ClairCity: Citizen-led air pollution reduction in cities

D6.4 Multi-level and SWOT analysis of air quality

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Description	This deliverable is a comparative analysis and SWOT analysis of city action perspectives. Air quality and carbon policies are often largely influenced by existing national and EU policy frameworks that very much influence the possibilities that individual cities and regions have for action. This report examines this leeway for action of individual cities and provides a comparative analysis of support and barriers that cities receive from higher policy levels, and discusses how they can react to that. The latter will be done by way of a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis of city action perspectives. The audience for this report are pilot cities' policy makers and policy makers in cities other than the 6 ClairCity city/region partners.

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1 Introduction

1.1 Objective of this report

City air quality and carbon policies do not operate in a void. They are determined by previous city policies, but also by conditions that are outside the realm of influence of city policy makers. These are in the first place the specific local conditions, which can be thought to consist of for instance geography, climate, economy, demography and socio-cultural perceptions and behaviours. Even more specifically relevant for air quality and carbon policies – even more when looking at heating and transport behaviours - are conditions like the quality of the existing housing stock, the domestic national fuel mix for energy or the quality of existing public transport structures. The scope of city policy actions is furthermore strongly influenced by the regional, national and European Union or international policies in which they operate.

This report examines the 'leeway for local policy action' of the six individual cities and regions in the ClairCity project. This will be done by way of a 'SWOT analysis' of the individual action perspective of each city/region. Based on this examination, a comparative analysis will be made in order to examine what general lessons can be learned for citizen-inclusive air quality and carbon policies and actions by other cities and regions.

1.2 Position of this report in the ClairCity project

This report is deliverable D6.4 with regards to the terms of reference of this project.

Within the ClairCity project, this report follows on the city policy baseline reports for Amsterdam (D6.1), Bristol, Ljubljana, Sosnowiec, Liguria and Aveiro/CIRA region (D6.2). The report forms the intermediate step towards tailored policy recommendations for each city/region, which are one of the key final products of this project. The report also serves as an input to the city policy workshops (D6.5/6.6), the individual city policy packages (D7.4/7.5) and as a step towards the overarching analysis of general lessons that can be learned from this project for other cities/regions aiming for citizen-inclusive air quality and carbon policies (D7.6).

1.3 Reading Guide

Chapter 2 to 7 of this report summarize the key lessons learned from the policy baseline reports of each city/region. A distinction is made between lessons learned regarding city policy making itself on one hand, and internal and external conditions that determine the leeway for action for city policy makers on the other hand. Each chapter is preceded by an update regarding recent national and city developments since the publication of the baseline report for the city/region. The chapters end with a SWOT analysis (strengths, weaknesses, opportunities and threats) for each individual city/region. Finally, chapter 8 presents an overarching SWOT analysis of city action perspectives.

2 Amsterdam

2.1 Recent national and city developments

The city baseline report for Amsterdam was finalised in March 2017. Key developments in Amsterdam and the Netherlands since termination of this analysis are:

- **'Gas-free'** (no more use of fossil gas for heating in the built environment) has become an important new framing of national policies due to the decision in early 2018 to leave the remaining domestic gas reserves in the ground and to strive for a natural gas-free built environment by 2050. A first neighbourhood in Amsterdam has been chosen and received national support to become gas-free;
- A **national climate law** was agreed on by coalition and several opposition parties in parliament. Currently a **national climate agreement** has to work out practical policies to realise the emission targets set;
- The Dutch Health Council advised to **strengthen current national air quality policies even beyond WHO limit values**. Suggested focus points are diesel car transport emissions and agricultural ammonia emissions. A **national clean air agreement** is also being prepared to specify national and local responsibilities for such further going policies.
- Amsterdam city air quality, carbon and sustainability **ambitions** moved towards an even **higher level** due to recent political changes: A new center-left city council was formed after elections in March 2018. Its four-party coalition agreement holds even more ambitious sustainability goals than that of the previous council. Headlines are a 'gasfree' city by 2040, and an 'emissions free' city within the city ring by 2025.

2.2 City policy making

In the Amsterdam baseline policy report, several conclusions were drawn regarding policy making in the city. These are summarized here.

Overall

- Local city policy targets and actions are more ambitious than those on a national level and supported by consecutive city councils;
- Local policies are supported by a detailed measuring network;
- Nevertheless some local air quality hotspots are persistent (mainly due to heavy traffic).

Transport

- The local low-emissions zone does not affect private car use. Rather, private car use in the city is discouraged by reducing the number of parking spaces and by making parking more expensive. The latter measure also helps financing policy execution;
- Electrical car use is stimulated by the provision of charging infrastructure and dedicated parking opportunities for electrical cars;
- Some streets in the city have been pedestrianised and transit routes have been deliberately cut.

Energy

- Gas-free policies are pursued in particular by expansion of the local district-heating network;
- Solar PV and heating are driven mostly by national provisions and further stimulated by local policy action.

Citizen involvement

- Local policies are framed towards 'own action' of 'active, engaged and competent citizens'. More recently, attention for a 'fairt' and affordable transition for the poor has been added;
- NGO action increaslingly takes national and local air quality and carbon policy makers to court, with so far more success in the latter than in the former field;
- Local energy cooperatives support city energy policy execution.

2.3 Leeway for city policy making

Regarding leeway for local policy making, the baseline policy report distinguishes between specific local conditions on the one hand, and barriers and support received from the national and European level on the other hand. Main conclusions drawn for the situation in Amsterdam are outlined below.

2.3.1 Specific local conditions

Some of the most important local conditions that set the scene for policy making in Amsterdam are that the city:

- Is an economic hub with many commuters into the city and a tourist hub with an increasing number of visitors per year;
- Has an extensive city public transport infrastructure (train, trams, metro, buses, bike), recently expanded with new metroline and closely embedded in national transport infrastructure (intercity train network);
- Has a flat surface throughout the city, large existing cycling infrastructure and cycling culture;
- Has a largely gas-based housing infrastructure, with some existing district-heating based on waste heat from local incineration plant.

2.3.2 National and EU support and barriers

Main conclusions on national and EU level drivers *supporting* Amsterdam policy making are:

- The recent policy decisions and dominant national discussion on gas exploitation in the Northern part of the Netherlands frame the 'gas-free' policy targets set in Amsterdam;
- EU air quality targets are directly transposed into national air quality and carbon policy targets. City policy targets exceed these EU/national targets by setting also limits to soot concentrations and by setting stricter CO_2 emission reduction targets than the national level.
- EU project funding plays a relatively small supportive role in practical execution of city policies.
- In particular national provisions stimulate the formation citizen energy cooperatives, investments in private rooftop PV and investments in electrical cars.

The first three drivers particularly impact on the target-setting and framing level of policies. The final driver has an impact on the execution level of policy-making.

Conclusions on national and EU level drivers that *hinder* Amsterdam policy making are:

- Regional/provincial spatial planning policy provisions limit wind energy applications within the city borders;
- National provisions for speed limits limit local low-speed trajectories on high-ways crossing the city area.

These drivers in particular have an effect on the execution level of policy-making.

2.4 Conclusion: SWOT of city action perspective

The above conclusions give rise to the following SWOT analysis of Amsterdam strengths, weaknessess, opportunities and threats for citizen-inclusive air quality and carbon policy making:

Strengths	Weaknesses
Local conditions – public transport infrastructure, cycling infrastructure, flat city area and cycling culture; **External factors –** national 'gas-free' framing and subsidy for one gas-free neighbourhood in Amsterdam, national support energy cooperatives, rooftop PV and electrical cars; **City policy making –** currently high political support for sustainability action, soot and CO2 targets beyond national level, low emissions zones, stimulation electrical car use, limitation of parking options, expansion waste heat district-heating **Citizen engagement –** framing towards 'own initiative' of citizens, local energy cooperatives support citizen action	**Local conditions –** large commuter city, still expanding tourist hub and growth of the city; **External factors** – limited role of EU projects in the city, regional spatial planning conditions, national competence for highway speed limits; **City policy making** – persistent local air quality hotspots **Citizen engagement –** Governmental opposition to NGO legal actions
Opportunities	**Threats**
- Current political climate favours ambitious local action; - New integral public planning law ('omgevingswet') with more room for local planning and health as a central issue; - Flat city surface and existing biking culture provide basis for stimulation of cycling; - 'Gas-free' framing of policies finds public resonance; - Higher parking tariffs finance anti-car policies; - Local energy cooperatives are allies in further city actions.	- Economic expansion might hinder limitation of car transport; - Local ambitions might lead to further conflict with regional/provincial spatial planning; - No further improvement of air quality hotspots if not tackled; - Governmental opposition to NGO action might reduce public support for furthergoing local actions.

