissions by year 2020, 2014).

Individual Sector	annual emissions GHG in 2005 kt CO ₂ eq	indicative goals reduction according to 2005	
		in 2020	in 2030
Traffic	4.431	+ 27 %	+ 18 %
Wide use	2.585	-53 %	- 66 %
Agriculture	2.003	+ 5 %	+ 6 %
Waste management	692	- 44 %	- 57 %
Industry	1.511	- 42 %	- 32 %
Energetics	365	+ 6 %	- 16 %

2. Does your region have any other strategy, e.g. energy transition strategy, urban renewal strategy, which steers towards low-carbon area development?

On a National level we have following strategies which steers towards low-carbon area development:

1. On a national level we have Action plan for energy efficiency for the period 2014-2020. In line with the requirements of Directive 2012/27/EU on energy efficiency, Slovenia sets itself

national goal of improving energy efficiency for 20 % by 2020. This goal is, that use of primary energy in 2020 will not exceeded 7,125 mio. toe, which means that according to the year 2012 should not increase by more than 2 %.

One of the important strategic documents on a national level is Strategic framework for climate change adaptation. This document provides a strategic framework and guidelines for adapting to climate change in Slovenia. The more detailed horizontal measures or activities are addressed which can help to adapt to climate change and thereby reducing it's exposure to the effects of climate change, and sensitivity and vulnerability of Slovenia for them, as well as increasing resistance and adaptability.

2. At the national level there is Eco Found - Slovenian Environmental Public Fund whose purpose is to promote development in the field of environmental protection and green growth. It is the only specialized institution in Slovenia that provides financial supports for environmental projects. The financial assistance is offered mainly through soft loans from revolving funds and since the year 2008 through grants.

Eco Fund finances following programmes:

- Loans to legal entities (municipalities and/or providers of public utility services, enterprises and other legal entities) and sole traders for investments in environmental infrastructure, environmentally sound technologies and products, energy efficiency, energy saving investments, and use of renewable energy sources;
- Loans to individuals (households) for conversion from fossil fuels to renewable energy sources, energy saving investments, investments in water consumption reduction, connections to sewage system, small waste water treatment plants, replacement of asbestos roofs;
- Grants to individuals (households) for investments in electric cars and for investments in residential buildings (energy efficiency and use of renewable energy sources);
- Grants to legal entities (municipalities and/or providers of public utility services, enterprises and other legal entities) for investments in electric cars and buses for public transport on compressed natural gas or biogas;
- Grants to municipalities for investments in buildings where public education takes place (schools, kindergartens, libraries etc.), newly constructed as low energy and passive buildings or renovated in passive standard.

At the regional and local level there are following strategies which steers towards low-carbon area development:

1. At the municipal level (municipalities which are included in Ljubljana Urban Region: Ljubljana, Borovnica, Dobropolje, Dol pri Ljubljani, Grosuplje, Ig, Kamnik, Litija, Log- Dragomer, Lukovica, Mengeš, Škofljica, Trzin, Vodice, Brezovica, Dobrova, Domžale, Horjul, Ivančna Gorica, Komenda, Logatec, Medvode, Moravče, Šmartno pri Litiji, Velike Lašče, Vrhnika) there are so called Local energy concepts which assess the opportunities and propose solutions for the energy supply of the local community, taking into account the long-term development of the local community in various fields and existing energy

capacity. Local energy concept is designed to raise awareness of energy consumers, to prepare measures in the field of energy efficiency, and to introduce new energy solutions. It includes an analysis of the current situation in the field of energy use and energy supply. It examines the possibility of using local renewable energy sources, which increases the security of supply of heat and electricity in the local community. The proposed projects simultaneously bring the reduction of emissions and environmental pollution. Local energy concept includes an Action Plan (where projects are economically evaluated) and a schedule.

2. Program ENSVET – Energy consulting for citizens. It provides individual, free, independent energy counseling and information, educational and awareness-raising activities to promote measures of efficient use of energy and renewable energy sources for people in the local environment. In ENSVET network offices scattered throughout Ljubljana Urban Region, qualified independent energy advisers operate. With free advice and interviews, they help in the selection, planning and implementation of investment measures for the efficient use of energy and the use of renewable resources in residential buildings. Counseling increases public awareness of energy, increases energy savings and reduces greenhouse gas emissions, thus facilitating the implementation of certain energy policy measures and programs. Basic information and network and consultancy information can also be obtained from the free telephone. ENSVET network is organized by the Eco Fund together with the interested local communities - municipalities. The Eco Fund is also the coordinator of the network, and it operates the municipal advisory office network and the energy consultants involved.

3. Regional development program for Ljubljana Urban Region

The regional development program for Ljubljana Urban Region and its measures focus on ensuring greater energy independence of the region, increasing the production of energy from renewable energy sources, improving energy efficiency and thus contributing to the goals of a low-carbon society. Incentives also are aimed at optimizing environmental protection by providing appropriate environmental infrastructure, waste reduction and adaptation to climate change.

3. Which organizations/decision making bodies are responsible for these strategies? Are the same organizations responsible for implementation? What kind of metropolitan governance do you have in your region and does it include land use planning?

For the strategies on the national level the Ministry of infrastructure and Ministry of the environment and Spatial planning, Sector for the environment and climate changes are responsible. The Slovenian Environmental Public Fund is also responsible for the implementation at the national level. It is the only specialized institution in Slovenia that provides financial supports for environmental projects.

At the local level regional development agencies and municipalities are mainly responsible for the implementation of strategies. At the metropolitan level there is a Regional Development Agency of the Ljubljana Urban Region which unites 26 municipalities in central Slovenia, in which it supports sustainably oriented business, infrastructural, social, cultural and creative activities. At the same time, it encourages connecting and developing partnership networks

among various stakeholders whose activities bolster the region's sustainable development. Within Regional development program for Ljubljana Urban Region Regional Development Agency is responsible for ensuring coherent land use planning.

4. Do you have a low-carbon area or station area as a development project in your region? How do you define it?

In Slovenia we do not have a low-carbon area or station area as a development project. Thus we have individual smaller and bigger investments which include the idea of low-carbon areas. For example:

- closing of the city center of Ljubljana for traffic,
- Innovative and energy efficient block within Zeleni gaj neighborhood,
- Eco Silver House.

We do not have a common definition for low-carbon areas or station areas. Individual projects include the fundamental principles of low-carbon ideas which are reflected through comprehensive planning of the energy efficiency, among other with renewable energy sources, perfect thermal insulation, wall soundproofing, sun protection, ecological materials, use of rainwater, micro solar power station on the roof, green roof, etc. In the field of traffic individual projects include: building of pedestrian zones, cycling lines, P+R systems, effective and modern public transport, subsidies for the electric vehicles ...

5. What kind of a project is it and how large is the area (e.g. climate street, low-carbon district, low-energy block or other)?

- Ljubljana's city center (low-carbon district)

Ljubljana's city center was closed for traffic in 2007. The city center, which was once the domain of cars and buses, is now mostly dedicated to pedestrians and cyclists. The city's public transport is becoming more and more accessible and user-friendly to passengers. Urban cycling is rapidly increasing in popularity and the city's cyclists thoroughly enjoy using the free Bicike(LJ) bike sharing network. More and more public city buses in Ljubljana are fueled by methane in order to achieve reduction in CO₂ emissions. Electric-powered vehicles called Kavalir can be hailed for a free ride and free logistic within the core city center area. With many concrete measures based on the Transport Policy of the City of Ljubljana (2012) we are following the main goal, and that is, among other things, to change traveling habits and improve the modal share in a way that one third of the journeys is made by public transport, one third by bicycle and on foot, and one third by personal vehicles.

The city Ljubljana is very active also in the field of waste management and in this manner lowering the CO₂ emissions which originate from waste. the European capital with the highest share, 63%, of separated waste collected and is the first capital in the EU in the 'zerowaste' program. For effective and eye-friendly waste disposal, there are 53 underground collection units installed in the city center. Underground collection units for paper, glass and packaging are accessible to all, while receptacles for biological and other waste are intended for nearby households. These are opened with a special card which record the waste input, which in turn determines the level of the monthly bill.

6. Are you developing new low-carbon areas or transforming the existing urban structure?

In Ljubljana urban region renovation of the existing infrastructure prevails (for example renovation of residential buildings, closing of the city center ...) Nevertheless, there are some individual new projects which are developing a new low-carbon infrastructure (for example building of a new railway stations in a suburbs of Ljubljana, building of new cycling lines, new low-carbon buildings ...)

7. What are the main measures to implement low-carbon areas (e.g. traffic free zone, low-carbon buildings)?

The main measures to implement low-carbon areas are:

- Traffic:
 - closure of the city centre for traffic
 - increase of pedestrian streets and reorganization of the streets according to the principle of common transport space
 - increase of cycling roads
 - availability of the public transport within the city
 - number of electric, methan public buses, trains
 - availability of the last mile vehicle (electric mini buses)
 - extension of public transport to suburbs
 - the integration of the railways into urban transport: new train stations and establishment of the city rail, building of new train and bus stops
 - number of environmentally friendly vehicles
 - limiting the speed at 30km/h in the neighborhoods and the overall calming of traffic in these zones,
 - implementing parking policy in the neighborhoods.

- Buildings
 - installation of a solar heating system in a residential building,
 - installation of a wood biomass heating plant for central heating of a residential building,
 - installation of a heat pump for central heating of a residential building,
 - connecting an older one- or two-floor building to a district heating system,
 - installation of energy-efficient wooden windows in an older residential building,
 - thermal insulation of the façade of an older one-or two-floor building,
 - thermal insulation of the roof or ceiling against an unheated area in an older one- or two-floor building,
 - installation of ventilation by returning the heat of waste air in a residential building,
 - installation of a gas condensing boiler for central heating of an older residential building,
 - construction or purchase of almost zero-energy new one- or two-floor buildings,
 - complete renovation of an older one- or two-floor building,
 - buying a dwelling in a new or renovated almost zero-energy three- and multi-dwelling building.
 - Installation of devices and systems for efficient heating and ventilation and preparation sanitary hot water

- use of renewable energy for the heating of rooms and preparation of sanitary hot water
- o modern devices for electricity generation, purchase of energy-efficient household appliances
- o reduction of heat losses in the renovation of existing residential buildings
- o degradable household waste.

8. Land use targets were analyzed in workshop 4: Transit oriented development. If you have any special climate targets in land use planning related to low-carbon areas, please describe them.

We do not have a special climate targets in land use planning.

9. Housing and its heating and cooling in low-carbon areas should be energy efficient and utilize renewable energy sources. Do you have special targets or recommendations for low-carbon building stock? What measures do you have for this? Are the measures for new housing or for retrofitting the existing stock?

An important area in the efficient use of energy is construction, as 40% of all energy is spent in buildings. In order to reduce energy consumption in buildings, it is necessary to adapt and rationally manage the district heating systems. From 2019 onwards, all newly built public buildings that use energy for heating and / or cooling, must be constructed as almost zero energy, and from 2021 this applies to all other new buildings. The energy in such buildings will be largely ensured from renewable energy sources.

In order to achieve the headline goal of energy efficiency, one quarter of the existing building fund needs to be renewed by 2020, representing around 22 million square meters of building surfaces. This means that the use of energy in buildings is reduced by almost 10%. A comprehensive, especially energy renovation of buildings (sustainable construction) is also a government strategic project.

The energy efficiency of buildings is marked with an energy certificate, which, in addition to the energy efficiency class (A to G scale), also contains recommendations for increased energy efficiency, and provides consumers with information on energy consumption to compare prices and rents for housing.

The reduction of energy consumption can be also achieved by using energy-saving household appliances and other energy-related products. These products are marked with an energy label showing the energy class and energy consumption. 85% of European consumers take into account the energy label for purchases. An ongoing revision of the EU labeling legislation with energy labels is in progress.

We have a special targets and recommendations for low-carbon building stock. They are defined by Eco Found - Slovenian Environmental Public Fund. They are defined in Rules on efficient use of energy in buildings with a technical guideline (Uradni list RS št. 52/10). All the recommendations for the architectural design, thermal protection, heating and cooling, ventilation and others are defined in Rules on efficient use of energy in buildings with a technical guideline (Uradni list RS št. 52/10).

10. What kind of restrictions or incentives are you using for limiting car use in low-carbon areas / zones?

There are several restrictions or incentives implemented:

- closure of the city center for traffic,
- parking in the city center is available only for residents with residential permissions,
- parking on the edge of the city center is payable,
- 5 P+R system car parks were set up on city arterial roads,
- Kavalir – small electric vehicles provide transport for people in pedestrian areas inside the ecological zone and on streets with traffic restrictions,
- The uniform payment system of the Urbana single city card for cash-free travel on LPP city buses, parking, pay to borrow Bicikelj bikes, for Ljubljana City Library services ... ,
- 17 % city buses with zero emissions,
- Bicikelj - a public bike-sharing system. Users have 380 bikes available at 38 stations in and around the city center. The system encourages users to borrow a bike for a journey and then return it to a station. The first hour is free, after which a usage fee is charged,
- Urban electric train for discovering city center for visitors and residents.

11. Are there special parking standards for low-carbon areas / stations in terms of CO2 emissions? Are there limitations to parking in low-carbon areas / stations (places/apartment)? How are park and ride areas implemented in station areas?

Yes they are, parking in car free zone is allowed only on defined streets and for residents only (with residential permissions). The delivery services are available daily from 6 a.m. to 10 a.m.

P+R parks are well implemented to serve as an efficient incentive for limiting the number of cars entering the city center. They were implemented to remove the need to drive in city traffic jams, search for a parking space outside the office, shop, health center or other locations, and above all with the desire to encourage less pollution in the city center from motor vehicles. We have set up five P+R system car parks on city arterial roads. Broadening the network of P+R parks strengthens public transport and encourages sustainable mobility in the Ljubljana Urban Region. Altogether, the five Ljubljana car parks in the P+R system have a total of 2,169 parking spaces. Car park users can park all day and the price of parking includes two city bus tickets.

12. What are the planning principles for bicycle parking in station areas (or other low-carbon areas)? Are there special bicycle parking standards for these areas and for housing units/flats? Do you have any targets regarding dimensioning or the amount of parking places?

