iSCAPE

D4.6

‘Report on local stakeholders engagement’

July 2019

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Main Authors	Dr. Saravjit Rihal (FCC), Katinka Schaaf (FCC)	
Partner in Charge	Future Cities Catapult (FCC)	
Contributing Partners	University of Bologna (UNIBO) Technical University of Dortmund (TUDO) University College Dublin (UCD) University of Surrey (UoS) Hasselt University (UH) Finnish Meteorological Institute (FMI)	
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Short Description	This report outlines engagement that has taken place in the six iSCAPE Living Labs (LL) and their local municipality, and in some cases, the local regional authority and other closely related stakeholders. The report provides the insights gained by the LLs from the municipalities with respect to policy change that could be driven by the technical work done by the LLs including simulation and modelling. This report has been produced as part of WP4 and forms the deliverable D4.6.		
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0.1	July, 2019	Lee Markham (FCC), Katinka Schaaf (FCC)	First draft
0.2	July, 2019	Antonella Passani (T6), Ines Vaittinen (ENoLL)	Consolidated version for the internal review
0.3	July, 2019	Katinka Schaaf (FCC)	Final version for acceptance and submission

Abbreviations

ARPAE: Agenzia Regionale Per La Prevenzione, L'ambientee L'energia Dell'emilia- Romagna (Regional Agency for Prevention, Environment and Energy of Emilia-Romagna)

CS: Citizen Science

ENoLL: European Network of Living Labs

EU: European Union

FCC: Future Cities Catapult (since 1st April 2019 Connected Places Catapult)

FMI: Finnish Meteorological Institute

GA: Grant Agreement

GBC: Guildford Borough Council

iSCAPE: Improving the Smart Control of Air Pollution in European cities

IAAC: Institute for Advanced Architecture of Catalonia

LBW: Low Boundary Wall

LL: Living Lab

PM: Particulate Matter (e.g. PM2.5)

SCK: Smart Citizen Kit

TCD: Trinity College Dublin

T: Task

TUDO: Technical University Dortmund

UCD: University College Dublin

UH: University of Hasselt

UNIBO: University of Bologna

UoS: University of Surrey

VLL: Virtual Living Lab

WP: Work Package

Definitions

Spatial Scale[1]:

In the physical sciences, spatial scale or simply scale refers to the order of magnitude of extent or size of a land area or geographical distance studied or described.

For instance, in physics an object or phenomenon can be called microscopic if too small to be visible. In climatology, a micro-climate is a climate which might occur in a mountain, valley or near a lake shore. In statistics, a mega-trend is a political, social, economical, environmental or technological trend which involves the whole planet or is supposed to last a very large amount of time. The concept is also used in geography, astronomy, and meteorology.

Simulation granularity[2]:

The granularity of data refers to the size in which data fields are sub-divided.

Finer granularity has overheads for data input and storage. This manifests itself in a higher number of objects and methods in the object-oriented programming paradigm or more subroutine calls for procedural programming and parallel computing environments. It does however offer benefits in flexibility of data processing in treating each data field in isolation if required. A performance problem caused by excessive granularity may not reveal itself until scalability becomes an issue.

An easy example to explain granularity: A kilometer broken into centimeters has finer granularity than a kilometer broken into meters.

Simulations in the context of iSCAPE

The following work packages (WP) where relevant: WP4 ‘Location based framework and deployment of behavioural solutions’ and WP6 ‘Simulating effects in terms of air pollution and climate change’ (Grant Agreement).
Both WPs results informed the conversations and collaborations between LLs, experts and municipality stakeholders. Present and future climate/traffic/air-quality simulations showed how potential policy changes could have an effect on different iSCAPE cities and its citizens.

1: https://en.wikipedia.org/wiki/Spatial_scale
2: https://en.wikipedia.org/wiki/Granularity

Figures

Executive Summary

This report outlines the activities the six iSCAPE LLs have conducted with local municipality stakeholders between April and June 2019, and the learnings from them. The LLs were required to run a meeting to examine local policy change addressed by all of the iSCAPE LLs, as well as the impacts of simulations undertaken with just three of the LLs.

Those three simulation-running LLs; Bologna, Hasselt and Vantaa, built and ran simulations of either mobility or climate change scenarios for their respective cities, and the meetings were used to discuss how these simulations were received by the municipality, identify what changes need to be made, and to learn lessons for how to work with simulations for the municipality in the future.

Some of the main simulation lessons concern how the simulations should be set up (e.g. problem areas, data etc.), how they should be run (e.g. the setting of realistic targets, how to allow comparison to the current base case), and how they should be handed over (e.g. how simulation results are explained to a non-technical audience).

All LLs used the meeting/workshop to learn how policy change works from the perspective of the municipality and to identify what the barriers and concerns are. The meeting allowed LLs to identify what they can do with their research findings to facilitate that process, and to explore ways to optimise the likelihood of that research driving real change.

Whilst the municipality is seen, by themselves and the LLs as the only organisation that can bring (policy) change, there are key areas in which the LLs can improve. Some of the improvements involve creating action plans - not currently done formally - whilst others involve enhancing current actions e.g. efforts to build relationships, refining how results are shared etc..

Besides engaging with municipality stakeholders and air quality experts, throughout the iSCAPE project the LLs engaged with citizens and local communities through citizen science activities (see D4.7 ‘Developing Citizen Science Communities Report, this report will be soon available on the iSCAPE website) and co-creation events / workshops (see D2.5 Community Feedback Reports). Those activities strengthen the LL / municipality relationships and informed their understanding of local policies.