3 Bristol

3.1 Recent national and city developments

The city baseline report for Bristol was finalised in November 2017. Key developments in Bristol and the United Kingdom since the main text was finalised in July 2017 include:

- As part of a new Clean Air Plan **Bristol City Council is evaluating 5 options for the establishment of a Clean Air Zone (CAZ)** in the city, including 4 which would have a charging (fee) element;
- A **Joint Spatial Plan** for the West of England (including Bristol) has been submitted to national government for review;
- The UK national government announced a **new national Air Quality plan for Nitrogen Dioxide in July 2017**, following earlier iterations being ruled 'woefully inadequate'. The plan focuses on achieving the UK Governments legal requirement to achieve compliance with EU limit values in the shortest time possible.
- A new draft **Clean Air Strategy** was published in 2018 and has been put out to consultation;
- The national government has also announced a **ban sales of all diesel cars from 2040**;
- Bristol City Council Energy Service lauched the City Leap Prospectus in 2018 with the aim of boosting activity to meet the 2050 zero carbon targets;
- There has been a recent increase in citizen action on air pollution with a number of groups being formed with the shared objective to push for clean air in the city;
- The West of England Devolution Deal and election of a West of England Combined Authority (WECA) Mayor has resulted in a more consistent source of development funding becoming available with control of a £900m investment fund over 30 years being handed to the region.

3.2 City policy making

In the Bristol baseline policy report, several conclusions were drawn regarding policy making in the city. These are summarized here.

Overall

- Local city policy targets and actions are highly constrained by national level policy, and financial constraints;
- Local policies are supported by a comprehensive air quality measurement network;
- Whilst concentrations of pollutants are slowly trending down, there are still significant exceedances of national and EU limits for NO_2, such that a large part of the city is designated an Air Quality Management Area (AQMA).
- Bristol CO_2 emissions are declining over time, primarily driven by the decarbonisation of the UK national power supply.

Transport

- Transport emissions from private cars remain the single largest problem for air quality in Bristol;
- Traffic congestion is an important local political issue;

- Significant upgrades are being made to local (bus) public transport infrastructure, whilst beneficial in the long term there has been traffic disruption during construction.
- A Clean Air Plan, which includes options for a charging Clean Air Zone (CAZ), is being evaluated.

Energy
- Energy cooperatives have been relatively successful in Bristol in building solar farms;
- A small district heating network is being introduced;
- Heating is the major source of CO_2 emissions in the city, primarily from household gas boilers.

Citizen involvement
- Citizen action is quite significant in relation to energy, with a variety of different initiatives active in supporting reduced energy use and community energy projects;
- Citizen action on air quality has been much more limited, with little or no organised action on these issues.

3.3 Leeway for city policy making

Regarding leeway for local policy making, the baseline policy report distinguishes between specific local conditions on one hand, and barriers and support received from the national and European level on the other hand. Main conclusions drawn for the situation in Bristol are outlined below.

3.3.1 Specific local conditions

Some of the most important local conditions that set the scene for policy making in Bristol are that the city:
- Is an economic hub for the South West region of the UK, and a relatively wealthy and growing city in the national context. Despite this there remain many low-income areas in the city;
- Has a reasonable city public transport infrastructure (buses and local trains), being expanded with new metro bus line and closely embedded in national transport infrastructure (intercity train network);
- Relatively strong (compared to rest of UK) cycling culture;
- Has a housing infrastructure which is in general poorly insulated, and largely gas-based heating, although there is the recent development of a small district heating network.

3.3.2 National and EU support and barriers

Main conclusions on national and EU level drivers *supporting* Bristol policy making are:
- EU air quality targets are directly transposed into national air quality and carbon policy targets;
- National carbon policy provides a strong legal basis for emissions reduction, with more amibitious targets than EU level;
- National policy is highly supportive of low-emission vehicle innovation, and the recent Clean Air Strategy proposal includes a focus on reduced particle emissions from wood burning;

- National Air Quality policy provides the opportunity for the establishment of a Clean Air Zone in Bristol, this could have important benefits for air quality.

The first three drivers particularly impact on the target-setting and framing level of policies. The final driver has an impact on the execution level of policy-making.

Conclusions on external drivers that *hinder* Bristol policy making are:

- Brexit overshadows most policy discussions in the UK, it is unclear how UK air quality and carbon policy will develop independently, this could be positive or negative;
- Local authorities have no legal obligation to meet EU air quality limits, but legal mechanisms exist for fines for non-compliance with these limits to be passed on to local authorities;
- National policies give preferential tax treatment to diesel vehicles;
- National policies for energy efficient housing have been blocked (nearly zero emissions requirements) or have failed with no replacement (Green Deal).
- Funding for the council is largely centralised, and budgets have been cut substantially in recent years;
- Funding for relevant transport or other projects typically needs to be tendered for from national departments, in competition with other councils. Although Bristol has succesfully gained funding in this way, it creates extra work, uncertainties and doesn't support longer-term planning and strategic action at the city level.

The first four drivers particularly impact on the target-setting and framing level of policies, whilst the latter two have an impact on the execution level of policy-making.

Regional policies may also play a role, but it is unclear which activities of relevance are being taken by the Combined Authority Mayor first elected in May 2017.

3.4 Conclusion: SWOT of city action perspective

The above conclusions give rise to the following SWOT analysis of Bristol strengths, weaknessess, opportunities and threats for citizen-inclusive air quality and carbon policy making:

Strengths	Weaknesses
Local conditions – public transport infrastructure being upgraded, relatively strong cycling culture; **External factors –** declining emissions from national grid, strong legal basis for carbon reductions to 2050, support for innovative low emission transport; **City policy making –** Clean Air Zone being evaluated, expansion district-heating; **Citizen engagement –** Citizen led action around energy.	**Local conditions –** large commuter city, poorly insulated housing stock, cycling infrastructure could be much better; **External factors** – city budgets largely determined (and squeezed) at national level, tax policy favouring diesel cars, lack of useful national policy supporting energy efficient housing; **City policy making** – persistent and widespread air quality limit breaches ; **Citizen engagement** – Little or no coordinated citizen action on air quality.

Opportunities	Threats
- Clean air zone provides opportunity for what could be highly effective action on transport emissions; - Regional policy provides access to new funding and could support integrated planning and transport solutions; - New national Clean Air Strategy, can support reduced particulate emissions; - Framing of air quality policy as tackling inequality and health problems - Brexit – uncertain, but divergence from EU policy could lead to more ambitious UK national policy in future; - Low hanging fruit for emissions reductions in energy efficiency renovation.	- Brexit – creates uncertainty in future air quality policy, could lead to weakened policy or lack of ambition in future; - Continued constraints on local authority budgets; - Continued centralisation and competition for project funding; - Congestion and media support for motorists makes changes to transport infrastructure and rules contentious; - Rules for Clean Air Zone may make it difficult to introduce a 'charging' zone, which is understood to be most effective. - New national Clean Air Strategy includes few concrete measures on transport emissions.