In the station area (city center of Ljubljana) there is a system of bicycle stations for self-owned bicycles and also for the bike-sharing system Bicikelj, which has 38 stations with 380 bikes available for sharing. Bicycle stations and Bicikelj stations are available at all P+R parks and are planned in parallel with public bus and train lines. There is also bicycle servis point available in the city center. Almost all housing units/flats have their own bicycle parkings within building.

13. What kind of low-carbon solutions have you created for last-mile dilemma in station areas?

For last mile dilemma in station area we have created:

- Cavalir - small electric vehicles which provide transport for people and personal luggage in pedestrian areas inside the ecological zone, pedestrian streets and on streets with traffic restrictions,
- companies for cargo delivery within Ljubljana city centre by cargo bicycles (inside ecological zone, in pedestrian streets and on streets with traffic restrictions) (Kurirček, Tine express ...).

14. Adaptation to climate change includes management of storm water and urban heat islands. What kind of measures do you have for cooling and for management of storm water?

/

15. In your low-carbon area, do you have circular economy related criteria (such as requirement for using recycled building materials or requirement for optimizing public space usage, space sharing)? What are the best practices you would like to share regarding circular economy/ resource efficiency?

In Ljubljana, we are convinced that in future the shift from linear to circular economy will have a significant impact not only on production but also the whole social order and the change in our mentality.

Our circular economy examples are:

- Kabiné Šerinjon, first Slovenian clothing e-library
- Library of THINGS
- Hygienic paper from packaging waste
- Upcycled furniture and fittings in the RCERO office building
- Point.For You. and awareness-raising on reuse and shared use
- Against plastic bags at Ljubljana's markets
- Bicycle sharing – BicikeLJ
- Reuse of damaged and dilapidated traffic signs
- Restoring used car tires
- Modernised pool technology in Tivoli swimming pool
- Processing bio waste into compost
- Processing Japanese knotweed into paper
- Reuse Centre and Repair Café at Povšetova 4
- Reuse of (waste) material
- Reuse of furniture

- Promoting short and green distribution chains
- Gloves on! campaign – tiger mosquito spread control project
- Street cleaning with recycled water and rainwater
- Reuse of asphalt
- Vehicle restoration
- (Co-)production of energy
- Material utilisation or recycling

Three selected examples are:

1. A library with different useful items on its shelves instead of books

The Library of THINGS is set up at the Community Centre in Savsko naselje. It is a library with different useful items on its shelves instead of books – THINGS/TOOLS – that can be used at home, in the garden, for playing, sports and many other items. Item rental is an innovative approach to prudent use of goods and environmental conservation and at the same time an example of responsible consumerism as it enables people to use things which they need only every now and then. Anyone who donates a thing on the »Wish List« or pays a membership fee can join the Library of THINGS. The project was developed in cooperation with the Regional Development Agency of the Ljubljana Urban Region, the cultural association prostoRož, the Slovenia Coworking Initiative and the City of Ljubljana which provided facilities for the operation of the Library of THINGS.

2. Among the first in the world to produce paper out of Japanese knotweed

Just like other cities Ljubljana is also faced with significant Japanese knotweed overgrowth, a plant on the list of hundred most invasive non-native species worldwide. With the aim of preventing excessive overgrowth of the plant and reusing it for beneficial purposes the City of Ljubljana teamed up with the Re-generacija collective, the University Botanic Gardens Ljubljana, the Pulp and Paper Institute and the public waste management company Snaga. In voluntary Japanese knotweed removal campaigns the dry stems of the plant were harvested, ground and processed into paper from which final products were made. And so Ljubljana is among the first in the world to produce paper out of Japanese knotweed at a semi-industrial level. By doing so we tackled the problem of invasive non-native species in an innovative way aligned with the principle of circular economy. The paper was used for the production of paper bags and notebooks, and the public company Snaga printed the English version of its magazine Snagazin on it.

3. Protecting water resources

The public waste management company Snaga is cleaning the city pavements in Ljubljana with machines which recycle water and they are using a biodegradable detergent. The machine has five floating brushes for wet cleaning which vacuum up the cleaning water. For street rinsing Snaga uses mostly rainwater collected on the roofs of its building complex at Barje.

16. What kind of recommendations or regulations regarding sustainable procurement do you have and on what level? (Region, city, area)

At the national level and local level we have a Regulation on Green Public Procurement (Uradni list RS, št. 102/2011). Green procurement is considered as an order in which a subscriber orders goods, services or works that have a lesser environmental impact and equal or better functionality compared to normal goods, services and works throughout their lifetime.

There are basic and additional environmental requirements based on the field of procurement: for electricity, for food, beverages, agricultural products for food and catering, for office paper and hygienic paper products, for electronic office equipment, for audio and video equipment, for refrigerators, freezers and their combinations, washing machines, dishwashers, air conditioners, for buildings, for furniture, for cleaning services and laundry services, for passenger and transport vehicles and bus and coach services. They are explained in Regulation on Green Public Procurement (Uradni list RS, št. 102/2011).

17. Good service level in station areas can create an attractive urban node. Do you have any service concepts for station areas, or recommendations of commercial or transport-related services? Within the urban structure, where are the public services concentrated in? (city center, station areas)

There is no official documents in relation to concepts for station areas or recommendations.

In Ljubljana the project Emonika as a project of commercial and transport-related service is planned:

Emonika City Center - Ljubljana passenger center is a planned multi-purpose transport center on the surface of 200,000 m². The public-logistic part will cover almost 14,000 m², including bus and train stations and a large, spacious station waiting room. Emonika City Center will replace or modernize today's railway and bus station into a unified facility, upgraded with a range of secondary offers (residential part, business and commercial part, entertainment section). This will highlight the role of the Ljubljana transport hub in the wider regional area. Not only in the relation of the central Slovenian traffic intersection, which can with integrated traffic arrangements encourage the use of public transport in the wider space, but also in the sense of creating a recognizable focal point in the capital city.

Public services are concentrated in traditional neighbourhoods ('soseska' in Slovenian), built mostly from 1950s to 1980s. They are a mix of residential and service programmes, with a neighbourhood centre developed around the station of public transport, which was predominantly bus network. In that time it represented a key urban planning tool in Slovenia. Examples of such neighbourhoods are Fužine, ŠS6 in Šiška, Ruski car or BS3 in Ljubljana. Neighbourhoods ('soseske') are very close to the concept of TOD, but are not promoted and planned in municipal spatial plans anymore. Regarding the service provision, the neighbourhood had its own school, kindergarten, shopping centre and some other services. At the regional/national level the equipment of the single settlement area mostly followed the administrative structure (communal/municipal centres) and the polycentric spatial development as the main spatial development paradigm Slovenia had during the past 50 years. In this regard, numerous studies have attempted to define the level of public and

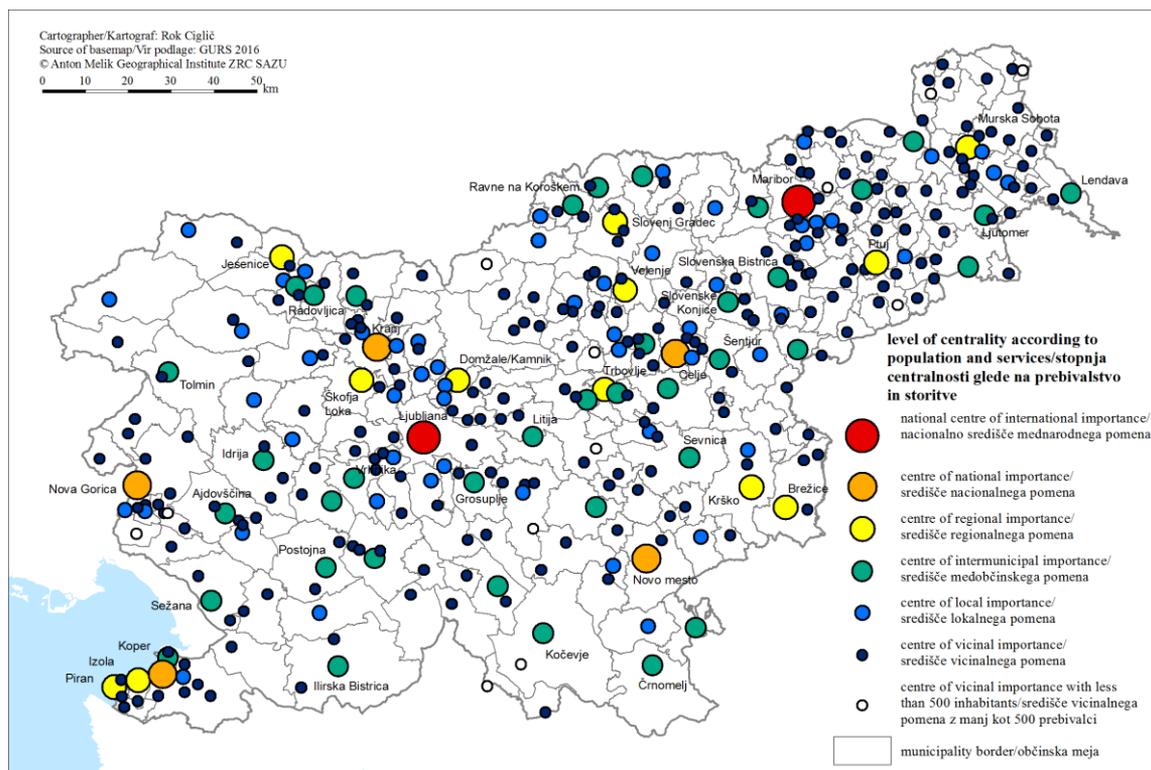
private service provision in the Slovene towns and cities. The last study (Nared et al. 2016) focused on the four groups of public services /four main functions: public administration, education, healthcare, and the judiciary:

Figure 2: Level of centrality for settlements and criteria for individual levels.

Level of centrality	Population	Expected functions
1. National center of international importance	≥ 100,001	<ul style="list-style-type: none"> – Public university – University medical center
2. Center of national importance	20,001–100,000	<ul style="list-style-type: none"> – Higher court – College, university faculty, or academy
3. Center of regional importance	10,001–20,000	<ul style="list-style-type: none"> – Large general hospital – District court – Junior college – Hospital
4. Center of inter-municipal importance	3,001–10,000	<ul style="list-style-type: none"> – High school – Health center – Local government office
5. Center of local importance	1,501–3,000	<ul style="list-style-type: none"> – Local court – Full primary school – Health station
6. Center of rural importance	501–1,500	<ul style="list-style-type: none"> – Municipal headquarters – Branch primary school

The concept above served to define the Slovene settlement system and its central settlements and not the expected level of services for the individual station community or within the individual settlement. The crucial public services are provided in 212 municipal centres (mostly in centrality levels 4, 5, 6) and do not depend on the transport provision. Location of services (city centre or elsewhere) differs from town to town.

Figure 3: Central settlements in Slovenia 2016.



18. How do you motivate citizens to take action for low-carbon objectives?

In last 10 years a considerable change has been made in the field of raising awareness and motivation of citizens to act environmentally friendly. On one hand there has been several awareness raising campaigns (Civitas Elan, Income, Snaga d.o.o., ...) where mainly informational strategies were used to change an individual's motivation, perception, knowledge and norms regarding environmental protection and on the other hand a lot of structural strategies, which alter the circumstances in which behavioural decisions are made or in which the behaviour is realized were introduced in Ljubljana. In the City of Ljubljana, we have developed following structural incentives to achieve greater awareness and behavioral change in environmental way and take action for low-carbon objectives:

- By closing the city center for traffic, we have designed public spaces by transforming spaces (which used to be intended for traffic) for pedestrians as well as for cyclists to newly transformed public spaces, and attract new visitors and residents to the city center.
- Uniform urban card Urbana which is an electronic payment card which can be used on city buses, for parking, for services in libraries, visits to museums, sports and cultural events which are prepared by the City of Ljubljana.
- A high-quality public transport corridor. A yellow belt for public passenger or collective traffic was introduced on the Barje, Slovenska and Dunajska cesta. The planned interventions in the area will enable better connection and arrangement of the crossing

points, the advantage of the buses at crossroads on the corridor and easier access to the stops for the physically handicapped passengers.

- Park and Ride System (P + R - Park and Ride). There are 5 Park and Ride Systems from which you can access to the city center with public passenger transport, and the transport price is included in a single parking price.
- Introduction of new bus connections with neighboring municipalities. Up to now, the municipalities of Medvode, Brezovica and Škofljica are directly connected to Ljubljana.
- Introduction of bus arrival displays. This will allow passengers to have a more transparent and accurate information system on the arrival of buses.
- A comprehensive cycling strategy introduces and designs new bicycle belts and allows for secure parking for bicycles (bicycle parking lots). Bikelj - A city bike is a system that allow flexible and affordable bicycle rental at around 20 locations.

19. Which organizations, authorities or other partners are the main stakeholders in developing low-carbon areas / stations? How is co-operation arranged?

There is no systemic approach in developing low-carbon areas. There are individual projects which involve different types of stakeholders.

The main stakeholders for developing low-carbon area Ljubljana city center are:

- public authorities: City of Ljubljana, Ljubljana Urban Region,
- knowledge providers: universities, research institutes,
- civil society: NGO-s, interested public, general public,
- economic activity: individual or collective private entities: Ljubljana Public Transport, Snaga d.o.o., ...

20. How is funding for low-carbon measures organized?

Funding for low-carbon measures is organized by Eco Found. It is the only specialized institution in Slovenia that provides financial supports for environmental projects. The financial assistance is offered through soft loans from revolving funds and grants for:

- Loans to legal entities (municipalities and/or providers of public utility services, enterprises and other legal entities) and sole traders for investments in environmental infrastructure, environmentally sound technologies and products, energy efficiency, energy saving investments, and use of renewable energy sources;
- Loans to individuals (households) for conversion from fossil fuels to renewable energy sources, energy saving investments, investments in water consumption reduction, connections to sewage system, small waste water treatment plants, replacement of asbestos roofs;
- Grants to individuals (households) for investments in electric cars and for investments in residential buildings (energy efficiency and use of renewable energy sources);

- Grants to legal entities (municipalities and/or providers of public utility services, enterprises and other legal entities) for investments in electric cars and buses for public transport on compressed natural gas or biogas;
- o Grants to municipalities for investments in buildings where public education takes place (schools, kindergartens, libraries etc.), newly constructed as low energy and passive buildings or renovated in passive standard.
- o

B) Data monitoring and other tools for Shaping low-carbon areas

1. How and with which method do you calculate greenhouse gas emissions on metropolitan (or city) level and what is your reporting cycle (e.g. annually, once in two years...)?

Municipality of Ljubljana calculates the emissions of greenhouse gases based on energy balance of the municipality. They use the estimated use of the energents in municipality. Since 1996, they follow it based on Standardised classification of business activity (SKD), which is harmonized with European norms. The production and use of energy in the territory of municipality are monitored in industry, transport, other use and in energy conversion. The estimates of harmful substances are calculated based on recommended emission factors for emissions of CO₂, SO₂, NO_X, CO, NH₃, (HOS - VOC) – CH₄ and nm HOS, N₂O, BTX (benzene, toluene, xylene – various types) under emissions of nmVOC, Pb, fine dust particles and the quantity of deposited ash. For certain sectors where recommended emission factors unsatisfactory describe the actual state, there are local emission factors calculated, especially for the emission from the transport.

The cycle of reporting is annual for most common substances. For a detailed studies it was unclear to determine the reporting cycle. The data on the website <https://www.ljubljana.si/sl/moja-ljubljana/varstvo-okolja/stanje-okolja/zrak/> is however updated.

There are also ongoing measurements of other GHG emissions and imissions with real time reporting and forecasting via mobile app.

On a city level, the municipal provider of energy TE-TOL measures the emisions (the release of gases in the environment) of GHG from the local power plant and imissions showing the state of the air.

Emissions are measured on a half-hour rate in the chimney of a power plant. They measure temperature of fumes, volume of gases, CO, SO₂, NO₂, dust and O₂.

Imissions (the state of air quality) are measured on hourly basis on five (5) sites. Two measuring stations by TE-TOL: in Zadobrova on height 280 m above sea level and another is Vnajarje on 630 m height. They measure sulphur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃) and fine dust (PM₁₀). Both emissions and imissions are available online with real-time and archive data on on <http://m.te-tol.si/airquality>.

There are also three municipal stations in the city centre and in one neighbourhood. They measure SO₂, NO, NO₂, NO_x, CO, and fine dust PM₁₀, publishing data in real time to the website <https://www.ljubljana.si/sl/moja-ljubljana/varstvo-okolja/stanje-okolja/kakovost-zraka/>.

The national report about air quality is published on annual basis ([link](#)).

2. Do you have any indicators for monitoring the development of greenhouse gas emissions and/or the implementation of climate action plan?

Yes. On a municipal level, there are indicators and climate action plan in place.

The climate action plan - Odlok o načrtu za kakovost zraka na območju Mestne občine Ljubljana ([link](#)) - was put in place in 2014, with regular reports about improvement. The latest report was published in 2017 (<https://www.ljubljana.si/assets/Uploads/Porocilo-o-kakovosti-zraka-v-Ljubljani.pdf>).

The action plan is focused primarily on fine dust PM₁₀, apart from other substances, but target values for them are missing.

3. Do you have indicators for monitoring the development of low-carbon areas in your region?

No, there are no indicators for monitoring low-carbon areas in the region, but there are some similar at the national level.

ID	Indicator	Measurement unit	Category of region	Target value (2023)	Data source	Frequency of reporting
CO 31	Energy efficiency: Number of households with improved energy consumption classification*	Number	Whole of Slovenia	2500	Estimate	Annually
CO 32	Energy efficiency: Decrease of annual primary energy consumption of public buildings	kWh/year	Whole of Slovenia	23000000	Implementing authority	Annually
4.4	Renovated useful floor area of buildings owned or occupied by the public sector Whole of Slovenia Annually	m ²	Whole of Slovenia	1800000	NEEAP 2020	Annually
4.5	Renovated useful floor area of renovated buildings owned or occupied by the central government**	m ²	Whole of Slovenia	180000	Implementing authority	Annually
4.6	Number of implemented energy renovation demonstration projects for different categories of buildings***	Number	Whole of Slovenia	5	Implementing authority	Annually
CO 34	GHG reduction: Estimated annual decrease of GHG (in the public and household sectors)****	t CO ₂ eq	Whole of Slovenia	32000	Implementing authority	Annually

Operational Programme for the Implementation of the EU Cohesion Policy 2014-2020, ([link](#)), Table 19

4. Are low-carbon concepts for shaping low-carbon areas, such as BREEAM Communities, LEED or One Planet Living, used in your region?

No. They are (rarely!) used for certifying single projects, but none yet for low-carbon areas. All of the standardized evaluations schemes being promoted by Green building council Slovenia ([link](#)), which also organizes professional education and support. Apart from mentioned low-carbon concepts, BNB and DGNB standards are most advertised and widespread.

Self-evaluation of Low-carbon Area / Station Area projects (if there is one), or of any other low-carbon local plans/projects, that demonstrate how climate targets are conducted.

Name a specific plan, project or case that incorporates the development of low-carbon station area (or other low-carbon area project):

There are no specific plan or project for a low-carbon station area currently in progress. A project Emonika that could be understood as a low-carbon station area, but any data about it is very limited ([link 1](#), [link 2](#)). The idea comes from the urban planning competition from the year 2002 ([link](#)).

1. What are the objectives of the plan/project in regard to climate change mitigation?
2. What is the time frame for carrying out the plan/project?
3. Who has the legal responsibility for the plan/project?
4. What kind of planning principles are there in the plan concerning climate targets?
5. What are the main measures for shaping low-carbon area?
6. Is the population and workplace density higher in the low-carbon area compared to the rest of the region? Is densification considered as an objective in the development of the area?
7. What are the tools in developing low-carbon areas a) if the land is public owned and b) land ownership is private? Are there differences in tools depending on the land ownership?

8. How is the development of the low-carbon areas monitored? Do you calculate emissions for smaller development areas? Are there other indicators?

C) Good examples/bad examples

Give examples of good and bad development plans of low-carbon areas (preferably a station area, if there is one). Briefly describe why the examples are good or bad. Please exemplify with links or images (Max 1 page)

Good practice	Bad practice
<p>Name: Eco Silver House</p>	<p>Name: Non-profit housing neighbourhood Polje I</p>
<p>Context: Energy efficient demo multiresidential high rise building is a research and demonstration project supported by the European Commission within the 7. Framework Programme. The overall objective of the project is to demonstrate and validate new technologies, concepts and systems for sustainable, low-energy building in order to test and assess the technological and economical feasibility of innovative energy solutions in high rise multi residential building Eco Silver House.</p> <p>The Eco Silver House is a multi residential high rise building located in the city centre of Ljubljana, capital of Slovenia, at Dunajska road, near the northern line of the town's ring road. The net total area covers the surface of 23.455m² of which approx. 12.870m² belongs to residential area. The project includes 17 floors, with 4 basement floors, where parking facilities and electric chargers for electric cars are available to residents as well as to other users. Beside the ground floor and mezzanine there are additional nine (9) floors and two (2) terrace floors.</p>  <p>Picture 1: Eco Silver House (http://www.akropola.si/modules/gallery/uploads/1a.jpg).</p>	<p>Context: Non-profit housing neighbourhood Polje I with 78 apartments was built in 2005 at the site of the shacks removed, by The Housing Found of the Municipality of Ljubljana. Considering it's construction the quality is poor. No principles of energy savings were taken into account. Neighborhood is located quite far from the city center. Considering public traffic, it is relatively rare especially for weekends and holidays. Considering a grocery, it is 1 km away. There is no Bikelj system available near the neighborhood. Equipment with footpaths and sidewalks is relatively poor. Also bicycle trails are available only partly and bicycle connection paths are poor. Considering parking spaces, there are not enough parking spaces available, parking spaces are narrow. (https://repozitorij.uni-lj.si/Dokument.php?id=102801&lang=slv).</p>  <p>Picture 2: Polje I neighborhood (http://www.odprtehisiseslovenije.org/objekt/stanovanjska-soseska-polje-i-ii-in-iii/).</p>
<p>Main authorities and stakeholders involved: -Users and tenants are key actors and can provide their expectations and validation of the project results. They are trained to enable proper use and exploitation of sustainable technologies embedded in the building.</p>	<p>Main authorities and stakeholders involved: The Housing Fund Of The Municipality of Ljubljana, Municipality</p>

<p>-Public and private clients and investors in housing and real-estate: they can prepare new design requirements and offer their clients new generation of buildings with sustainable solutions.</p> <p>-Architects, design and engineering organisations and their associations: design data and replications of the model for different environments/locations support their design decisions. General information about the demonstration building results will be widely spread among architects.</p> <p>-Producers, providers of services and installers of building systems, components, products and services and their national, European and international associations: they can improve their products and services based on validation and assessment information gathered within project</p> <p>-Local Authorities & National/Regional Public Bodies and promoters in energy efficiency and sustainable building: they are key players as policy makers, responsible for favourable legislative framework creation, public procurements.</p>	
<p>Web links: http://www.ee-highrise.eu</p>	<p>Web links: /</p>
<p>Why is the practice considered as 'good'?</p> <p>The overall objective of the project is to demonstrate and validate new technologies, concepts, and systems used, in order to test and assess the technological and economical feasibility of innovative energy solutions in Eco Silver House building, and to contribute directly to the EU energy and climate change policy. Buildings are at the core of the EU's prosperity. They are important to achieve EU's energy savings targets and to combat climate change whilst contributing to energy security. The fundamental principles of sustainable development of a high rise building are reflected in Eco silver house through comprehensive planning of the energy efficiency project savings, among other with renewable energy sources, perfect thermal insulation, wall soundproofing, high-quality air conditioning system with a recuperator, sun protection, extremely rational air-conditioning appliances, intelligent control and management of electric and mechanical devices, machinery and tools, ecological materials, use of rainwater, micro solar power station on the roof, green roof etc. The building is designed to fulfil the requirement for: the passive standard (PHPP07) with the consumption of 10 kWh/ m2 energy for heating per year. The most important innovations of the EE-HIGHRISE are the integration of the building envelope – HVAC system, intelligent integrated control system and renewable energy sources, fulfilment of the passive standard for a high rise building with 11 floors and 128 residential units.</p>	<p>Why is the practice considered as 'bad'?</p> <p>Considering low-carbon construction concept no principles of energy savings were taken into account. The construction of the neighbourhood is bad. There are alarming conditions regarding moisture, cracking walls and ceilings, rusting at breaks, poor window sealing, poor insulation and construction finishes. The inspection found discrepancies between the project design and actual design in the selection of materials and the design of critical details, and in particular the errors and superficiality in the thermal insulation layer (the insulation was not properly attached, insulation is missing, the use of glass instead of rock wool), which resulted in the formation of thermal bridges, the introduction of meteoric water into the insulating layer and, consequently, the appearance of wall mold in most dwellings (Rozman, 2014). For non-profit neighbourhoods it is common that the cheapest materials are installed, there are short construction time, lack of construction control. Neighborhood is located quite far from the city center. Considering public traffic, it is relatively rare especially for weekends and holidays. Considering a grocery, it is 1 km away. There is no Bikelj available available near the neighborhood. Equipment with footpaths, sidewalks and bicycle trails and connections is poor. Considering parking spaces, there are not enough parking spaces available, parking spaces are narrow. (https://repositorij.uni-lj.si/Dokument.php?id=102801&lang=slv).</p>

D) Current experience

1. Does your own organization have a climate strategy or is it included in your general strategic approach? Do you have a climate action plan? If yes, what are the targets?

RRA LUR does not have a climate strategy or a climate action plan.

On a state level there is Strategic framework for climate change adaption and on local/municipality level Local energy concepts.

2. Is your organization involved in shaping low-carbon areas? What are the main measures in your organization?

LP is conducting various studies that includes topic of shaping low-carbon areas. One of them is Central-European Urban Heat Island Atlas (CE UHI atlas). The CE UHI Atlas is a web-based tool for presentation of different factors influencing urban heat island phenomena. It is a result of the UHI project –Development and application of mitigation and adaptation strategies and measures for counteracting the global urban heat islands phenomenon. The UHI is a microclimatic phenomenon that occurs in the metropolitan areas. It is characterized by a significant increasing of temperature in the urban area with respect to the surrounding rural areas. These areas of higher temperatures are termed 'urban heat islands'. Higher temperatures induce enhanced direct and indirect heat stress leading to low quality of life in urban areas. Urban heat island affects people's health by bad air quality, while also influences water resources and energy consumption. This can be avoided by the implementation of proper knowledge, good mitigation practices, and adaptation measures. The CE UHI Atlas is a tool for considering the critical urban areas in Europe and can be used to limit the temperature increase in cities by establishing proper short-term and long-term mitigation, risk prevention and management activities.

RDA LUR is not involved in shaping low carbon areas, but we contribute to this topic with support tools and various projects. One of our main focus is sustainable mobility, we coordinated project A network of P+R scheme collection points in the Ljubljana Urban Region, within we prepared expert guidelines and investment documentation required to draw on EU funds to finance construction of the anticipated 23 facilities for the P+R scheme collection points in the region (some are already constructed). We were involved in elaborating of sustainable urban mobility plans (SUMP) for some of the municipalities in the region, including the City of Ljubljana. RDA LUR is also preparing The regional development programme (RDP) for each financing period. RDP is a basic programmatic, strategic, and implementation document at the regional level designed to harmonise the region's development objectives, determine the relevant instruments, and assess the funds needed

for their realisation. The RDP contains a situation analysis, defines the development opportunities, the development vision, and the region's objectives and priorities; it also financially evaluates the planned programmes and projects. The RDP is realised through agreements on the region's development, which contain both regional and sectoral projects. The RDP and its measures focus on ensuring greater energy independence of the region, increasing the production of energy from renewable energy sources, improving energy efficiency and thus contributing to the goals of a low-carbon society. Incentives also are aimed at optimizing environmental protection by providing appropriate environmental infrastructure, waste reduction and adaptation to climate change.

3. Has an evaluation been conducted?

/

4. Do you have experience in using a Low-Carbon -concept (BREEAM, LEED, One Planet Living etc.)? If yes, what kind of experience do you have?

No.

5. Does your organization have questions about shaping low-carbon areas, that you would like to be discussed in the forthcoming workshop?

Shaping low carbon areas just for housing or also for other areas (bussines, school districts...)?