4 Ljubljana

4.1 Recent national and city developments

The city baseline report for Ljubljana was finalised in March 2018. Key developments in Ljubljana and Slovenia since termination of this analysis are:

- A modern and high-capacity railway link between Divaca and Koper will be finally constructed after receiving more than EUR 150 million of European grants. The Act on the second track entered into force on 21 July 2018.[1] This is an important development to improve the freight rail system in Slovenia and hopefully which will deliver also some sustainable benefits.
- The Slovenian government has adopted a revision of the 2018 budget of Eko Sklad (Eco Fund), the public environmental fund managed by the Ministry of the Environment and Spatial Planning, increasing subsidies planned for 2018 as part of efforts to fight climate change.[2]
- The Ministry of Infrastructure drafted the Action plan on alternative fuels in transport in June 2018, which defines objectives and measures to reduce emissions from transport, and as such have a positive impact on GHG and air pollutant emissions.[3]

[1] Ministry of Infrastructure of the Republic of Slovenia, http://www.mzi.gov.si/en/media_room/news/9167/
[2] Balkan Green Energy News, 18 July 2018, https://balkangreenenergynews.com/slovenia-boosts-2018-subsidies-to-fight-climate-change/
[3] Ministry of Infrastructure of the Republic of Slovenia, http://www.mzi.gov.si/en/media_room/news/9165/

- Slovenia is currently drafting a national energy and climate plan as a response to the Energy Union Strategy. A Conference on energy transition as an opportunity for the Slovenian economy was organised in April 2018.[4]
- Ljubljana was chosen through a Eurostat survey as the third cleanest EU capital.[5]

4.2 City policy making

In the Ljubljana baseline policy report, several conclusions were drawn regarding policy making in the city. These are summarized here.

Overall

- Ljubljana won the Green European Capital Award in 2016, which recognises and rewards local efforts to improve the environment, the economy and the quality of life in cities. Each year this award is given to a city, which is leading the way in environmentally friendly urban living and which can act as a role model to inspire other cities.[6]
- Carbon emissions in the city have continuously decreased, mainly due to reduced industrial output and to the higher number of connections to the district heating system;
- From the main air pollutants, particulate pollution, in particular PM_{10} is still an important issue in the city. The main sources of PM_{10} emissions are transport and burning wood for heating, the latter especially in the neighbouring municipalities. Further promotion of district energy supply and the use of environmentally friendly vehicles could decrease PM_{10} emissions in the city and surroundings.
- National and local policymaking are strongly integrated, as expressed for instance by the national lead in local air quality plans. However, a closer cooperation on a regional level could contribute to achieving more effectively modal shifts in transport (e.g. from private to public transport).

Transport

- The city is working on concrete measures to reduce PM_{10} pollution in Ljubljana by fostering sustainable mobility. Through its Sustainable Mobility Plan, the city has performed very visible actions, like the creation of a pedestrian zone in the city centre, the introduction of electric vehicles available on demand, the creation of more P+R parking lots on the city's outskirts, intensive renovation and modernisation of the bus fleet as well as introduction and extension of public transport lines into the region.
- Cooperation between Ljubljana city and the surrounding municipalities should be further intensified, in order to address more effectively air quality and carbon emissions in the whole region, in particular in issues like commuting and integration of rural and urban public transport. A closer cooperation on a regional level would be also needed in assuring transport modal shifts. On a national level, intensive transit traffic passing through the country is still an issue.

[4] Ministry of Infrastructure of the Republic of Slovenia, http://www.mzi.gov.si/en/media_room/news/9161/
[5] Ljubljana City, https://www.ljubljana.si/en/news/ljubljana-as-the-third-cleanest-eu-capital/
[6] European Green Capital website, http://ec.europa.eu/environment/europeangreencapital/about-the-award/policy-guidance/

Energy

- Concrete measures to reduce PM_{10} pollution in Ljubljana consist of prohibiting polluting heating practices and expanding connection to district heating infrastructure where possible.
- The use of outdated furnaces or stoves is still common in Slovenia and is contributing to air pollution, especially CO_2 and PM emissions. The city's Sustainable Energy Action Plan tries to tackle this by promoting the reduction of energy consumption, increasing district heating, or the transition towards greener sources of energy, like renewable energies. Further national legislation could contribute to reduced pollution in Ljubljana stemming from wood stoves in the surrounding areas and municipalities.

Citizen involvement

- City pushes strongly towards environmental awareness/action, however, most action is not initiated primarily by citizens, but by the city.
- Ljubljana's green policy ambitions are strongly influenced by a stable local leadership that sometimes dares to resist initial citizens concerns. The mayor and the vice mayors are the most prominent figures.
- Direct contact with citizens, actions to increase citizen awareness, obligatory national and local consultations, and a strong circuit of existing close contacts between policymakers and other stakeholders (such as NGOs) are the main methods to involve citizens in Ljubljana. A recently established citizens' initiatives web portal service and office, and 17 local districst with 52 field district offices are also an important tool for citizens' engagement. A City Manager installed in 2018 is a further contribution to stakeholder engagement, as he is responsible for the establishment of the city center stakeholder platform for cooperation with city administration and decision makers.

4.3 Leeway for city policy making

Regarding leeway for local policy making, the baseline policy report distinguishes between specific local conditions on one hand, and barriers and support received from the national and European level on the other hand. Main conclusions drawn for the situation in Ljubljana are outlined below.

4.3.1 Specific local conditions

Policies in any city are partly determined by local circumstances that are outside the influence of local policymakers. Some of the most important local conditions that set the scene for policy making in Ljubljana are:

- The city is situated in a basin surrounded by mountains that is mainly exposed to Western winds. Inversion occurs frequently and is responsible for part of the air pollution in the city.
- The city and country are also situated at a crossroads of European transit routes, which is responsible for part of the air polluting and greenhouse gas emissions from transport.
- Slovenia lacks a discrete regional level, so that policy making is concentrated at either local or national level.

4.3.2 National and EU support and barriers

Main conclusions on national and EU level drivers *supporting* Ljubljana policy making are:

- EU policy standards and limit values contributed to shaping Slovenian air quality and carbon policymaking. NO_x is not a key air problem regarding air pollution in Ljubljana anymore. Rather, PM_{10} and O_3 are the main air pollutants of which exceedances of limit values are found.
- The involvement of Ljubljana city in successful applications to EU funded projects also shaped and helped realise its green ambitions. This included its award to be the Green Capital of Europe in 2016.
- National and local policymaking are strongly integrated, as expressed for instance by the national lead in local air quality plans. However, in practice local policies are driven primarily by the city.

These drivers particularly impact on the target-setting and framing level of policies. Becoming involved in EU funded projects particularly impacts on the implementation of policies.

Conclusions on external drivers that *hinder* Ljubljana policy making are:

- The integration of national and local policymaking also hinders Ljubljana policy making. Slovenia lacks a regional governance level and many small communities do not have the executive power to elaborate extensive air quality plans. A closer cooperation on a regional level, like the Ljubljana regional development agency that was installed in recent years, would be needed for instance in assuring transport modal shifts and less household biomass burning.
- The expansion of the national transport infrastructure is a national competence that is not always synchronised with local developments. This is illustrated, for instance, by the massive road infrastructure expansion contrasted against the limited investments in the rail system. Only recently, a large rail infrastructure project has been approved for EU grant financing and has a green light to start (second track between Divaca and Koper as mentioned above).
- A relatively small number of measuring stations in the city, and air quality models that are in a process of being improved are also said to set limits to more detailed local and national policymaking. Further work has been undertaken in this area to improve the situation.

These drivers in particular have an effect on the execution level of policy-making.

4.4 Conclusion: SWOT of city action perspective

The above conclusions give rise to the following SWOT analysis of Ljubljana strengths, weaknessess, opportunities and threats for citizen-inclusive air quality and carbon policy making:

Strengths	Weaknesses
Local conditions – relatively good public transport infrastructure, small city that allows walking and cycling; **External factors –** important role of EU projects in the city, strong role of Ljubljana city for surrounding municipalities; **City policy making –** city has a decision making power on environmental and climate issues, prominency of the mayor and the vice mayor in realising local policies that initially cause public concerns, sustainable mobility plan and sustainable energy action plan outlining measures to be taken to improve the situation **Citizen engagement –** environmental NGOs involved mainly discussions on local level, public consultations available to citizens, direct contacts of city with citizens, policy making mainly top down rather than bottom up, citizens' initiatives web portal service and office.	**Local conditions –** location in a basin which creates inversion which is partly responsible for the bad air quality in the city, large economic and transport hub contributing to emissions; **External factors** – lack of a formal administrative regional level to support and manage surrounding municipalities, national transport infrastructure not always synchronised with local developments; **City policy making** – there are some limits on what cities can do, national level bears the final responsibility for local air quality plans. There is integration of national and local air quality policy making with national level having the lead but in practice local policy making the driver **Citizen engagement –** citizen engagement sometimes requires a push from the city of Ljubljana, sometimes the consultation meetings are closed to invited participants – some environmental NGOs do not get to participate at an early stage.
Opportunities	**Threats**
- The successful framing of Ljubljana as a green city and the attainment of EU funding that supports this development help to realise high ambitions in the city; - Further sustainable mobility measures, e.g. transport modal shift, connection of the urban transport network with adjacent municipalities and beyond, will improve the air quality policy making. - Increased transport infrastructure – rail/ buses, will also contribute to decreasing air pollutants from transport.	- Initially limited cooperation/ integration between Ljubljana city with neighbouring municipalities that might prevent spreading of sustainable transport and energy measures to these other areas. - Lack of a comprehensive national rail network prevents further uptake of sustainable means of transport such as rail or buses. - There is a need for further education of citizens to decrease unsustainable energy consumption (of biomass burning for heating) and the use of cars. - Due to high prices of real estate and concentration of jobs in Ljubljana city, suburbanisation is still an issue, therefore, commuting is rising.

5 Sosnowiec

5.1 Recent national and city developments

The city baseline report for Sosnowiec was finalised in March 2018. Given the short time that has elapsed there have been few significant developments in Sosnowiec and Poland since the main text was finalised, the main development is that:

- A **city bike-sharing scheme** has been introduced in Sosnowiec.

5.2 City policy making

In the Sosnowiec baseline policy report, several conclusions were drawn regarding policy making in the city. These are summarized here.

Overall

- Due to large smog problems in winter time, air quality has recently become a more important policy issue in Sosnowiec and in Poland generally, although concentrations and exceedances have been declining (from 2014 to 2016);
- There is a single national air quality monitoring station in Sosnowiec, and a handful of passive collectors. Whilst region monitoring agencies are satisfied with this, local citizens united in an air quality NGO are less happy about the location and 'unrealistic' results from monitoring;
- A comprehensive Low Emission Economy Plan (PGN) sets out local policy to improve air quality and reduce carbon emissions, although implementation is hampered by city budget deficits. However, the list of projects defined in the PGN is also used in the allocation of EU funding.

Transport

- Transport emissions are not considered a major contributor to the air quality problem in Sosnowiec, although there are occasional NOx limit exceedances;
- Public transport provision is relatively strong, with good tram and bus infrastructure in the city, including a programme to upgrade buses and trams, as well as the introduction of an online digital public transport information system;
- There is little cycling infrastructure, although some first cycling paths have been introduced recently and seem successful Their connection to similar networks in neighbouring regions is planned for the future.

Energy

- Low stack (chimney) emissions from household heating are the single largest air quality issue in Sosnowiec, leading to dense winter smogs and poor air quality (high particulates) during cold periods – the primary causes are poor quality fuels (coal and waste) and boilers;
- Programmes have been introduced to encourage households to switch to alternative fuels, district heating and/or to upgrade their boilers.

Citizen involvement

- Citizen action on air quality is led by a small group of dedicated citizens in a group called 'Smog Alert' which is part of a larger national network.
- Citizen policy involvement and awareness of air quality and carbon issues is understood to be low.

5.3 Leeway for city policy making

Regarding leeway for local policy making, the baseline policy report distinguishes between specific local conditions on one hand, and barriers and support received from the national

and European level on the other hand. Main conclusions drawn for the situation in Sosnowiec are outlined below.

5.3.1 Specific local conditions

Some of the most important local conditions that set the scene for policy making in Sosnowiec are that the city:

- Is part of the larger Upper-Silesian urban conglomeration, centred on Katowice and with a population of around 2.7 million;
- Sosnowiec is experiencing population decline, and in comparison to neighbouring towns and cities has a below average income as it has experienced significant de-industrialisation and closure of its coal mines;
- The bus operator (PKM) is recognised nationally for its innovation and good service, and is investing in low-emission buses;
- Lack of cycling culture and infrastructure;
- Has a housing infrastructure which is in general old and poorly insulated. Distict heating network is comprehensive.
- Little scope and potential for renewable energy, very low current adoption.

5.3.2 National and EU support and barriers

Main conclusions on national and EU level drivers *supporting* Sosnowiec policy making are:

- EU air quality targets are directly transposed into national air quality rules, with the EU rules thought to establish a minimum standard that may not otherwise exist. Although exceedances of limit values mean that Poland is currently under EU infringement proceedings;
- EU funding is a key catalyst for policy action and implementation in Poland;
- The Silesia region receives significant EU and national funding for environmental protection
- National tax policies penalise those that import cars with large engines from other countries;
- National air quality policy has been supported by adoption of the Anti Smog resolution in 2018, a resolution was already adopted in the Silesia region which includes Sosnowiec, coming into effect in 2017;
- National and regional air quality monitoring and alarm services provide good real-time information on air quality;
- Creation of a new regional entity, the Upper Silesian – Zagłębie Metropolis area, will lead to greater regional investments in transport;

The first three drivers particularly impact on the target-setting and framing level of policies. The other drivers have more of an impact on the execution level of policy-making.

Conclusions on external drivers that *hinder* Sosnowiec policy making are:

- Until recently there was a lack of quality and/or efficiency standards for commercial heating fuels and stoves, leading to poor quality fuels and combustion;
- National carbon policy is weak, with little attention paid to it by the current government which is sceptical of climate change and very keen to support the domestic coal sector and concious of energy affordability for poor households;

- National policy actively discourages renewable energy, as this is viewed as too expensive for Poland and competing with the domestic coal sector;
- National and regional (voivodeship) politics and policies sometimes conflict, with more ambitious regions having little freedom to deviate from national policy;
- National policies give preferential tax treatment to diesel vehicles.

These drivers particularly impact on the target-setting and framing level of policies.

5.4 Conclusion: SWOT of city action perspective

The above conclusions give rise to the following SWOT analysis of Sosnowiec strengths, weaknessess, opportunities and threats for citizen-inclusive air quality and carbon policy making:

Strengths	Weaknesses
Local conditions – good public transport infrastructure, especially the bus operator, anti-smog resolution, declining air pollution concentrations and exceedances; **External factors –** new regional urban administration and potential funding, significant national and regional investments in transport infrastructure, real-time air quality monitoring information; **City policy making –** new bike sharing scheme, boiler replacement programme; **Citizen engagement –** Citizen led action on air quality through NGO – 'Smog Alert'.	**Local conditions –** little or no cycling culture or infrastructure, concerns over local air quality monitoring network; **External factors** – complex arrangement between national, regional and local governance and competing politics, lack of useful national policy supporting carbon reduction or renewable energy; **City policy making** – persistent air quality problems in cold periods, no time-series data on CO_2 emissions; **Citizen engagement** – Little or no coordinated citizen action on carbon emissions.
Opportunities	**Threats**
- New fuel standards to reduce burning of poor quality fuels; - Most houses are connected to district heating and/or natural gas networks and these are growing; - Expansion of cycle infrastructure to support new bike-sharing scheme - New regional urban area provides access to new funding for transport and could support integrated planning and transport solutions; - Investments in building renovation (thermal) for public and other buildings.	- Population decline – leading to shrinking of budgets, abandoned buildings, lower investment; - Citizen opposition to restrictions or additional costs for cars, e.g. parking charges or reduced speed limits; - Regional and National government political differences could hinder action; - Relatively high national per capita CO_2 emissions; - Continued national government support for coal sector; - Growth in road transport will lead to air quality problems from traffic, which is not currently a major issue.

6 Liguria

6.1 Recent national and regional developments

Some recent developments at national and regional / local level – not included in the Policy Baseline Report submitted in March 2018.