The share of the modal split for low-carbon areas vs. "normal" areas?

Does on-demand (demand responsive) transport plays any role in establishing low-carbon areas? If yes what role?

Are you monitoring any indicators (environmental, modal split...)?

What is the extent of planned low-carbon areas?

Also interesting topics for us: Storage of CO₂, limitation of old vehicles, electro mobility.

6. What experiences from workshop 5 do you want to bring to the next workshop? The question will be distributed under WS 5 and will complement the inventory. (Answered after workshop 5)

OSLO/AKERSHUS

5th Workshop

Shaping Low-carbon areas

Inventory

Questions

In the inventory for shaping low-carbon areas, the SMART-MR Partners should draw on the experience gained at the previous workshops and from expertise gained in their own metropolitan region.

A) Open questions on shaping low-carbon areas

1. Does your region have set regional greenhouse gas emission targets and do you have a regional climate action plan? If yes, what kind of targets do you have (e.g. reduction percent in CO₂ emissions, target year for carbon neutrality)? Are the targets for total emissions or per capita emissions?

Oslo and Akershus have separate climate strategies/plans.

Akershus county council's current climate and energy plan has a main objective of reducing direct GHG (greenhouse gas) emissions by 50 % by 2030.

The new regional plan for climate and energy in Akershus is currently on consultation with a deadline 6th of April. The proposed new climate objective is to reduce the direct GHG emissions by 55 % within 2030 compared to 1991-level and to reach a low emission society (80-95 % reduction) by 2050. The plan focuses on four areas where it is necessary to reduce GHG emissions in order to meet the main objective:

Transport: reducing 50 % by 2030 compared to 1991

Stationary combustion: reducing 90 % by 2030 compared to 1991

Waste and wastewater: reducing 80 % by 2030 compared to 1991

Agriculture: reducing 20 % by 2030 compared to 1991

The objective on transport is crucial to meet in order to fulfill the main objective taking into consideration that almost 80 % of the direct GHG emissions are caused by the use of fossil fuels in the transport sector. The proposal is also taking into account the indirect GHG emissions in the county suggesting objectives on zero emission buildings, reducing food wastage, the need for transport by air and consumption of meat, and increasing recycling, reuse and redesign of products by 2030.

The City of Oslo will reduce its GHG emissions by 36 percent compared to 1990 levels by 2020, 50 percent as soon as possible after 2022 and 95 percent by 2050. The targets are for total emissions.

The main sources of GHG emissions in Oslo are transport (61 %), waste (19 %), buildings (17 %) and energy (3 %). Of the emissions that derive from transport around half are attributable to the transport of people, and half to goods transport and construction activities. The transport sectors will

require the most determined efforts moving forward. The use of fossil heating oil in buildings accounts for 17 per cent of the emissions. The goal is to fully phase out these emissions by 2020.

2. Does your region have any other strategy, e.g. energy transition strategy, urban renewal strategy, which steers towards low-carbon area development?

The regional plan for land use and transportation in Oslo and Akershus aims at reducing the need for transport by car and facilitate for public transport, walking and cycling. The focus is on compact development and less urban sprawl, concentrating growth around six regional cities and station areas. The plan is crucial in order to facilitate for a development towards a low emission society.

Akershus county council and The City of Oslo have a hydrogen strategy. The main target in the hydrogen strategy is that the region in 2025 will have a sufficiently established HRS network with connection to a national and Nordic infrastructure for fuel cell transport. There are two stations with 200 kilo capacity already in business and in the course of 2018 there will be two more.

In addition Oslo has a Climate and energy strategy, Climate budget, Climate Change Adaptation Strategy 2014-2030, Action Plan for Stormwater Management, The Urban Development of Oslo, and Strategy for public procurement (Norwegian version only).

Ruter (the public transport provider in Oslo and Akershus) has a strategy to be fossil free by 2020. They have launched a test program for electrical busses and boats, they have also increased their focus on biogas.

3. Which organizations/decision making bodies are responsible for these strategies? Are the same organizations responsible for implementation? What kind of metropolitan governance do you have in your region and does it include land use planning?

The implementation of the regional plan for land use and transportation is ensured through agreements between parties to commit to joint action within specific areas. The plan is to be followed up by municipalities, transport agencies and statutory bodies as well as by the regional planning bodies themselves

The regional plan for climate and energy applies to the entire Akershus society. In the action plan responsibility for implementation of the climate measures is delegated to the state, county and municipalities. The plan is not binding, but requires that the measures and objectives are taken into account in national and local planning and decision-making. Thus, to ensure implementation of the Regional Plan for Climate and Energy, it is

important to instill a sense of ownership of the planning process with the relevant stakeholders. The 22 municipalities in Akershus are central to this work. In addition, it is important to involve the central government, businesses, research and development institutions, and various organizations.

As of July 1 2016, the Climate Agency is tasked with coordinating and facilitating climate progress in Oslo.

The Vice Mayor for Finance is responsible for the Climate Budget, but the Climate Agency develops the support material and follows up on reporting from all City departments. All City departments are responsible for goal attainment and annual expected progress on the targets in the climate budget.

The Vice Mayor for Environment and Transport is responsible for climate and environmental policies in Oslo.

The Vice Mayor for Urban Development is responsible for urban development. Urban development in Oslo is concentrated within the existing built environment, which requires densification and transformation in prioritized areas. Road transport is the biggest greenhouse gas source in Oslo. Therefore, car-transport should be reduced, through a compact development around public transport nodes, increased cycle-lanes and a car-free city centre. Key programs and strategies include regional planning collaboration and climate-friendly building. This includes low-energy housing, climate neutral municipal buildings and transformation areas, as well as innovative pilot projects (FutureBuilt).

4. Do you have a low-carbon area or station area as a development project in your region? How do you define it?

To support climate friendly urban development the municipalities in the western part of the Oslo region – Oslo, Bærum, Asker and Drammen (Buskerud County) – have launched FutureBuilt. The FutureBuilt-program (a ten-year program (2010-2020) has a vision to show that climate neutral urban areas, based on high quality architecture, are possible, and the aim is to complete 50 pilot projects. The pilots are mostly individual buildings, but also a few urban areas. Two of these areas are Hamang in Bærum (Akershus), and Furuset in Oslo.

The area projects in FutureBuilt must be localized close to a public transport node for rail with high frequency. The pilots also aim at minimum 50 percent reduction in greenhouse gas emissions, in transport, energy consumption and building materials.

The Municipal master plan for Oslo defines four categories of development areas (all in close proximity to transport nodes). The measures vary within the different categories, but densification is common for all the categories.

As mentioned above the regional plan for land use and transport aims at reducing the need for transport by car and facilitate for public transport, walking and cycling by focusing on compact development and less urban sprawl, concentrating growth around six regional cities and station areas.

5. What kind of a project is it and how large is the area (e.g. climate street, low-carbon district, low-energy block or other)?

The two Future Built pilots mentioned above are planned to be low carbon areas/districts. The area of Hamang is approximately 220 acres (310 hectares), while the area of Furuset is 870 acres.

6. Are you developing new low-carbon areas or transforming the existing urban structure?

Hamang is an old industrial area, and the plan is to develop it into a residential area. At Furuset the plan is to transform and add on to an existing sub-urban structure.

The regional plan for land use and transportations aims at increasing the spatial concentration of housing development and jobs, to stop further urban sprawl. Future growth should be concentrated near the railways and metro system.

7. What are the main measures to implement low-carbon areas (e.g. traffic free zone, low-carbon buildings)?

In addition to the principle of densification close to transport hubs, facilitating walking, cycling and use of public transport are important to successfully implement low-carbon areas. The removal of existing parking places and the use of restrictive parking standards are also important measures. The use of environmentally differentiated toll road taxes is very important for reducing car use and facilitates for low carbon cars, it is also important to facilitate for refueling and charging infrastructure.

For Zero emission buildings it is will be important to use LCA (life cycle assessment) (or other GHG accounting standards) and environmental certification (ex BREEAM) in the decision-making process.

8. Land use targets were analyzed in workshop 4: Transit oriented development. If you have any special climate targets in land use planning related to low-carbon areas, please describe them.

In the regional plan for land use and transportation:

1. A transport system that is effective, environmental friendly, accessible to all, and with the lowest possible reliance on cars.
2. Efficient land-use, based on the principles of polycentric development and conserving the green landscape.

9. Housing and its heating and cooling in low-carbon areas should be energy efficient and utilize renewable energy sources. Do you have special targets or recommendations for low-carbon building stock? What measures do you have for this? Are the measures for new housing or for retrofitting the existing stock?

Current national building code is passive house level and Oslo Municipality decided in 2017 that the Municipality's own new buildings all will be net-ZEB, reflecting the government goal of net-ZEB as building code level by 2020. Oslo's climate and energy strategy states a goal that the energy efficiency measures in the existing building stock should amount to 1,5 TWh by 2020. By 2020 all heating oil will be banned.

In the proposal for regional plan for climate and energy in Akershus following objectives concerning buildings and stationary combustion, are formulated:

- All new public buildings are zero emission buildings by 2030 (new buildings)
- Local renewable energy production is increased by 2030 (new and existing buildings)
- Combustion of fossil oil and gas for heating is phased out in 2030 (existing and new buildings)

The action plan has suggested a broad range of measures. An important one is to use LCA (or other GHG accounting standards) when new buildings or renovations are planned. Climate friendly materials such as wood and local renewable energy production such as solar cells are seen as important to achieve zero emission buildings. Furthermore, in objective 1 there are suggested measures to widen the perspective on zero-emission buildings to zero-emission neighborhoods or areas.

10. What kind of restrictions or incentives are you using for limiting car use in low-carbon areas / zones?

The toll road system in Oslo and Akershus limits the use of car in the central area of the region, by giving public transport a competitive advantage. The removal of parking space in the city center of Oslo, and time limited parking are restrictions for limiting car use. The use of restrictive parking standards for new buildings is also important to limit car use.

11. Are there special parking standards for low-carbon areas / stations in terms of CO₂ emissions? Are there limitations to parking in low-carbon areas / stations (places/apartment)? How are park and ride areas implemented in station areas?

There are limitations on parking in central areas adopted in Regional plan for land use and transport, mostly in order to reduce commuting by car. There have been built more than 8 000 P&R on about 50 different train-, metro- and bus-stations, mostly in Akershus. The main justification for P&R has been to reduce commuting by car. The effect on CO₂ emission of this policy can be discarded. For the sake of CO₂ friendly and effective land use, no more P&R are built in city centers close to the bigger train-stations.

The Parking standard of Oslo defines the parking standard for vehicle parking and bicycle parking when constructing, reconstructing or changing use of buildings for residential, commercial or public services. The parking standard defines three different area categories (parking zones): city center, urban areas and low-density areas. For each category, the parking standard is described. Areas within 500 meters from a public transport hub, metro station or train station is defined as “urban areas”.

Parking standard applies when making new zoning plans or applying for building permits. The Parking standard has recently been revised. The objective of the standard is to help reduce the use of cars and increase the use of walking, bicycling and public transport.

In developed/existing areas, the limitations to parking vary. It depends on who is the land owner, the categories of land use, who operates the area, etc.

The City of Oslo is currently working on a project called “Car free city life in Oslo”. An area of approximately 1.3 km² will be transformed to a better urban environment within 2019. Car traffic restrictions will be introduced gradually. The primary focus is to improve city life. Reducing traffic is used as means to achieve this. The project will complicate parking and driving downtown.

12. What are the planning principles for bicycle parking in station areas (or other low-carbon areas)? Are there special bicycle parking standards for these areas and for housing units/flats? Do you have any targets regarding dimensioning or the amount of parking places?

In the region there are goals for a sufficient number of bike parking on every train stations, etc., primarily with a shelter. A program for building “Bike hotels” – safe parking-houses for bikes - on the bigger train-stations are under fulfillment, and the last years the county has spent about the same amounts of money on bike parking and car parking.

The Parking standard of Oslo describes the planning principles for bicycle parking when constructing, reconstructing or changing the use of buildings in all areas in the City of Oslo including station areas (areas within 500 meters from public transportation hubs, metro stations and train stations).

The parking standard defines both the amount of bicycle parking and the level of quality.

According to the Parking standard, bicycle parking should be easy accessible, visible and well connected to the main bicycle routes. For bicycle parking dimensioned for min. 20 bicycles, there are special demands for quality. E.g. min. 10 % of the parking must be accessible for cargo bikes and min. 50 % of the parking must be climate protected.

The Municipal master plan for Oslo refers to the current parking standard. In addition, the general provisions in the plan state that when planning areas with public transport stops, bicycle parking with adequate capacity and quality must be facilitated.

The City of Oslo has a Bicycle Strategy. One of the measures in the strategy is making a plan for bicycle parking in Oslo. The plan should identify the area needs, capacity needs and quality level. Another measure is to evaluate the bicycle facilities on metro- and train stations in Oslo. The evaluation should conclude with a recommendation on future needs for bicycle parking and define the adequate level of quality.

13. What kind of low-carbon solutions have you created for last-mile dilemma in station areas?

In regard to the transport of people the best approach to the last mile dilemma is to plan integrated transport hubs, with possibilities for changing between different modes of public transport (e.g. from train/metro to bus/shuttle bus), but also to facilitate the use of bike, and making the bigger area more walkable. The densification strategy in the regional plan for land use is an attempt to eliminate or reduce the impact of the last-mile dilemma.

We work continuously with improvement of infrastructure for pedestrians and cyclists. Currently, there is a strong political focus on bicycle. In Oslo, we have a Plan for the bicycle infrastructure. The object of the plan is that 80 % of the inhabitants will live within 200 meters of the bicycle network. The measures are among other things making the network more fine meshed, and making the bicycle network more attractive for all types of cyclists.

The promotion of EV-cycles (Oslo has financially supported its inhabitants in buying EV-cycles while Bærum (in Akershus) had a project renting out EV-cycles for free) has also erased some of the barriers experienced by the inhabitants using cycling as a mean of transport, making distance and carriage less important.

14. Adaptation to climate change includes management of storm water and urban heat islands. What kind of measures do you have for cooling and for management of storm water?