- In the morning of August 14, 2018 the Morandi bridge - part of the A10 motorway - in Genoa collapsed. A complete reorientation of traffic flows in the city in the coming years is therefore required. As of 30 September 2018, a Decree Law has been issued that dedicates substantial amounts of money to local transport and city planning. Effects of the bridge collapse on air quality still remain to be seen, but a severe worsening in the most effected parts of the city is likely.
- A relatively recent report on air pollution (i.e. Mal'aria 2018)[7] by the environmental NGO Legambiente does not even mention Liguria, and Genoa is mentioned only once. The reason is probably that other cities are doing worse (despite the report acknowledges that O_3 limit value exceedances are also found in Genoa);
- The planned electrification of the docks in the port of Pra' have started in September 2018 and will be finalised by the end in 2019 (this is a two-year delay compared to what the previous port regulatory plan indicated i.e. end 2017).[8]

6.2 City policy making

In the Liguria Region Policy Baseline Analysis report, several conclusions were drawn regarding policy making in the city. These are summarised here.

Overall

- In the Liguria Region air quality is a challenge but it is not considered a major problem for three reasons: 1) Other problems (e.g. floods, waste, forest fires, water quality) are perceived as more pressing; 2) the air in the region is cleaner than in other parts of Italy; and 3) the air is cleaner than in the past, due to industrial policy and industrial activity decrease.
- Problems with NO_2 and O_3 persist (and PM_{10} poses still a risk) particularly in urban areas such as Genoa.
- The sources of pollutants (transport and the port) are very close to where citizens live, affecting exposure.
- The potential consequences of climate change that may affect the Liguria Region most are floods, droughts, forest fires and heat waves.
- No long-term targets and policy plans exist for air pollution or climate change on either a regional or local level.

Transport

[7] Legambiente (2018) Rapporto di Legambiente sull'inquinamento atmosferico nelle città italiane - 29 gennaio 2018
[8] Genova 24 (2018) Porto, al via elettrificazione banchine Pra'-Voltri. Lavori completati a ottobre 2019. Last accessed: 18/09/2018

- Road transport - next to the harbour - is the main air polluting cause in Liguria. Exposure of citizens to road traffic is highest as it happens at ground level.
- The Liguria Region has a wide regional network of local public transport consisting of urban ans suburban buses (mainly diesel), trains, a metro, maritime transport and a funicular and lifts.
- Genoa is highly congested also because the highway node and the rail network (which supports regional and long-distance passenger as well as freight traffic) converge in the city.
- The use of public transport is being fostered by the region through continuous efforts to improve and expand the public transport network.
- Cycling in Liguria is mostly a recreational activity. Urban cycling is negligible in Genoa and slightly more common in other smaller, flatter cities with better cycling infrastructure.
- Local practices such as more scooter parking and cheaper car park, and the lack of cycling infrastructure make motorised road transport more convenient.
- Liguria has a few pedestrian areas and Areas of Limited Traffic (ZTL) in the main cities.
- The so-called Gronda link road project is being implemented to push transit traffic (which now goes through the city) to outside of Genoa.

Energy

- Italian energy targets concerning energy saving and renewables are slightly more ambitious than the EU's targets.
- Liguria is behind with renewables implementation compared to other regions in Italy.
- Renewable energy for heating purposes consists mainly of biomass burning - mostly outside the major urban centres.

Citizen involvement

- Citizens in Liguria are not actively involved in the air quality and climate discussion although there have been citizens protest to demand cleaner, more energy efficient harbour policies.
- Environmental activism comes principally from NGOs, but air quality is not high up on their priority list. Cleaner transport and energy topics are on their agenda, motivated by climate mitigation needs not air pollution.
- On the contrary several citizens (mainly owners of the historical Genoese Vespa) demonstrated against a planned ban on most polluting motorbikes. The initial plans were withdrawn, but the new Mayor again proposed plans to promote electric scooters, albeit over the longer term.

6.3 Leeway for city policy making

Regarding leeway for local policy making, the baseline policy report distinguishes between specific local conditions on one hand, and barriers and support received from the national and European level on the other hand. Main conclusions drawn for the situation in Liguria are outlined below.

6.3.1 Specific local conditions

Some of the most important local conditions that set the scene for policy making in the Liguria Region are as follows:

- The large forest area in the Liguria Region results in good air quality overall in the region and drives attention away from hotspots such as urbanised areas like Genoa.
- The prevailing wind direction in the Liguria Region blows pollution away from the city.
- The hilly and compact territory places limitations on city planning, for instance in Genoa. Industry, the large port, traffic (including a highway that goes through the city and a very high number of motorbikes / scooters) and housing are all close together.
- Population - old (high social care costs) and concentrated on the coast, mainly in Genoa.
- The Liguria Region has a wide air quality monitoring network divided in zones according to emission characteristics, climate, topography and geography. Its latest air quality plan dates from 2006 (a new plan is pending approval).
- Air quality policies are hindered by budget limitations and by lack of willingness of local policymakers to implement unpopular measures (e.g. affecting car/scooter use).

6.3.2 National and EU support and barriers

Main conclusions on national and EU level drivers *supporting* policy making in Liguria are:

- EU regulation drives national and local policies: the aim of air quality and carbon emission reduction actions is to comply with EU requirements (and avoid sanctions);
- Italian energy targets concerning energy saving and renewables are slightly more ambitious than the EU's targets;
- Recent new national policies tackle solid fuel burning by households;
- Several financial schemes are at the disposal of the public and public authorities to finance the energy transition;
- The Terzo Valico high-speed train, which will connect the Ligurian port with Northern Italy and the rest of Europe. Its aim is to divert freight traffic substantially from road to rail;
- Energy, transport projects often (co-)financed by EU.

The first two drivers particularly impact on the target-setting and framing level of policies. The other drivers have more of an impact on the execution level of policy-making.

Conclusions on national and EU level drivers that *hinder* policy making in Liguria are:

- Financial - Public transport improvement investments compete in local and regional budgets with social care.

6.4 Conclusion: SWOT of city action perspective

The above conclusions give rise to the following SWOT analysis of Liguria Region's strengths, weaknessess, opportunities and threats for citizen-inclusive air quality and carbon policy making:

Strengths	Weaknesses
Local conditions – Climate suitable for cycling, predominant wind direction helps to reduce air pollution, wide public transport network, existence of some pedestrian areas and Areas of Limited Traffic (ZTL) **External factors –** Wide air quality monitoring network **Region / city policy making –** continuous efforts on improving public transport, wide air quality monitoring network **Citizen engagement –** presence of a few environmental NGOs	**Local conditions –** Hilly territory unsuitable for cycling, highway node and rail network converging in Genoa causing congestion, spatial limitations, population concentrated in Genoa, large forest extension driving attention away from urban hotspots, large harbour, lack of cycling infrastructure **External factors –** car / scoorter culture (and no biking culture), relatively low renewable share - biomass burning for heating mainly **Region / city policy making –** Low priority and lack of ambition of air quality policies, more and cheaper parking, last air quality plan from 2006 **Citizen engagement** – Air quality not a top priority for NGOs nor citizens, citizens against bans on most polluting scooters
Opportunities	**Threats**
- The collapse of the Morandi bridge diverted substantial funds to the city that might lead to a reorientation of overall traffic flows. - Under construction Gronda link road may divert much road traffic off the city - Ongoing Terzo Valico high-speed train may divert freight traffic substantially from road - Planned electrification of the harbour - Planned new Regional Air Quality Plan raising attention of air quality - Electric mobility and car sharing - Genoa learning from urban cycling experience in other cities - Increased share in renewables - Expansion of the areas of limited traffic - Environmental NGOs getting air quality into their agendas - New government bringing the issue of air quality and GHG emissions up the agenda	- Continuing to favour policies that make car use appealing, convenient - Increased harbour traffic offsetting the improvements of electrification - Recovering economy that could foster industrial activity - EU and national targets for air quality and CO_2 emissions not stimulating meaningful policies at the regional/local level - Stop of EU funding for transport/enery projects - Persistance of other “more pressing” problems diverting attention from air quality - More polluted cities continuing to divert attention from the Liguria Region and Genoa

7 Aveiro / CIRA

7.1 Recent national and regional developments

Since the Aveiro Region Policy Baseline report was submitted (March 2018) new developments at national level are as follows:

- The national air quality index (IQAr) of 2017 shows that the number of days with "Very Good" and "Good" air quality decreased (-4%) in 2017 compared to 2016. Days

with "Poor" and "Very Poor" air quality increased about 1%.[9] This trend is also observed for the Aveiro Region.