The city of Oslo has an Action Plan for Stormwater Management.
According to the plan the five areas of focus over the coming years are to:

- Acquire more knowledge
- Prevent negative impacts
- Develop model projects
- Establish closer working relationships
- Improve information and guidance

One very important measure is to build an open floodway and retention network that is an integral part of our sewer systems. Also, local measures like rain gardens, green roofs etc. will limit the amount of storm water in runoff systems and reduce instances of overflow. Some roads must also act as floodways where there is a considerable distance to the nearest watercourse. With open systems, we can make use of natural purification methods to clean contaminated storm water. It is important that natural drainage lines are maintained.

15. In your low-carbon area, do you have circular economy related criteria (such as requirement for using recycled building materials or requirement for optimizing public space usage, space sharing)? What are the best practices you would like to share regarding circular economy/ resource efficiency?

In the regional plan for climate and energy in Akershus circular economy is an important framework condition combating climate change. Recycling, reuse and redesign are important themes in the plan concerning both buildings, waste and products.

Biogas fuel production (LBG and CBG) from waste fractions such as waste water and organic waste are good example of circular economy which help reducing GHG emission from the transport sector and better use of resources. Oslo's biogas plant (42 GWh) even produces ecological fertilizer from the digestate reducing in addition GHG emissions from the agriculture sector. VEAS (waste water treatment plant) in Asker will soon build a biogas plant for fuel production (60Gwh).

Oslo is also coordinating EU's Urban Agenda for Circular Economy.

16. What kind of recommendations or regulations regarding sustainable procurement do you have and on what level? (Region, city, area)

Green public procurement is one of three main strategies suggested for meeting the climate objective in the regional plan for climate and energy in Akershus. It is for example seen as important to strengthen the competence on how to integrate environmental criteria in public procurement, use LCA analysis and encourage the market to deliver climate friendly products and services.

Oslo's Strategy for public procurement specifies that: "Oslo municipality will use procurement as a powerful tool in the effort to accelerate the green shift, climate goals and circular economic thinking. This requires procurement processes that strengthen the competitiveness of climate and environmentally friendly solutions with little environmental footprint, high expected quality, long life and good reuse possibilities." One of the strategy's targets is to ensure that Oslo becomes a greener city.

17. Good service level in station areas can create an attractive urban node. Do you have any service concepts for station areas, or recommendations of commercial or transport-related services? Within the urban structure, where are the public services concentrated in? (city center, station areas)

The main principle for planning urban nodes is to ensure that the commercial shopping and service area in the city is situated close to the rail-stations. Secondly to facilitate some kiosks, café, seats, etc. within the station area. Ticketing are nearly fully digitalized (phone). There are just a few ticket kiosk left, however, there are still ticket-automates on train and metro stations.

Within the urban structure, public services are mainly concentrated near public transportation hubs, metro- and train stations. Further, most of the municipal, regional and national agencies are located near public transportation hubs, metro- and train stations.

Oslo's strategy for urban development (part of the Municipal master plan) contributes to increase the share of transportation with public transport. In recent years, most new commercial development has been concentrated in the urban nodes/station areas.

The Municipal master plan defines four categories of development areas. The measures vary within the categories, but densification is common for all the categories. In all the categories, there is a goal to have a variation of commercial and public services to reduce the need for transportation.

Oslo also has a municipal plan for localization of merchandise and services. The plan is from 2003, but the goals of services in close proximity to where people live, and services close to public transport and with good accessibility for people who travel by foot or bike are still relevant for land use planning.

18. How do you motivate citizens to take action for low-carbon objectives?

The direct contact with the citizens is executed at a local rather than at a regional level.

Oslo is the European Green Capital for 2019. The whole city will be invited to contribute to a celebration of Green City Life but also to address common challenges across Europe.

The website KlimaOslo.no is dedicated to sharing the experiences from transitioning the City of Oslo to a climate-friendly city.

Oslo rewards climate-friendly choices through measures like the Climate and Energy Fund (financial support to buy electrical bikes, install solar cell panels, to remove oil heating, to install charging infrastructure for EV in housing cooperatives, urban gardening) dedicated parking for and charging of electric vehicles, and improving the public transportation system with money from the toll ring.

19. Which organizations, authorities or other partners are the main stakeholders in developing low-carbon areas / stations? How is co-operation arranged?

The measures in the Municipal master plan for Oslo apply to all municipal agencies. The Planning and Building Agency is responsible for the municipality's overall land use planning. In this regard, the agency is the main stakeholder in developing low-carbon areas/stations. In Norway, all plans for land use are objects for public scrutiny and must be adopted by the City council. The agency makes plans for land use on different levels, and they also consider private initiatives for land use proposed by e.g. land owners.

Co-operation is arranged in different ways. When processing plans, the Planning and Building Agency asks for statements regarding various subjects from other municipal agencies. E.g. the Agency for Urban Development contributes with reviews on among other things natural environment, facilitation for bicycling, etc. Also, when working with change/development of land use, the Planning and Building Agency often organize a project with participants from different municipal agencies and even participants from regional or national authorities. Public participation is statutory.

To ensure implementation of the Regional Plan for Climate and Energy, it is important to instill a sense of ownership of the planning process with the relevant stakeholders. The 22 municipalities in Akershus are central to this work. In addition, it is important to involve the central government, businesses, research and development institutions, and various organizations.

20. How is funding for low carbon measures organized?

Akershus County Council has a climate and environment fund that will contribute to implementation of some of the measures suggested in the action plan for climate and energy. The fund can for example be used to

finance projects or support climate measures implemented in the municipalities.

Financial support for climate measures can also be sought through different state support programs such as Enova or Innovation Norway. The national Klimasats-fund is especially targeted to contribute to climate measures in the municipalities within specific areas.

In Oslo low carbon measures are funded over the annual municipal budget, the Climate and Energy Fund, revenue from local toll stations (used for public transport infrastructure), parking fees, etc.

B) Data monitoring and other tools for Shaping low-carbon areas

1. How and with which method do you calculate greenhouse gas emissions on metropolitan (or city) level and what is your reporting cycle (e.g. annually, once in two years...)?

Statistics Norway publishes municipal emission statistics every two years. The statistics cover the years 2009-2015 (per February 2018), for carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O).

The following nine categories are included in the statistics:

1. Mining, quarrying, oil and gas extraction, including service activities
2. Gas from landfill waste
3. Wastewater and waste – excluding landfill
4. Heating in other industries and households
5. Road traffic – light vehicles incl. mopeds/motorcyclists
6. Road traffic – heavy vehicles
7. Diesel-powered motorized equipment
8. Agriculture – livestock and livestock manure
9. Agriculture – fertilizer and other agriculture

The next publication of statistics, with emission data for 2016, is planned for around March/April 2018. For more information on how the greenhouse gas emissions at municipal level is calculated, including information about methodology, please visit Statistics Norway website for the documentation report (only available in Norwegian):
<https://www.ssb.no/natur-og-miljo/artikler-og-publikasjoner/utslipp-til-luft-av-klimagasser-fordelt-pa-kommune>

2. Do you have any indicators for monitoring the development of greenhouse gas emissions and/or the implementation of climate action plan?

Akershus county council has developed indicators for most of the objectives in the plan. It is a challenge where there is no supporting data from Statistic Norway. Many of the indicators are therefore under development.

In order to assess how greenhouse gas emissions will progress between the national publications of emissions statistics, the Climate Agency in Oslo has developed a selection of indicators. These indicators form the basis for the «climate barometer» which is updated and published quarterly. The climate indicators are divided into two sectors; mobility and stationary.

Mobility indicators:

- Market share for fuel technologies of new registrations of passenger cars and vans
- Cars and vans divided by fuel technology of total fleet in Oslo
- Share of zero-emission technology of new passenger car and vans in Oslo and Akershus
- Number of passages through the toll stations in Oslo and Bærum
- Percentage of passages by type of vehicle through the toll stations in Oslo and Bærum
- Number of passages past local counting points in Oslo
- Sale of construction diesel in Oslo

Stationary indicators:

- Sale of light heating oil and paraffin for use in buildings in Oslo
- Solar cells in Oslo

3. Do you have indicators for monitoring the development of low-carbon areas in your region?

In the action plan for the regional plan for land use and transport one task is to make a system for measuring whether or not the development are in line with the strategies of the regional plan. The indicators are under development.

4. Are low-carbon concepts for shaping low-carbon areas, such as BREEAM Communities, LEED or One Planet Living, used in your region?

BREEAM NOR is a well-known concept/tool in Norway and used in the FutureBuilt projects.

Self-evaluation of Low-carbon Area / Station Area projects (if there is one), or of any other low carbon local plans/projects, that demonstrate how climate targets are conducted.

Name a specific plan, project or case that incorporates the development of low-carbon station area (or other low carbon area project):

“Area zoning plan for climate-effective urban development at Furuset”.

The area zoning plan is part of FutureBuilt, a ten-year program (2010-2020) with a vision of developing carbon neutral urban areas and high-quality architecture. The aim is to complete 50 pilot projects – urban areas as well as individual buildings – with the lowest possible greenhouse gas emissions.

Furuset is a satellite city from the 1970's, with app. 10.000 inhabitants. The area has good transit coverage with buses and metro, and a significant development potential at the transit terminal. The E6 creates a barrier through the area. In 2014, The Planning and Building Agency published their suggested area zoning plan for climate-effective urban development at Furuset. The area zoning plan is an important governmental tool to ensure that the overall concept and guidelines for the individual properties contribute to a climate-friendly urban development. The area zoning plan was adopted by the City council in October 2017.

1. What are the objectives of the plan/project in regard to climate change mitigation?

The main objective of the plan is to reduce greenhouse gas emissions by 50 % compared to 2014-level. In the longer term, the ambition is that Furuset will be a climate neutral district.

Other objectives:

- To develop Furuset to be model of environmental friendly urban development.
- To strengthen the blue/green structure.
- To establish a traffic system that prioritizes walking, bicycling and public transport.
- To strengthen the public transport hub through densification, variation in housing and increase in jobs.
- To further develop the public infrastructure (nursing homes, nurseries, etc.).

2. What is the time frame for carrying out the plan/project?

The project is an area zoning plan. There is no time frame for carrying out the plan. The area zoning plan will be a guideline when The Planning and

Building Agency process plans for land use and building applications within the area zoning plan.

3. Who has the legal responsibility for the plan/project?

The City of Oslo (The Planning and Building Agency).

4. What kind of planning principles are there in the plan concerning climate targets?

The concept of the development area is to establish two urban spaces/town squares which are connected by a new urban street. In the middle of the two new urban spaces, we find the Trygve Lies square, the existing public transport hub which will be the center of the district. Here, a new bus terminal will be established to strengthen the existing transport hub (metro and bus station). New development in the urban spaces and Trygve Lies square will be planned with high density and urban qualities. New infrastructure for pedestrians and cyclists will be developed in the area to facilitate walking and cycling.

5. What are the main measures for shaping low-carbon area?

In the future, pedestrians, cyclists and public transport will be prioritized. The new development area at Furuset is situated next to an existing established and effective public transport hub that will be improved and developed. The infrastructure for bicycles will be developed. Car parking will be reduced by offering fewer parking facilities. Energy use will be reduced through guidelines in the Quality Program for the area and the use of Greenhouse Gas Accountings as management tools. The energy supply will be smarter and more environmentally friendly by establishing a district heating system that will also make use of excess heat generated in the area.

6. Is the population and workplace density higher in the low-carbon area compared to the rest of the region? Is densification considered as an objective in the development of the area?

Densification is considered as one of the most important objectives in the development area. In Oslo, the population density is app. 3698/km². In the Furuset district, the density is higher, but the plan is to further densify the area.

7. What are the tools in developing low-carbon areas a) if the land is public owned and b) land ownership is private? Are there differences in tools depending on the land ownership?

When changing the land-use objectives, both private and public land owners must propose either an area zoning plan or land use plan. The plan must be an object for public scrutiny and must be adopted by the City council.

The Planning and Building act is the most important legislation for environmental protection and implementation of environmental measures when planning in urban areas. The act ensures that interventions in our physical environment are subject to common national goals and environmental requirements, that the consequences of planned measures are investigated and that plans are ensured open and predictable academic and political treatment in which all interests are discussed. The act provides the framework for the planning processes, regardless of plan type (area zoning plan, land-use plan, etc.). All plans for land use and building applications shall be treated in accordance with the provisions of the act. The act also define environmental requirements for buildings.

There are also other acts/legislations and central government planning provisions (statlig planretningslinje) that sets environmental requirements. Environmental ambitions beyond the requirements of the law is up to the individual developer, both private and public land owners.

8. How is the development of the low-carbon areas monitored? Do you calculate emissions for smaller development areas? Are there other indicators?

The emissions are not (yet) monitored, but estimated during the planning process.

C) Good examples/bad examples

Give examples of good and bad development plans of low-carbon areas (preferably a station area, if there is one). Briefly describe why the examples are good or bad. Please exemplify with links or images (Max 1 page)

Good practice	Bad practice
<p>Name:</p> <p>Fornebu – Low carbon area 2027</p>	<p>Name:</p> <p>The Municipality Master plan for Ås municipality 2015-2027</p>
<p>Context:</p> <p>Fornebu was the first airport for civil, modern and international flights in Norway. The land was acquired in 1934 and the airport was finished in 1939, expanded</p>	<p>Context:</p> <p>The land-use part of the municipal master plan for Ås proposes a change of land-use objectives for several areas. The plan proposes several new residential areas</p>

<p>in 1960, decided to be closed in 1992 and closed in 1998. It covers an area of around 3.5 square kilometres.</p> <p>The work of planning the new town started in 1994 and a clarifying master plan was adopted in 1996 (KDP-1). The next masterplan was adopted in 1999, known as KDP-2, and today due to the increased need of housing a new masterplan is developing. The new plan are supposed to allow room for app. 11,000 new homes, around 25-30,000 office spaces, extensive recreational grounds, large bird sanctuaries and areas for shopping, services and social infrastructure (kindergartens, schools, health-care sites, youth clubs, etc).</p> <p>There are several projects with high environmental standard in the area, and I 2014 the planning authority was awarded with a European spatial planning prize. Fornebu was pointed out for several reasons, and one of the jury's comment was related to the underlying philosophy that the area should be a showcase for modern environmental thinking, emphasizing sustainability in terms of energy, environmental standards and adaptation to climate change. .</p> <p>In March 2018 the city council approved a new Climate strategy, called Climate Wise 2030. The strategy has pointed out Fornebu to be a demonstration area for Low Carbon area in 2027. Today you will find the Norwegian first passive house kindergarten, built in 2009 and the world's first Breeam Outstanding shopping mall, Fornebu S. Several projects are developing in cooperation with Futurebult, like the Oksenøya Centre (school, kindergarten, health care centre and sports arena) and new housing area with app. 700 residents.</p>	<p>located more than 500 meters from transport hubs/train station/bus station. E.g. the proposed area Rustadporten is located 2 km from Ås city centre, and 1 km from the nearest bus station. The plan proposed 450 new dwellings. Due to the long distance to public transport, car would possibly become the preferred means of transport. The plan was not in line with the Regional plan for land-use and transport. The county governor and The National Roads administration had objections to the plan. Instead of allowing new residential areas far from the city centre, they proposed that densification of the city centre/transport hub should be the planning principle.</p>
<p>Main authorities and stakeholders involved:</p> <p>Bærum municipality and the land owners. The Futurebilt programme, the research programme Zero emission neighbourhood and SmartCity Bærum (a partnership between the municipality and the business).</p> <p>The master plan gives a framework and guidelines for further planning, together with the Climate strategy and climate action plan.</p>	<p>Main authorities and stakeholders involved:</p> <p>Ås municipality and the land owners.</p>
<p>Web links:</p> <p>Read more about at: http://www.ectp-ceu.eu/index.php/en/?id=299</p> <p>Read more about at: http://www.ectp-ceu.eu/index.php/en/?id=299</p>	<p>Web links:</p> <p>https://www.regjeringen.no/no/dokumenter/as-kommune--innsigelse-til-tre-boligomrader-i-kommuneplanens-arealdel-20152027/id2525102/ (Norwegian site).</p>

<p>Why is the practice considered as 'good'?</p> <p>The next 15 years, Bærum expects app. 30.000 new inhabitants. Bærum is one of the fastest growing municipalities in Norway. The Municipal master plan describes the municipal strategy for urban development: Bærum wants urban development at the transport hubs. By densifying the transport hubs, they create a customer base for local cafés, shops, cultural activities, schools, public services and public transport. The master plan for Fornebu and all the developers, the ZEB and Futurebuilt programme together with SmartCity Bærum provides for a desired development.</p> <p>In 2014, the planning authority I Bærum got the European spatial planning prize. The area was picked out for several reason, and the jury was particularly impressed by the way in which a wide range of issues associated with energy supply and consumption; efforts to minimize carbon dioxide emissions, and measures for handling pollution and noise, are being implemented in parallel with a broadly based strategy for safeguarding and strengthening the biological diversity and landscape qualities of the area. The project demonstrates, in an exceptional manner, how long-term spatial planning can facilitate a holistic approach to harmonising a very complex range of environmental issues in a coordinated way to allow for a high intensity of land use for residential and commercial purposes.</p>	<p>Why is the practice considered as 'bad'?</p> <p>Mainly because the location of the areas (far from public transport) will lead to car being the preferred means of transport.</p>
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D) Current experience

1. Does your own organization have a climate strategy or is it included in your general strategic approach? Do you have a climate action plan? If yes, what are the targets?

Akershus county council will follow up the regional plan for climate and energy when it is politically adopted in June 2018.

The Climate and Energy Strategy for Oslo was adopted by the City council in June 2016. The strategy has been developed in dialogue and interaction with 40 businesses/agencies from municipality, national government and private businesses. The plan is followed up by the Climate Agency on behalf of the City council for Environment and Transport. The strategy is common for all municipal agencies. The targets of the Climate and Energy Strategy are to reduce greenhouse gas emissions by 50 % by 2020, and by 95 % by 2030. The strategy defines 16 initiatives, e.g. "The percentage of daily travels by bike shall be increased to 16 % by 2020 and 25 % by 2025".

2. Is your organization involved in shaping low-carbon areas? What are the main measures in your organization?

We are not shaping specific low-carbon areas. More generally both the regional plan for land use and transportation and the regional plan for Climate and energy are.

The Agency for Urban Development develop and manage public areas such as streets, squares, parks, open spaces, sport facilities, the forest and the fjord. We are involved in shaping low-carbon areas through facilitating for pedestrians, cyclists and public transport. This is our main measure, as most of the greenhouse gas emissions in Oslo derive from transport (61 percent, app. half to goods transport and half to transport of people). To reduce the emission from private cars we are continuously expanding the public charging network for EVs. Today we have 1260 public charging points (3, 6 kW). In addition we are facilitating quick charging points. Other measures are developing the green and blue structures, facilitate for urban agriculture and efficient handling of storm water.

3. Has an evaluation been conducted?

No. However, an evaluation of the previous plan for climate and energy for Akershus was conducted. Involvement and ownership of parties was generally too weak and the plan was not followed up sufficiently.

4. Do you have experience in using a Low-Carbon -concept (BREEAM, LEED, One Planet Living etc.)? If yes, what kind of experience do you have?

BREEAM is currently being implemented in building Eikeli high school in Akershus.

5. Does your organization have questions about shaping low-carbon areas that you would like to be discussed in the forthcoming workshop?

What is the best definition of a low carbon area? Is it possible to monitor GHG emissions for smaller areas/districts?

6. What experiences from workshop 5 do you want to bring to the next workshop. The question will be distributed under WS 5 and will complement the inventory. (Answered after workshop 5)

PORTO

5th Workshop

Shaping Low-carbon areas

Inventory

Questions

In the inventory for shaping low-carbon areas, the SMART-MR Partners should draw on the experience gained at the previous workshops and from expertise gained in their own metropolitan region.

A) Open questions on shaping low-carbon areas

1. Does your region have set regional greenhouse gas emission targets and do you have a regional climate action plan? If yes, what kind of targets do you have (e.g. reduction percent in CO₂ emissions, target year for carbon neutrality)? Are the targets for total emissions or per capita emissions?

In 2004 Portugal approved the National Program for Climate Change (PNAC 2004), subsequently revised in 2006 and 2008 and adopted a National Strategy for Adaptation to Climate Change and established a financial instrument of the Government to act in the area of climate change. With this policy framework, Portugal has ensured the achievement of national objectives in the field of climate change within the framework of the Kyoto Protocol, mainly through the reduction of greenhouse emissions in all sectors of the economy, having limited the increase of its emissions by 2012 to around 13% in the 1990s, and the contribution of carbon sequestration land-use activities, changes in land use and forests. Broad outlines for climate policy instruments post-2012 in their mitigation dimension were launched and was determined the elaboration of the National Low Carbon Roadmap, completed and placed to Public Consultation in 2012, and the National Program for Climate Change.

More recently, and with a view to establishing transition to a sustainable development model capable of reconciling the indispensable growth with a lower consumption of natural resources, with the quality of life of the populations and with the inclusion of social and territorial cohesion, was established the Commitment to the Green Growth (CCV). In this document the Portuguese target for the reduction of the greenhouse gas emission is define.

At regional level and following the national objectives we have the financial instruments that allows us to fulfil the targets.

All our targets are for total emissions and based on reduction percent in CO₂ emissions.

2. Does your region have any other strategy, e.g. energy transition strategy, urbakiin renewal strategy, which steers towards low-carbon area development?

We have a strategy for energy transition in order to increase the share of renewable energies in final energy consumption. A strategy for the urban rehabilitation through the Exceptional Rehabilitation Regime and to promote, within the framework of Portugal 2020, support for interventions in deprived urban areas, abandoned industrial areas, social housing, public buildings and improving efficient energy in housing and other strategies.

Anyway all of our regional and national strategies could be important to the development of low-carbon area, but we don't refer in any policy document to low carbon areas as our strategy is focus in sectors.

3. Which organizations/decision making bodies are responsible for these strategies? Are the same organizations responsible for implementation? What kind of metropolitan governance do you have in your region and does it include land use planning?

The government is responsible for all the strategy related with the climate change, the implementation is promote by the central and local state, the enterprises and other organizations.

In terms of metropolitan region, Metropolitan Area of Porto has a strategy to the decarbonization that is integrate in the strategy for the territory development of the region – AMP (Porto Metropolitan Area) 2020. Including:

- a) Energy efficiency: mainly in areas of the eco-building (including the land use licensing), rehabilitation, greening and blueing facades and roofs, definition of sky views, the use of solo between buildings. Energy renewable in public buildings. Education of the population for the energy efficiency.
- b) Renewable Energy: Map of the potential wind, solar, photovoltaic, water and biomass in each municipalities of the metropolitan area.
- c) Promotion of communities with low energy consumption, in line with the complementarity between rational use of energy / demand management and of renewable energy sources in buildings.
- d) Valorization and protection of the forest
- e) Electric mobility

It doesn't include the land use planning. The land use planning is a responsibility of the municipalities.

4. Do you have a low-carbon area or station area as a development project in your region? How do you define it?

We don't have a low-carbon area or station in our region, but we have some measures that we could use, if we decided to have a low carbon area. In our climate change strategy we have something with the same name, a "low carbon zone", but it is an area where traffic circulation is conditioned to the most polluting vehicles (some old cars or trucks) for reasons of human health protection in compliance with Community and national legislation. The targets for this low carbon zones are: -

Reduction of pollutant emissions; - Encourage the use of hybrid or electric vehicles; - Promote the use of public transport; - Abatement of the old car park.

5. What kind of a project is it and how large is the area (e.g. climate street, low-carbon district, low-energy block or other)?

If we are referring to “low carbon zone”, usually the projects considered street sections, including the sidewalk or a specific infrastructure.

6. Are you developing new low-carbon areas or transforming the existing urban structure?

We are mainly transforming the existing urban structure, but we should underline that our strategy for climate change don't have a focus in low-carbon areas.

7. What are the main measures to implement low-carbon areas (e.g. traffic free zone, low-carbon buildings)?

We don't have low carbon areas, but we have traffic restriction in the cities center, implementation of walking zones and incentives to the energetic efficiency for the recuperated buildings.

8. Land use targets were analyzed in workshop 4: Transit oriented development. If you have any special climate targets in land use planning related to low-carbon areas, please describe them.

Not applied.

9. Housing and its heating and cooling in low-carbon areas should be energy efficient and utilize renewable energy sources. Do you have special targets or recommendations for low-carbon building stock? What measures do you have for this? Are the measures for new housing or for retrofitting the existing stock?

The measures are mainly for the energy efficiency in public infrastructures and in the social housing stock, through actions (i) to carry out energy audits and support the elaboration of Energy Consumption Rationalization Plans provided that the implementation of the energy efficiency measures resulting from these plans is substantiated; (ii) investments for the energy rehabilitation of buildings and equipment of Local and Subregional Administration through investments such as the integration of solar hot water, microgeneration, lighting systems, heating, ventilation and air conditioning (HVAC), interventions façades and roofs of buildings); (iii) the creation of urban thermal energy networks, since they are exclusively aimed at supplying clusters of public buildings that are larger consumers of heat and cold; (iv) investments in equipment to improve the energy efficiency of public lighting.

10. What kind of restrictions or incentives are you using for limiting car use in low-carbon areas / zones?

We usually have restrictions like traffic circulation is conditioned to the most polluting vehicles and velocity limits.

11. Are there special parking standards for low-carbon areas / stations in terms of CO2 emissions? Are there limitations to parking in low-carbon areas / stations (places/apartment)? How are park and ride areas implemented in station areas?

There aren't any specifications related with the parking in low-carbon areas.

12. What are the planning principles for bicycle parking in station areas (or other low-carbon areas)? Are there special bicycle parking standards for these areas and for housing units/flats? Do you have any targets regarding dimensioning or the amount of parking places?

No.

13. What kind of low-carbon solutions have you created for last-mile dilemma in station areas?

We are studying the possibility of implement a bike sharing system in the centers in the major cities of the metropolitan region in articulation with the transport interfaces.

14. Adaptation to climate change includes management of storm water and urban heat islands. What kind of measures do you have for cooling and for management of storm water?

Storm water and urban heat islands isn't in our agenda, but we have some measures related to the flood in case of to much rain water like flood prevision and warning systems.

15. In your low-carbon area, do you have circular economy related criteria (such as requirement for using recycled building materials or requirement for optimizing public space usage, space sharing)? What are the best practices you would like to share regarding circular economy/ resource efficiency?

We would like to share a project call "Circular construction" that has been working with the constructors, municipalities, architects, engineers and contractors having a key role in ensuring that the design of the buildings takes into account the re-use of the materials used. The project also have an important role informing the citizens with what to do with the waste of small construction and demolition made at home.

16. What kind of recommendations or regulations regarding sustainable procurement do you have and on what level? (Region, city, area)

We have a guide about sustainable purchases made by LIPOR (Waste Management Service of Greater Porto) – that help the public entities to include environmental and social criteria in the public procurement.

Accordingly to our public procurement code, following the guidelines laid down by the Community directives, the public entities should included environmental and social aspects for the purposes of admission and exclusion of applications and proposals, and for the purposes of their evaluation and classification.

17. Good service level in station areas can create an attractive urban node. Do you have any service concepts for station areas, or recommendations of commercial or transport-related services? Within the urban structure, where are the public services concentrated in? (city center, station areas)

We would like to share a practice that made this node very useful, a



supermarket in one of the metropolitan station that allowed people to make their shop when they are on the way home. The supermarket not only serve the ones that are travelling to this station area, but also all the ones that are travelled thru this station and can stop for a few minutes to shop and then take the next metropolitan.

18. How do you motivate citizens to take action for low-carbon objectives?

- Thru tv programs (documentaries, debates ...) and advertising campaigns.
- Debating in the schools and thru the kids put the families in action.

But what really put the citizens interesting in take action for the low-carbon objectives was the drought and the forest fires that we have in 2017.

19. Which organizations, authorities or other partners are the main stakeholders in developing low-carbon areas / stations? How is co-operation arranged?

If we have low carbon areas/stations the main stakeholder should be the municipality.

20. How is funding for low carbon measures organized?

The measures are planned in the National Program for Climate Change and are funded mainly by the European Structural and Investment Funds.

B) Data monitoring and other tools for Shaping low-carbon areas

1. How and with which method do you calculate greenhouse gas emissions on metropolitan (or city) level and what is your reporting cycle (e.g. annually, once in two years...)?