- The University of Aveiro (UA) has published a report stating that as a consequence of climate change - and weather conditions - air quality in Portugal will continue to decrease.[10] The news was picked by several country-wide[11] and local[12] news channels.
- By July 2018 a national plan for the expansion of the cycling network was published. The Plan involves the construction of 1,000 kilometers of bicycle path in 10 years, requiring an investment of 300 million euros, partly to be locally funded.[13]

At the regional and local level:

- Ciclaveiro (the Association for Urban Mobility by Bicycle) continues to promote cycling in Aveiro city as a means of transport from an early age as shown by a recent event targeting families with children.[14]
- Aveiro municipality continues to favour car use. The construction of a new underground car park in the Rossio area of Aveiro – one emblematic green area of Aveiro - is under consideration. This resulted in several protest actions and in a petition against the project signed by over a thousand inhabitants - fearing among others increase of traffic, and patrimonial and environmental damage[15]- and other protest actions have been going on.[16] The hotel industry supports the underground car park.[17]
- The region is working on a project to create a long-distance walking and cycling route in Aveiro ("Grande Rota da Ria de Aveiro - GRRA"). Its main objective is to promote the Aveiro Region, its environmental values, active mobility (walking and ccyling) and water transport through investments in outdoor active tourism activities and a focus on cycling routes.

7.2 City policy making

In the Aveiro Region (CIRA) Policy Baseline Analysis report, several conclusions were drawn regarding policy making in the region. These are summarised here.

Overall

- Air quality in the CIRA is relatively good (largely within European limit values);
- Industrial policies have helped to reduce air pollution over recent decades;

[9] REA (2018) Ar e Ruido. Indice de Qualidade do ar.
[10] Medjournal (2018) Em 2050 a qualidade do ar em Portugal vai trazer degradação da saúde pública. Last accessed: 12/09/2018
[11] E.g. SAPO 24 (2018) Cientistas de Aveiro alertam que qualidade do ar vai continuar a degradar-se; Diario de Noticias (2018) Cientistas de Aveiro alertam que qualidade do ar vai continuar a degradar-se; JN (2018) Cientistas de Aveiro alertam que qualidade do ar vai continuar a degradar-se; TV Europa (2018) Qualidade do ar e saúde da população vão continuar a diminuir em Portugal. Last accessed: 12/09/2018
[12] E.g. Diario de Aveiro (2018) Cientistas alertam que qualidade do ar vai continuar a degradar-se. Last accessed: 12/09/2018
[13] SAPODESPORTO (2018) Governo quer mil novos quilómetros de ciclovias em 10 anos, num investimento de 300ME. Last accessed: 12/09/2018
[14] Ciclaveiro (2018) Mini Rodas 2ª edição. Last accessed: 20/09/2018
[15] Publico (2018) Citizens fear that the underground park will "sink" the Rossio. Last accessed: 20/09/2018
[16] Publico (2018) Protesto contra o projecto do Rossio toma a forma de um piquenique. Last accessed: 20/09/2018
[17] Diario de Aveiro (2018) Hotelaria a favor de estacionamento subterrâneo no Rossio. Last accessed: 20/09/2018

- Measurements in the region are limited - there are only three measuring stations in total;
- Exceedances still happen for O_3 and PM_{10} mainly. Industry, port, traffic and domestic heating are main sources of air pollution and of greenhouse gas emissions;
- $CO_{2\text{-eq}}$ emissions in the CIRA have increased since 1990. The main sources of CO_2 emissions are energy from industry and domestic heating, as well as transport.

Transport

- Public transport is limited in terms of frequency and area covered;
- The need for improving the public transport network is well-understood by all stakeholders and the regional and local government;
- The pace of improvements in public transport and bike infrastructure is low and no shift towards these modes are observed. Finance (high upfront investment) is an issue.
- Political will has been lacking to accompany public transport measures and investments with typically unpopular policy measures disincentivising the use of private vehicles;
- Overall urban cycling is negligible but some cities have developed a cycling culture to some extent (e.g. Ilhavo, Murtosa and Águeda). Aveiro also has a municipal bike sharing scheme though.

Energy

- Despite biomass burning from domestic heating is one main way by which citizens contribute to emissions in the CIRA, policies do not properly address this.
- No regional policies to promote renewables and energy efficiency.

Citizen involvement

- Local policies are directed at raising awareness of citizens but do not encourage or demand behaviour change.
- The main local policies targeted at citizens are on the improvement of public transport and improvement of bike infrastructure.
- Main NGO / citizen (involvement) activities regarding clean air / carbon reduction are:
    - Incident based activism at the port – citizens complain when an issue is evident.
    - Transport based - mobilising people to cycle as a means of commuting.
    - Dialogue with Industry – to improve environmental performance and prevent incidents;
    - Dialogue with authorities – via a pool of committed citizens that advise the CIRA on advancing sustainability
    - Awareness raising via EU-led events such as the European Mobility Week

7.3 Leeway for city policy making

The baseline policy report distinguishes between specific local conditions on one hand, and barriers and support received from the national and European level on the other hand. Main conclusions drawn for the situation in Aveiro Region are outlined below.

7.3.1 Specific local conditions

The most important local conditions that set the scene for policy making in the CIRA are:

- Its relatively low population density – this hinders public transport development.
- Its coastal situation (flat in many areas – albeit there are some hillier area) and Atlantic climate with moderate winds all year long – this poses opportunities for cycling and for renewable enegry developments.
- An old building stock with poorly insulated homes and no central or district heating.
- Plenty of car parking space, relatively cheap or for free which hinders the uptake or public transport or active modes of transport.

7.3.2 National and EU support and barriers

Main conclusions on national and EU level drivers *supporting* policy making in the CIRA are:

- European regulations and policies (industry and transport) are primarily accountable for the decrease in air pollutants and GHG emissions over time in the CIRA;
- Portugal's GHG emissions targets are more ambitious than the EU average aspiting to reductions of 18%-23% by 2020, and 30%-40% by 2030 compared to 2005;
- Coal for electricity production will be phased out by 2030; the tax on coal and coke products to produce electricity will be incrementally stepped up to 100% by 2022;
- Most air quality and climate related policies in the CIRA financed / co-financed by the EU;
- At national level there is a subsidies scheme to promote electric vehicles and the renewal of the public authorities' vehicles fleet for electric ones.

The first three drivers particularly impact on the target-setting and framing level of policies. The last two drivers have more of an impact on the execution level of policy-making.

Conclusions on drivers at national and EU level that *hinder* policy making in the CIRA are:

- The Aveiro Region meets air quality standards and there are no clear local hotspots of poor air quality; as result, neither air quality nor the associated health aspects are a major issue of public debate in the Aveiro Region;
- A hierarchy of policy making determines local policies in the CIRA: the EU, the national government, the Centre of Portugal and the Aveiro Region itself;
- There is lack of citizen pressure for ambitious policies;
- The fact that public transport was a national responsibility until 2015 (now a local / municipal responsibility) hindered the development of the public transport network.

These hindrances have more of an impact on the execution level of policy-making, whilst the first two hindrances may also affect target-setting.

7.4 Conclusion: SWOT of city action perspective

The above conclusions give rise to the following SWOT of the CIRA's strengths, weaknessess, opportunities and threats for citizen-inclusive air quality and carbon policy making:

Strengths	Weaknesses
Local conditions – Suitable local climatic conditions for cycling, suitable local climatic conditions for solar and wind energy **External factors –** Air quality index published yearly for all regions **Region / city policy making –** Long tradition of cooperation between the CIRA municipalities, bike sharing scheme in place **Citizen engagement –** A few active NGOs and citizens running transport initiatives and talking to the Regional authorities and industry on air polution and CO_2 emission related issues	**Local conditions –** Limited public transport network, rural areas with low population density, hilly geography in some municipalities, old building stock poorly /no insulated, solid fuel burning as main source of heating in homes **External factors –** Lack of national schemes to support energy efficient renovation of homes **Region policy making –** public transport is a local responsibility only since 2015, no energy efficiency / renewable policies, plenty of cheap / free car parking space **Citizen engagement** – Little attention / public pressure from citizens for ambitious air quality / climate policies
Opportunities	**Threats**
- Cross-municipality sharing of good practices e.g. regarding cycling - Local authorities can set more ambitious goals than the national government - Municipal / Intermunicipal campaigns for public awareness - Reduce emisisons from heating promoting home insulation, updating heating infrastructure, requiring certified heating systems & quality fuels - Expanding the measuring network - Discourage car use (while collecting revenues) through less and more expensive parking, only-pedestrians zones - More stringent EU regulation (limit values, fuel standards) - Introduction of (more) call buses - Increased uptake of electric mobility - Introducing Low Emission Zones	- Recovering economy that could foster industrial activity - Continuing to favour policies that benefit car users (e.g. more, cheap(er) parking) - EU and national targets for air quality and CO_2 emissions not stimulating meaningful policies at regional/local level - Stop of EU funding for transport/enery projects

8 Comparative analysis of city action perspectives

8.1 Local conditions compared

Across the six cities and regions examined, large variations in local conditions were found. As a result of these differences in local conditions, it is not possible to establish *direct* causal chains for city policy making that are generally applicable in any European city. The impacts of local conditions on city policy making, whilst predominantly indirect, set the scene for local policy making in such a 'natural' way that these conditions can easily, but mistakenly, be overlooked when discussing the leeway for local policy making. The comparison of the six

cities, shows that local conditions certainly have a significant impact on local policy making (Table 8-1).

Firstly, the local conditions have an impact on emissions and concentrations. For instance, inland or basin located cities like Ljubljana and Sosnowiec are more prone to high concentrations of air pollution than coastal cities like Bristol, Amsterdam, Genoa or Aveiro - even when considering the relatively impactful harbour activities is some coastal cities. The location of a city within a specific region, together with average wind speeds and directions, also determines the degree of background pollution arriving from elsewhere. This is important as measurement of higher pollutant concentrations in a city, particularly if local concentrations exceed limit values, will increase the necessity and pressure for measures to be taken. Hence, local conditions influence the **urgency of local action**.

Secondly, specific local conditions influence the **possibilities for specific pollution mitigation or adaptation policy measures.** In a city with a high population density (e.g. Genoa) it will be easier to develop and expand public transport than in a region with a low population density (e.g. CIRA/Aveiro). In cities with an existing cycling culture, such as Bristol or Amsterdam, it will be easier to expand the cycling network than in a city that is largely without such culture (e.g Sosnowiec).

Table 8-1 Specific local conditions and their impacts on city/regional policy making

Local condition	Relevant variations found	Impact on city air pollutant and carbon emissions and concentrations	Impact on city/regional policy
Geography and climate	Coastal vs. inland; terrain inclination and basin location; wind speeds and directions; temperatures and sun hours	Concentration of air pollutants in the city; ocurrance of inversions	Urgency of measures; possibilities to carry out specific measures (e.g. modal shift to walking/cycling; promotion of local wind/solar PV)
Economy	Cities with budget surpluses/ budget deficits;	Emissions	Possibilities to carry out specific measures (e.g. expensive measures such as infrastructural adaptations);
Demographics	High/low population density and size of city; spread in population affluence and ethnicity	Emissions	Possibilities to carry out specific measures (e.g. public transport); Framing of policy measures (e.g. adapted to specific target groups)
Socio-cultural	'Cycling culture'	Emissions	Possibilities to carry out specific measures (e.g. promotion of cycling)
Energy	National fuel mix; Insulation of local housing stock and degree of connection to district-heating	Emissions	Urgency of measures (e.g. fuel shift); possibilities to carry out specific measures (e.g. expansion of district heating)
Transport	Degree of regional economic hub function; location towards international transport routes; existing car/ public transport infrastructure	Emissions	Urgency of specific measures (e.g. commuting); possibilities to carry out specific measures (e.g. expansion of public transport)

8.2 National/regional support measures and constraints compared

Apart from local conditions, several national or regional support measures and constraints were also found that had a significant impact on policy developments in the six cities (Table 8-2).

Table 8-2 National/regional support measures and constraints

National/ regional support measures	National/ regional constraints
- National discussion on gas exit triggered by domestic earthquakes as a result of gas exploitation (AMS); - National support for citizen energy cooperations (AMS); - Ban on diesel car sales in the future (BRI); - Regional financial support for economic development introduced (BRI); - National anti smog resolution due to NGO action (SOS); - National train infrastructure project diverts city road traffic to rail (LIG); - Close regional cooperation improves possibilities for EU/national funding, economic development and regional transport infrastructure (AVE)	- Regional spatial RES plans prevent location of wind turbines in city (AMS); - No local low-speed area on national highways allowed (AMS); - Hierarchial finance structure, with cities to apply for national support by way of tenders (BRI); - National tax preferences for diesel vehicles (BRI; SOS); - Lacking regional policy level hinders cooperation between municipalities (LJU); - Timing of development of road versus rail infrastructure (LJU); - Lacking national standards for commercial heating fuels and stoves (SOS); - No regional air quality nor carbon policy planning (LIG);

8.2.1 National/regional constraints

On the constraints side, **a lack of integration of local and regional spatial planning** in many cases was found to be an underlying cause of constraints to local policy making. In Amsterdam, for instance, provincial spatial planning prevented wind turbines to be installed within the city limits. In Ljubljana, a lack of a discrete regional policy level was pointed to for past problems to integrate city and regional public transport.

Suboptimal timing of infrastructural measures has also been found to be an issue in some cases. For instance in Ljubljana, where a very high car ownership in the country was partly attributed to the fact that after the Slovenia's independence priority was given to the development of good road infrastructure and only now major measures to improve train infrastructure are being taken.

Other impediments to local policy making from regional and national policy levels that were found in the cities relate to **hierarchical financial governance structures**. In Bristol, for instance, many local projects have to be tendered for at a national level. This competition with other municipalities for local project funding has caused substantial pressures for the realisation of local targets.

Contradictory policies on a national level, like subsidies for diesel cars, were also identified in some cities as a hurdle to local policy realisation. The stimulation of diesel cars in this way contributed to climate change mitigation, but worsened local air pollution.

Lacking regional air quality and carbon policy plans were identified as a barrier to policy making were identified as a barrier in the case of Liguria. With air quality overall not

considered to be a major problem in Liguria, no clear policy plans on a regional level exist to work on further improvements of air quality.

A preference for the existing **national fuel mix and domestic sources** together with a **lack of fuel and heating equipment standards** were found to be major issues that impeded local policy making in the case of Sosnowiec.

Over time, some of these constraints were recognized by local, regional and national policy makers and were partly solved. A regional development agency for the Ljubljana region has solved some of the problems encountered to integrate regional and local public transport. Similarly, the relatively small communities in the Aveiro area are united in CIRA as an overarching governance umbrella that improves possiblities to develop joint infrastructure and apply for EU infrastructural funds. For Bristol, a regional 'West of England Combined Authority ' with dedicated budgets has alleviated some of the local funding problems. And a future ban on the sale of diesel cars will mitigate the previous preference for diesel cars in national legislation.

8.2.2 National/regional support

On the support side of local policies from a national and regional level, a myriad of **direct regulations** exists that simply have to be implemented on a local level. These are found over all policy areas relevant to local air quality and carbon policies, varying for instance from building requirements to road traffic regulations, and from national RES subsidies to national air quality standards.

Also, **national infrastructural developments** can have a large impact on local pollution, as in the case of the development of the Terzo Valico high-speed train that will divert much port traffic in Liguria from the road to the train.

Sometimes also **national provisions that directly or indirectly empower citizens** play a role to stimulate local policy making. This is for instance the case in Amsterdam, where the possibility created by national government to establish (semi-)commercial energy cooperations by households that feed for instance rooftop solar-PV into the grid has also resulted in citizens to organise themselves in order to get more influence in local green policy making.

Finally, sometimes **national, regional and local incidents** play an important role in supporting local policy making. In the Netherlands, small earthquakes caused by exploitation of the largest domestic natural gas field have led to massive citizen protests, which in turn led the Dutch government to decide to end its exploitation prematurely and to strive for a completely 'gas-free' built environment by 2050. In several neighbourhoods in the Netherlands, including one in Amsterdam, experiments with converting the built environment have now started or will start shortly. In Poland, repeated occurrence of heavy smog in many cities first led to a citizen movement to protest against these incidents and later to national legislation to address smog. In Genoa, the recent tragic incident with the Morandi bridge has led to a massive collapse of traffic in the city, but now also to the influx of national funding that might lead to a restructuring of the city traffic infrastructure.