Emissions are calculated by polluting gas and by emitter sector. The reporting cycle is annual.

In the projects we use the greenhouse gas emission reduction indicator. It is calculated in tonnes CO₂ equivalent, as a result of the implementation of energy efficiency measures aimed at reducing primary energy consumption.

The calculation of the GHG emission reduction estimate should be based on the following formula:

Reference Value: should be 0, since it is an indicator of achievement;

Target: $\text{GHG emissions identified in the energy audit carried out prior to the implementation of the operation} - \text{GHG emissions identified in the energy certificate issued after the implementation of the operation} = \text{Reduction of tons of CO}_2 \text{ equivalent};$

Target Year: for clearance of the target must be considered the year of issuance of the certificate after the implementation of energy efficiency measures in the framework of the operation.

The reporting cycle should be annually

2. Do you have any indicators for monitoring the development of greenhouse gas emissions and/or the implementation of climate action plan?

In our Sustainable Urban Mobility Action Plan with regard to the outcome indicator, the set of actions proposed for the municipalities of the Metropolitan Area of Porto should make possible to reduce by approximately 14.4% emissions of greenhouse gases, reducing from the reference value of 2 290 763 ton / CO₂ in 2012 to 1 960 104 ton / CO₂ in 2023.

3. Do you have indicators for monitoring the development of low-carbon areas in your region?

Not applied.

4. Are low-carbon concepts for shaping low-carbon areas, such as BREEAM Communities, LEED or One Planet Living, used in your region?

We don't have knowledge that this concepts are being use in our region.

Self-evaluation of Low-carbon Area / Station Area projects (if there is one), or of any other low carbon local plans/projects, that demonstrate how climate targets are conducted.

Name a specific plan, project or case that incorporates the development of low-carbon station area (or other low carbon area project):

Urban requalification of the river marginal - Cais de Gaia

1. What are the objectives of the plan/project in regard to climate change mitigation?

This project had environmental concerns both in the project phase: with the incorporation of local materials, such as granite, thereby reducing the gaseous emissions from cargo transport; the reduction of waterproofed areas in the intervention area; the placement of a double geotextile blanket in the paved area with granite blocks which prevents its degradation by the effect of rainwater or by the effect of the rise of river waters at flood heights; the bet on sowing and planting native species that require less water. For the exploration phase, measures were taken to restrict private road traffic and to promote the use of public transport, which are already mostly efficient.

The implementation of the measures described provides for a significant reduction of greenhouse gas (GHG) emissions and at the same time mitigation of the effects of climate change.

2. What is the time frame for carrying out the plan/project?

The project will be finish on July of 2019.

3. Who has the legal responsibility for the plan/project?

The Municipality of Gaia.

4. What kind of planning principles are there in the plan concerning climate targets?

The planning and execution of this project took into account the set of existing and planned plans for this area and their integration in order to enhance the inert advantages to its implementation, namely: regulation of traffic conditioning and parking in the Historic Center; regulation of traffic and loading and unloading operations in the city, creation of a set of peripheral car parks and the re-qualification of the public space of the surrounding area. With this set of measures is intended to significantly reduce emissions of greenhouse gases.

The improvement of the quality of life of the resident and visiting population, through the promotion of the enjoyment of direct contact with extensive green areas, giving priority to soft modes of transport: pedestrian and cyclist, for this purpose were created wide and unobscured areas. Due to its location and visibility, this project will have a high impact at the level of the call to awareness of sustainability.

5. What are the main measures for shaping low-carbon area?

The main direct measures are: a significant reduction in the circulation of private, light and heavy vehicles (such as traffic restrictions and the provision of several car parks in the vicinity of the site to be intervened); promoting carbon sequestration (by photosynthesis, by planting trees and shrubs); the reduction of the consumption of electric energy (opting for photovoltaic energy in signage and public lighting); in indirect terms: to carry out public awareness actions (placing posters in the public space with advice on good practices); along with eco points, containers for the reception of used cooking oils which may be used in the manufacture of biofuels.

6. Is the population and workplace density higher in the low-carbon area compared to the rest of the region? Is densification considered as an objective in the development of the area?

It is an intervention in the historical center of the city, a consolidated urban area. In terms of qualification of the territory, this place essentially has areas

of commerce and services, equipment and tourist areas. It is not intended, therefore, its densification, only its arrangement.

7. What are the tools in developing low-carbon areas a) if the land is public owned and b) land ownership is private? Are there differences in tools depending on the land ownership?

The present intervention refers to land in "Critical area of recovery and urban reconversion of the historic center", lands in the public domain. However, it is integrated into a set of public and private projects whose sum will bring enormous added value to the sustained development of the City and the Metropolitan Area.

8. How is the development of the low-carbon areas monitored? Do you calculate emissions for smaller development areas? Are there other indicators?

As a monitoring plan for greenhouse gas emissions (GHG), the municipality intends to place measurement stations in strategic locations, in addition to counting motorized traffic.

C) Good examples/bad examples

Give examples of good and bad development plans of low-carbon areas (preferably a station area, if there is one). Briefly describe why the examples are good or bad. Please exemplify with links or images (Max 1 page)

We don't have any good or bad practice to point out related with low carbon areas.

Good practice	Bad practice
Name: -	Name: -
Context:	Context:
Main authorities and stakeholders involved:	Main authorities and stakeholders involved:
Web links:	Web links:
Why is the practice considered as 'good'?	Why is the practice considered as 'bad'?

D) Current experience

1. Does your own organization have a climate strategy or is it included in your general strategic approach? Do you have a climate action plan? If yes, what are the targets?

In the general strategic approach of the metropolitan area of Porto are include measures related with our climate strategy, like the measures for decarbonization that are integrate in the strategy for the territory development of the region – AMP (Porto Metropolitan Area) 2020, that include: - Energy efficiency, Renewable Energy; Promotion of communities with low energy consumption, in line with the complementarity between rational use of energy / demand management and of renewable energy sources in buildings; Valorization and protection of the forest and - Electric mobility.

In the beginning of 2017, aiming to promote leadership and coordination at the metropolitan scale, ensuring, in addition to the best management and coordination practices, the necessary latitude to ensure the right balance in the implementation of the climate strategy in a territory with more than 2000km² and enormous diversity, the metropolitan area of Porto start to elaborate a Metropolitan Plan for Adaptation to Climate Change.

Despite the metropolitan dimension, the operation intends to train and support the construction of municipal strategies to adapt to climate change, while at the same time strengthening local action in this area.

The main target is deepening the knowledge to anticipate risks and opportunities, influencing planning options at the local, metropolitan and regional level, in a participatory process based on communication, promoted by a partnership between municipalities, universities, public and private institutions, companies and citizens.

The Metropolitan Plan for Adaptation to Climate Change should be presented and discuss with the general public in April of 2018.

2. Is your organization involved in shaping low-carbon areas? What are the main measures in your organization?

No.

3. Has an evaluation been conducted?

Not applied.

4. Do you have experience in using a Low-Carbon -concept (BREEAM, LEED, One Planet Living etc.)? If yes, what kind of experience do you have?

No

5. Does your organization have questions about shaping low-carbon areas, that you would like to be discussed in the forthcoming workshop?

6. What experiences from workshop 5 do you want to bring to the next workshop. The question will be distributed under WS 5 and will complement the inventory. (Answered after workshop 5)

ROME

5th Workshop

Shaping Low-carbon areas

Inventory

Questions

In the inventory for shaping low-carbon areas, the SMART-MR Partners should draw on the experience gained at the previous workshops and from expertise gained in their own metropolitan region.

A) Open questions on shaping low-carbon areas

1. *Does your region have set regional greenhouse gas emission targets and do you have a regional climate action plan? If yes, what kind of targets do you have (e.g. reduction percent in CO₂ emissions, target year for carbon neutrality)? Are the targets for total emissions or per capita emissions?*

The Lazio Region started the construction process for a new Regional Energy Plan (Piano Energetico Regionale – PER) drafting a Strategic Document for the Energy Plan of the Lazio Region, preparatory to the PER.

With this document the Region defined the conditions suitable for the development of a regional energy system increasingly aimed at the use of sources and effective economic efficiency as a means of greater environmental protection, in particular for the purpose of reducing emissions of climate-altering gases.

The first binding objective for the Lazio Region is set by the Ministerial Decree of 15 March 2012 (the so-called "Burden Sharing" Decree), which shares the national target for renewable electric and thermal energy sources by 17% on the Regions, to be in line with the objective 20-20-20. But the outlook is expected to be longer term, given that the actions planned today will have effects in 2030 and the EU is approving the new 2030 energy climate package, with more ambitious targets for that date.

The targets of the so-called Objective Scenario in the Lazio Regional Energy Plan are:

- 13.4% rate of energy from renewable sources on total consumption in 2020, instead of 11.9% required by the DM Burden Sharing.
- Development of distributed generation from renewable energy sources to reach 38% rate of energy from renewable sources on total consumption in 2050.
- Strong limitation of the use of fossil sources to reach an 80% reduction of CO₂ in 2050 compared to 1990, with 89% in the civil sector, 84% in the production of electrical energy, and 67% in the transport sector.
- Reduction of total final consumption of energy by 5% in 2020, 13% in 2030, and 30% in 2050.
- Significant increase in the electrification rate of final consumption from 19% in 2014 to 40% in 2050.

The targets are expressed as a percentage of total emissions.

The Metropolitan City of Capital Rome (CMRC – Città metropolitana di Roma Capitale) joined the Covenant of Mayors (Patto dei Sindaci) in 2009, an initiative by the European Commission to promote the energy and environmental sustainability. The Covenant of Mayors includes measures to simplify administrative procedures to improve the quality of environment and of citizens' life.

So far 31 municipalities have approved their own SEAP (Sustainable Energy Action Plan). Each SEAP contains the per capita emissions of the territory, referred to the base year, that were calculated using the ECOREGION program. The same program is used to monitor

emissions: in the base year they were 5.49 t CO₂ p.c.; the target is to reach 4.05 t CO₂ p.c. in 2020.

2. *Does your region have any other strategy, e.g. energy transition strategy, urban renewal strategy, which steers towards low-carbon area development?*

The Council of the Lazio Region launched the Regional Plan of Mobility, Transport and Logistics (PRMTL) to optimize the conditions of economic, social and environmental sustainability and to promote the development and enhancement of the Region as a driving force of Central Italy, a crucial node of the national and European infrastructural system.

The macro objectives of the plan are the adaptation of transport infrastructures and services to the territorial needs and the achievement of a sustainable balance between supply and demand for individual and collective transport.

The Plan proposes that territorial governance policies are integrated to mobility policies through the presentation of a Regional Planning and Territorial Document (Documento di Assetto Regionale e Territoriale – DART) for the following purposes:

- 1) Identification of new settlements and new functions of railway stations in order to increase accessibility (localization efficiency).
- 2) Sustainability of new certified urban settlements (e.g. Leadership Certification in Energy and Environmental Design – LEED), including "Assessment of impacts on mobility" and developed according to best practices (e.g. Transit Oriented Development TOD).

The localization efficiency, measured on the basis of the reduction in car dependency of an area, is the result of an effective mix of convenient and efficient public transport services (node functions) as well as the possibility of carrying out most of the daily activities near the residence (location functions). Efficiency turns car use from a need to an option, allowing families to reduce transportation costs.

Particularly interesting are the Ecologically Equipped Productive Areas (Aree Produttive Ecologicamente Attrezzate – APEA), where the Region intends to promote technologies for energy efficiency and environmental improvement, to stimulate the development of new eco-enterprises and environmental management by reusing and saving resources.

The Regional Law 18 July 2017, no. 7 "Provisions for urban regeneration and building recovery" was approved by the Regional Council and includes ordinary provisions aimed at encouraging the rationalization of the existing building stock, promoting the redevelopment of degraded urban areas and unorganized or unfinished buildings and redeveloping buildings for residential and non-residential use through demolition and reconstruction, seismic adaptation and energy efficiency.

3. *Which organizations/decision making bodies are responsible for these strategies? Are the same organizations responsible for implementation? What kind of metropolitan governance do you have in your region and does it include land use planning?*

A Regional Decree planned a Memorandum of Understanding between the Lazio Region and the National Agency for New Technologies, Energy and Sustainable Economic Development (Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile – ENEA) for sustainable development initiatives. Afterwards, a Strategic Address Committee and a Technical Secretariat were established to prepare the Regional Energy Plan.

The implementation of the Plan is in charge of the Regional Department of Environment, Mobility, and Land Use.

The metropolitan governance includes the City of Rome and 120 other municipalities. The Metropolitan City of Capital Rome was established by the Law 7 April 2014, no. 56 and it's officially operative since 1 January 2015. The Metropolitan City of Capital Rome (Città Metropolitana di Roma Capitale - CMRC) is headed by the Metropolitan Mayor and the Metropolitan Council. With more than 4.3 million inhabitants, it is the largest metropolitan area in Italy. Metropolitan cities adopt a three-year strategic plan (National Law no. 56/2014) to direct their own lines of action. The Metropolitan General Territorial Plan (Piano Territoriale Metropolitan Generale – PTMG) is the structural governance plan of the Metropolitan Areas, which also includes environmental policies and soil defence.

4. *Do you have a low-carbon area or station area as a development project in your region? How do you define it?*

The Traffic Plan of the municipality of Rome has organized the urban area into so-called Environmental Islands. They are similar to the Environmental Areas of Traffic in Towns and to the Home Zones, originally called Woonerf (living yard) and pioneered in the Netherlands. The environmental islands are enclosed within the main road network and the road network that serves them is therefore only made up of local roads. They are called “islands” because they lie within the mesh of the main roads and “environmental” because they are aimed at recovering the livability of urban spaces.

5. *What kind of a project is it and how large is the area (e.g. climate street, low-carbon district, low-energy block or other)?*

The project is based on Environmental Islands that cover the central area of Rome.