8.3 EU support measures and constraints compared

Looking at support measures and constraints to local air quality and carbon policy making from a European Union level, it is remarkable that **no clear constraints resulting from EU policies** to local policy making have been identified in any of the six cities (Table 8-3). Rather, EU regulations were considered to be a strong driver for action and only the lack of more stringent EU regulations, for instance to expand the number of local measuring stations, in some cases was mentioned to be a barrier to underpin furthergoing local policies. Apart from that only the uncertainty to local policy makers in Bristol caused by Brexit could be regarded as a clear constraint from an EU level to the local level.

On the support side, several aspects of EU policies were found. **EU emission target setting and legislative limit values for concentrations of air pollutants** are directly transposed in national legislations and regulations. These targets are also applied on a local level and are often the key driver for local policy makers to take action. **EU funding of regional and local projects** plays an important role in many of the cities that were examined, for instance in Sosnowiec. **EU awareness campains**, such as the Green Capital and the European mobility week, found a large resonance in several pilot cities. Bristol and Ljubljana themselves were Green Capitals in the past.

Table 8-3 EU support measures and constraints compared

EU support measures	EU constraints
- National air quality standards based on EU legislation (all); - Many local projects driven by EU regional or project funding (e.g. SOS, LJU); - EU awareness campaigns like green capital, sustainable mobility week (e.g. BRI, LJU, AVE)	- Policy uncertainty due to Brexit (BRI)

8.4 City action perspectives compared

The analysis shows that, within the framework conditions set by local conditions and national and international policies, cities take own independent actions in various ways. These refer to the **target setting level**, **framing level**, and **execution level** of policies. Also, the **level of citizen engagement** in the examined cities differs largely.

Regarding city **policy target setting**, in all cities translations of national targets into local targets are found. Usually these are in line with national targets, and sometimes surpass these (e.g. in specific RES targets, energy efficiency targets). In Amsterdam in addition there is a specific air quality target found that does not exist on a national level nor in other cities and countries. It refers to soot as a specific component of air pollution.

When looking at the **public debate in cities**, it was noticed that the core of the public debate and hence of the core policy attention in each city was different, with some cities focusing on transport and others on energy. In Bristol, for instance, the public debate seems to focus particularly on transport, with the Clean Air Zone as a main current issue. In Ljubljana, the pedestrian zone as a main transport related measure in the city was already introduced

many years ago. Currently a steady expansion of further transport related measures is taking place, with train infrastructure as a present focus and wood burning from surrounding areas as a key remaining issue to be solved. In Aveiro/CIRA and Genoa/Liguria air quality and carbon policies seem not to be very dominant in the public debate, although transport has suddenly been parachuted into the core of the public attention in Genoa due to the collapse of the Morandi bridge. In Amsterdam and Sosnowiec, on the other hand, energy is the main focuspoint of attention. With the 'gas-free debate', Amsterdam and the Netherlands are heading in a different direction than other cities, that are partly in a transition from coal to gas. This holds in particular for Sosnowiec, where domestic coal so far is ubiquitous and low-stack (chimney) emissionsare the dominant issue in the debate due to their contribution to frequent winter smog periods.

Next to differences in the core of the public debate in the six cities, the analysis also pointed to different ways of **framing of city policies**. In Amsterdam, in line with a socio-liberal policy orientation, the own contribution of citizens to air quality and carbon emission reduction was found to be stressed. A centre-left political perspective (Labour party) in Bristol pointed to more attention to the socially poor. In Ljubljana a strong personal leadership of the mayor in particular stimulated green policies, with the city initiating particularly strong efforts to stimulate public awareness. In Aveiro/CIRA, Liguria and Sosnowiec the city council seems to take a more traditional car/scooter and (fossil) energy perspective, as public communication on the public's own contributions to air quality and carbon issues here seems more limited.

At the **execution level of local policy making**, in several cities the importance of **local measurements and measuring stations** was mentioned. These were regarded as playing an important role in underpinning the position of local policy makers in a debate with their national counterparts, as the measurements were able to show exactly where breaches of limit values occurred. With amateur air quality measuring materials now having become available, measurements also play a role in the discussion on how to increase citizen awareness in various cities. Some in this debate - in particular in the traditional measuring institutions - point to the scientific unreliability of these measurements. Others argue that the large number of measurements that becomes possible in this way can partly compensate for the unreliability of individual measurements and that, independent of the quality of the measurements, the engagement of citizens in such measurements contributes to public awareness and therefore should be encouraged.

Regarding **citizen engagement** in the six cities/regions, finally, two main observations could be made. Firstly, **higher citizen engagement does not always lead to more ambitious air quality or carbon policies**. In the case of Genoa, strong citizen protests led to the cancellation of a planned ban of old scooters to the city centre. A new mayor now aims to undertake more gradual steps in this direction, but new protests have already been announced. Similarly, the now widely supported pedestrian zone in Ljubljana had to be introduced in the face of substantial citizen protests at first.

Secondly, **citizen engagement is often funneled through NGO action**. In most cities, environmental NGOs were found to be active in the fields of air quality and carbon policy, although in Aveiro and Genoa this action seemed to be relatively limited. The NGOs often catalysed public action, even more as in many cities air pollution and climate change are still not perceived by many citizens as tangible problems that affect their own lives. Very

successful NGO action was encountered in particular in the Sosnowiec case, where citizen protests against smog that initially started in Krakow and later also spread to Sosnowiec led to the founding of a country-wide active environmental 'anti-smog' NGO. Through the active lobbying of this NGO an anti-smog resolution was passed at regional level and later national legislation was adopted with the aim to counter the occurance of smog in Polish cities. In the Amsterdam and Bristol cases, it was found that NGO action seemed to achieve success through litigation, whereby NGOs started court cases against national government to force them to take more ambitious policy action.

8.5 Conclusion – Comparative analysis of city action perspectives

Based on the analysis carried out, it is not possible to make one overarching template for a 'SWOT' of city level policy action in the context of local conditions and regional, national and EU policies. Rather, from the comparison of the six cities/regions in this report the first contours of conclusions and recommendations for successful city level action in the fields of air quality and carbon policy are arising. These will be further expanded in the final stages of the ClairCity project, where the overall 'city policy packages' per city and the overarching city comparison will also include lessons learned from the various citizen engagement activities carried out in the other work packages of the ClairCity project. Initial conclusions and recommendations are:

On regional/national constraints and support

- The comparison of cities in this report provides strong evidence for the importance of regional cooperation to realise city goals. This holds in particular for spatial and infrastructural planning to achieve a modal shift from cars to walking/cycling, to an attractive and integrated public transport system or to more comprehensive district-heating systems. Regional cooperation can also contribute to attracting national or EU funding to realise such large projects.

On EU constraints and support

- EU funding can contribute to achieving local air quality and climate objectives even without a supportive national environment. Furthermore, European initiatives like the Green Capitals or the Mobility Week can help to create strong local visibility of green policy objectives, which raises public awareness of, and support for, the issues at stake.

On city level action perspectives

- Ambitious air quality and carbon policy action on a city level is possible. Many examples of successful policies have been found in the cities that were examined. These concerned target setting as well as execution of individual air quality, carbon, transport and energy policies. Public support for such action on a city level needs to be carefully managed. Different ways of policy framing can be applied depending on different political orientations, choosing for instance between a more active and independent role of citizens or for more directive awareness-raising policies, and between prioritising individual segments of the city population or the population as a whole.

On citizen engagement

- Citizen perception of AQ problems is still often limited and does not reflect the real health impact of AQ problems. Citizens are also torn between their needs and available options for heating and transport and the impacts of these activities. Open communication with citizens and listening to their views is therefore required to gain public support. Thereby it should be taken into account that giving in to citizen action and short-term concerns sometimes does not result in more ambitious policies. NGOs have an important role in mobilising citizens' views, therefore support for and communication with such NGOs should be an integral part of city policy making next to interaction with individual citizens.