6. *Are you developing new low-carbon areas or transforming the existing urban structure?*

-

7. *What are the main measures to implement low-carbon areas (e.g. traffic free zone, low-carbon buildings)?*

The Lazio Region is characterized by the urban system of Rome that has a prominent position by extension, population, economic activities and interchanges with the other areas of the region. In September 2014, the General Plan of Urban Traffic (PGTU) of Rome was approved, which defines an organic framework of objectives and measures to improve and rationalize the organization of existing mobility systems. The PGTU deals with the management of mobility within a system framework, guaranteeing a balance between the needs of the various components and maximizing the integration between the different modes of transport throughout the urbanized area. The aim is to provide the city with a model of accessibility that is consistent with its artistic historical vocation and with the development needs of the outermost territory. The key theme/tool of the new PGTU is “sharing”: it means replacing the current rules, geared primarily to the management and control of the occupation of spaces, with measures of spatial and temporal sharing of the city. All the PGTU's actions recall the concept of sharing: mobility bonuses, car and bike sharing, mobility management, public transport, open data, toll parking, environmental islands, smart cards.

Each Environmental Island has:

- “access gates” to mark the division between the main road system and the internal road areas (raised pedestrian crossings, raised intersections, narrowing of the roadway).
 - traffic calming measures, such as chicanes; crossings or elevated intersections; systematic continuity of the pedestrian share; bumps; dissuader elements; privileged pedestrian traffic areas.
 - cycle paths to serve the main local services and the points of access to the TPL, organising them for modal exchange (construction of guarded bicycle parking, racks at stations or bus stops; information to exchanging users)
 - reduction of mobility needs (for services, shopping and job, by developing a local economy).
 -
8. *Land use targets were analyzed in workshop 4: Transit oriented development. If you have any special climate targets in land use planning related to low-carbon areas, please describe them.*

-

9. *Housing and its heating and cooling in low-carbon areas should be energy efficient and utilize renewable energy sources. Do you have special targets or recommendations for low-carbon building stock? What measures do you have for this? Are the measures for new housing or for retrofitting the existing stock?*

Yes, there are national and regional laws, such as:

- Legislative Decree 19 August 2005 no. 192 about energy efficiency in buildings (Implementating the European Directive 2002/91/EC) and its Guidelines (Presidential Decree 02 April 2009 no. 59).
 - National Guidelines about energy certification of buildings (Decree of the Ministry for Economic Development 26 June 2009).
 - Regional Law (LR Lazio 27 May 2008 no. 6), Regional provisions on sustainable architecture and green building.
10. *What kind of restrictions or incentives are you using for limiting car use in low-carbon areas / zones?*
- The Environmental Islands in the central area of the City include different measures to limit car use:
- The road design inside the islands drastically reduces traffic.
 - Car traffic is limited to residents during the day.
 - The speed limit is 30 km/h; pedestrians and cyclists have right of way.
11. *Are there special parking standards for low-carbon areas / stations in terms of CO2 emissions? Are there limitations to parking in low-carbon areas / stations (places/apartment)? How are park and ride areas implemented in station areas?*
- No, there are not.
 - Yes, parking is limited to residents and delivery vehicles.
 - Park and ride areas are generally free of charge for public transport subscribers.

12. *What are the planning principles for bicycle parking in station areas (or other low-carbon areas)? Are there special bicycle parking standards for these areas and for housing units/flats? Do you have any targets regarding dimensioning or the amount of parking places?*

The following principles were held into consideration to carry out the territorial interventions planning:

- potentially attractive demand for cycling trips combined with public transport (survey carried out).
- public transport offer (railway and underground stations, tram and bus stops).
- existing or planned cycle paths.

The new HUB and Bike Park systems will represent a point of origin and destination not only for those currently travelling on the already existing cycle paths but also for those will travel on about 70 km of already financed cycle paths.

13. *What kind of low-carbon solutions have you created for last-mile dilemma in station areas?*

Reduction of car parking areas and increase of bicycles and pedestrian ways.

14. *Adaptation to climate change includes management of storm water and urban heat islands. What kind of measures do you have for cooling and for management of storm water?*

Regional Law (LR Lazio 27 May 2008 no. 6), Regional provisions on sustainable architecture and green buildings.

15. *In your low-carbon area, do you have circular economy related criteria (such as requirement for using recycled building materials or requirement for optimizing public space usage, space sharing)? What are the best practices you would like to share regarding circular economy/resource efficiency?*

Regional Law (LR Lazio 27 May 2008 no. 6), Regional provisions on sustainable architecture and green buildings.

16. *What kind of recommendations or regulations regarding sustainable procurement do you have and on what level? (Region, city, area)*

The Lazio Region, by the Decree of the Regional Council no. 310/2017 officially approved the Action Plan of the Lazio Region for implementing the Green Public Procurement (PAR GPP). The Lazio Region also takes part to the project GPPbest (Best Practices Exchange and Strategic Tools for GPP – Exchange of Best Practices and Strategic Tools for GPP) funded by the European Commission under the LIFE program (Environmental Governance Axis and Information). Then project aimed to contribute to the promotion of new models of sustainable consumption and the diffusion of best practices, policies and approaches of Green Public Procurement, in order to highlight the advantages and to favour its wider application.

The MCCR approved the Action Plan to implement the GPP2020 in 2009 (Green Public Procurement 2020). The new national law about procurement (Legislative Decree no. 50/2016, modified by Legislative Decree no. 56/2017), both buys and constructions, made some minimal

environmental criteria (Criteri Ambientali Minimi - CAM) set by the Ministry for Environment mandatory.

17. *Good service level in station areas can create an attractive urban node. Do you have any service concepts for station areas, or recommendations of commercial or transport-related services? Within the urban structure, where are the public services concentrated in? (city center, station areas)*

- There are not specific recommendations, in general the indication is to concentrate services to create a strong attraction.
- City centre and few other locations, some are station areas.

18. *How do you motivate citizens to take action for low-carbon objectives?*

By tax deductions for energy savings of existing buildings (2018 National Budget Law). Furthermore, the MCCR encourages energy savings and improvements of the safety of heating systems by economic contributions to improve the heating system efficiency.

19. *Which organizations, authorities or other partners are the main stakeholders in developing low-carbon areas / stations? How is co-operation arranged?*

The main organizations are the Lazio Region, the Municipality of Rome. Cooperation is arranged through institutional agreements.

20. *How is funding for low carbon measures organized?*

Using part of the increasing real estate value.

B) Data monitoring and other tools for Shaping low-carbon areas

1. *How and with which method do you calculate greenhouse gas emissions on metropolitan (or city) level and what is your reporting cycle (e.g. annually, once in two years...)?*

COPERT Micro is a simulation model to calculate the main traffic emissions on a city level (annually), also computable on metropolitan level if input data are available (car fleet, driving conditions like average speed, kilometres travelled by type of road)

2. *Do you have any indicators for monitoring the development of greenhouse gas emissions and/or the implementation of climate action plan?*

The Regional Information System will provide a specific section of the "Lazio Energy Management Information System" (SILEM). The SILEM represents the heart of monitoring, and will have the function to collect, update and make interoperable all the main databases (energy, socio-economic, technological) available national and local interest that will be the subject of integration and processing, to return outputs such as, for example, energy demand divided by sector and at an appropriate territorial level; energy supply by source; CO₂ emissions from energy uses. The objective is to report, on one hand, the de facto state of the

regional energy balance (with relative historical series) and, on the other one, a prediction of simulation scenarios in preparation for an efficient and effective monitoring and updating activity. Periodical of PER, to verify compliance with the trends towards the decarbonisation and energy sustainability objectives indicated in the Plan. Essential tools for monitoring will also be the available regional and national databases, which must be harmonized with the tools adopted at a national level for monitoring burden sharing, particularly the SIMERI (Italian System for Renewable Sources Monitoring) system of the Energy Service Management (Gestore Servizi Energetici – GSE). The theme of burden sharing, as mentioned in the introduction, is a particularly sensitive area, as it is related to a binding objective whose realization must be adequately monitored.

Capital Rome uses the following set of indicators:

- average emission density of pollutant x [g/(km²*h)]
- average differential exposure to pollutant x [min]
- average traffic exposure to pollutant x [min]
- total emission of pollutant x [kg]

3. *Do you have indicators for monitoring the development of low-carbon areas in your region?*

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4. *Are low-carbon concepts for shaping low-carbon areas, such as BREEAM Communities, LEED or One Planet Living, used in your region?*

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Self-evaluation of Low-carbon Area / Station Area projects (if there is one), or of any other low carbon local plans/projects, that demonstrate how climate targets are conducted.

Name a specific plan, project or case that incorporates the development of low-carbon station area (or other low carbon area project):

1. *What are the objectives of the plan/project in regard to climate change mitigation?*

The Urban Planning National Institute – Lazio Regional Section (Istituto Nazionale di Urbanistica – INU) and the Coordinating Group of Bicycle Associations of Rome (Coordinamento Roma Ciclabile – CRC) is promoting to the Municipality of Capital Rome a project for a massive diffusion of TOD's in the suburban areas of Rome and its metropolitan region, where, together with sustainable mobility, the attention is given to urban and building renewal and circular economy, with strong outcomes in term of low-carbon objectives. The areas that could be involved are nearly 20, with a population of around 10-20.000 people each.

2. *What is the time frame for carrying out the plan/project?*

2 - 3 years for the final plan approval, starting with a public proposal, and closing with a public private partnership. Other 2 – 3 years for the realisation of the private and public infrastructure works.

3. *Who has the legal responsibility for the plan/project?*

The Municipality of Capital Rome has the responsibility for the plan.

4. *What kind of planning principles are there in the plan concerning climate targets?*

No soil consumption, urban agriculture improvement, reduction of mobility needs, sustainable mobility – walkability and bikeability, low carbon housing.

5. *What are the main measures for shaping low-carbon area?*

The main measures are increasing the quality of public spaces and roads for walkability and bikeability and for a sustainable access to Regional Railway stations, speed control (30 km/hour), housing renewal and densification, local economy development, increasing the accessibility and availability for services and activities, reduced dependency from outside areas. The program causes a circular process: it increases the real estate value by private housing renewal and densification, uses part of this value for financing low carbon measures (infrastructures for mobility and local economy development), upgrades the local context, with a higher real estate value follow up.

6. *Is the population and workplace density higher in the low-carbon area compared to the rest of the region? Is densification considered as an objective in the development of the area?*

Densification is one of the main objectives.

7. *What are the tools in developing low-carbon areas a) if the land is public owned and b) land ownership is private? Are there differences in tools depending on the land ownership?*

In the areas involved in the project, land ownership is mainly private. The main tools are the so called Integrated Programs (public-private partnership programs), provided in the new Master Plan of the City of Rome.

8. *How is the development of the low-carbon areas monitored? Do you calculate emissions for smaller development areas? Are there other indicators?*

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C) Good examples/bad examples

Give examples of good and bad development plans of low-carbon areas (preferably a station area, if there is one). Briefly describe why the examples are good or bad. Please exemplify with links or images (Max 1 page)

Good practice	Bad practice
<p>Name: CAPTURE CArs to Public Transport in the URban Environment Rome Celio Implementation</p>	<p>Name: Ponte Mammolo Station</p>
<p>Context: The CAPTURE test site in Rome is the Celio area, adjacent to the Colosseum, in the historic centre. The main objectives were to reduce car traffic by increasing the use of public transport and increase the environment quality through physical measures. Physical measures are not easy to introduce. Small-scale, low-visibility cheap solutions were found to be the most readily implemented. However, these do not achieve large-scale change unless introduced as part of an overall vision and strategy.</p>	<p>Context: The station is in the suburbs of the urban area of Rome. It is served by a metro, urban and extra-urban buses, and a large park-and-ride. The surrounding area is low-density and the residential area very distant (500m or more). The objective was to facilitate the metro/car intermodality to reduce traffic in Rome, and CO₂ emissions. There are, however, several barriers to using the station.</p>
<p>Main authorities and stakeholders involved: The main actor is the Commissioner for Mobility and Transport Policies in Rome, who was also the Deputy Mayor of the City. Sapienza University designed the scheme of the measures in Rome Celio. The Municipality of Rome and the Department VII of Mobility and Transport Policies are the actors that appraise, approve and finance mobility and transport projects.</p>	<p>Main authorities and stakeholders involved: The company who build the metro, the station and the park-and-ride. The public transport companies ATAC and Cotral and the Municipality.</p>
<p>Web links: https://romamobilita.it/it</p>	<p>Web links: http://www.atac.roma.it/</p>
	 <p>The Area of Ponte Mammolo</p>  <p>Pedestrian access problems</p>

<p>Why is the practice considered as 'good'?</p> <p>It was the first implementation of a package of measures to reduce car traffic in Rome. There were several important positive results:</p> <ul style="list-style-type: none"> • Reduction of traffic by about 5 000 vehicles/day in 1998 (about 30%). • A large decrease in maximum speed, from 77 km/h to 25Km. • About modal split, before the project 65% of commuters used to use private cars to go the Celio, while after it only 55% did, for a reduction of 10%. This reduction can be attributed to the introduction of paid-parking for non-residents. • A slight reduction in noise. 	<p>Why is the practice considered as 'bad'?</p> <p>There are many barriers to interchanges between park-and-ride and the metro:</p> <ul style="list-style-type: none"> • Distance to be walked between parking areas and the transit station. • Long distances are arduous on rainy or hot summer days with no shelters available along walking paths. • Fear of crime, especially for women and night users. • Inadequate number of free parking spaces for public transport subscribers. • Absence of kiss-and-ride facilities (drop and pick-up zones) located near the main station entrance.
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D) Current experience

1. *Does your own organization have a climate strategy or is it included in your general strategic approach? Do you have a climate action plan? If yes, what are the targets?*

Regarding the environmental management, the Municipality of Rome can use different tools to tackle transport pollution, such as the Lazio Region Recovery Quality Air Plan (Piano di Risanamento della qualità dell'aria). This plan, following the European rule framework, lays down a set of planned, permanent, and emergency interventions.

The official resolution 76/2016 regarding the implementation of measures to restrict vehicular traffic (as provided by the new traffic plan) aims to air pollution prevention and the containment.

2. *Is your organization involved in shaping low-carbon areas? What are the main measures in your organization?*

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3. *Has an evaluation been conducted?*

Yes, it has.

4. *Do you have experience in using a Low-Carbon -concept (BREEAM, LEED, One Planet Living etc.)? If yes, what kind of experience do you have?*

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5. *Does your organization have questions about shaping low-carbon areas, that you would like to be discussed in the forthcoming workshop?*

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6. *What experiences from workshop 5 do you want to bring to the next workshop. The question will be distributed under WS 5 and will complement the inventory.*

(Answered after workshop 5)