Table of Contents

1. Introduction

Work package and task reference

WP4 - Location-based framework and deployment of behavioural solutions

The report shares detailed findings from the engagement activities between the LLs and their municipality stakeholders with respect to specific iSCAPE technical solutions that could influence and support evidence based policy change (adapted from the GA).

Task 4.4 (T4.4)

Engaging local stakeholders through workshops and developing local citizen science communities.

1.1. Aims and objectives

This report (D4.6), details the work for WP4/T4.4 (behavioural solutions and policy change) that specifically focuses on the technical solutions that have potential to influence choices that reduce air pollution. Below is a description of aims for T4.4 that are appropriate for D4.6.

1.1.1. Aims (T4.4)

- Engage with city stakeholders specifically so that recommendations can be made for influencing policy change.
- Engage local citizens, businesses, authorities and researchers in exploring policy options and measures (technical solutions) analysed in previous tasks and in other deliverables (D4.4, D4.5 and D6.4).

1.2. The aims of T4.4/D4.6 were achieved through the following:

Focusing on municipality stakeholders

As part of the wider stakeholder engagement for T4.4, D4.6 (this report) primarily focussed on meeting with municipality and in some cases, regional, stakeholders.

Conducting simulations

Three of the six LLs undertook simulations (see definition on page 5) and modelling concerning either air quality or mobility issues as part of the iSCAPE project (see Deliverables D4.4, D4.5 and D6.4).

Feedback on the simulations from municipality stakeholders

The simulation results were presented to municipality stakeholders during a meeting in which the presented simulations, as well as simulations as a tool could be openly discussed and critiqued. An outcome of these meetings was the identification of scenarios and use cases for the LLs to undertake further simulations in the near future.

Learning about the process of policy change within the municipality

During the meeting, municipality stakeholders were asked to provide an overview of the policy change process within the municipality and to highlight how technical solutions from the LLs could be used. Among other things the municipalities were also asked to identify priorities, types of evidence sought, modes of effective dissemination etc.

Reflection by LLs on next steps

Having received feedback on the simulations (some LLs) and an overview of the local municipality's policy change process (all LLs), the LLs were then able to update their strategy for interacting with their municipality (e.g. problem areas, types of simulations, types of deliverables etc.).

2. Methodology

This chapter gives an overview of the framework by which the LLs conducted the workshops/meetings with their local municipality stakeholders.

2.1. Cities with simulations and cities without simulations

Within iSCAPE the six LLs can be divided into those that undertook local simulations (Bologna, Hasselt and Vantaa) and those that did not (Bottrop, Dublin and Guildford).

The framework provided by the managing partner, FCC, was used by all six LLs with the only distinction being the presence or absence of simulations. If a LL undertook and ran local simulations additional instructions were provided and feedback specific to the simulations was sought.

2.2. Framework

The LLs were presented with the following framework to help them extract the priorities from the municipalities as well as their positions on simulation and policy change. The framework provided guidance on who should attend, the structure of the meeting itself, as well as pre- and post-meeting activities.

2.2.1. Whom to invite?

- LLs were advised to invite local municipality stakeholders as their primary audience.
- A mixture of decision makers, technical experts and urban planners were sought as well as any other relevant municipality contacts.
- There was no limit on the number of municipal attendees or on which department they represent. The LL decided what was most suitable to their situation and existing relationship with the city.

2.2.2. Before the meeting(s)

- FCC provided a high-level meeting plan with specific questions for all LLs to explore with their stakeholders (see appendix).
- LLs were free to amend the plan as per their relationship with the municipality. Any significant changes were to be approved by the managing partner in advance of the meeting.
- FCC provided each LL with a common ‘Findings Template’ on which to record the

findings from the meeting and for submission post-meeting.

2.2.3. Meeting(s)

- The LLs were engaged to hold face-to-face meetings with the stakeholders.
- No restrictions were placed as to the venue for the meeting.
- A minimum duration of between 60-90min was suggested by FCC, though the LLs were encouraged to adapt to any local constraints.
- The LLs were encouraged to take written notes on whiteboards, flip charts etc., and if possible, take photos with the attendees.

2.2.4. Cities with simulations

If the LL had undertaken any intervention simulations in the municipality (Bologna, Hasselt and Vantaa), then the meeting's goals were to:

- Walk attendees through one or more of these simulations.
    - To understand any municipality concerns around these specific simulations as well as simulations in general.
- Identify what impact could the simulations have.
    - For the municipality (financial, well-being, municipality processes etc.).
    - For citizens (for more information see D5.1 A database and report for the baseline environmental and socio-economic assessment, this report will be soon available on the iSCAPE website).
- Discuss how the simulations could support policy change .
- Determine if and how simulations are currently used by the municipality .
- Understand the process of policy change for that municipality (including barriers, concerns, time frames etc.).
- Understand which iSCAPE–related simulations the municipality wants to run in the

future and to understand why.

- Understand the impacts the municipality is hoping to make.

2.2.5. Cities without simulations

If the LL did not run any intervention simulations in the municipality (Bottrop, Dublin and Guildford), then the meeting's goals were to:

- Understand what is relevant for the municipality and why.
    - Determine the priority of these questions/problems.
    - Understand the impacts the municipality is hoping to make.
- Understand the process for policy change in that municipality (including barriers, concerns, time frames etc.).

2.2.6. Post-meeting

The LLs were required to submit their completed findings template to FCC, along with any photos and/or annotations from the meeting.

3. Cities with simulations

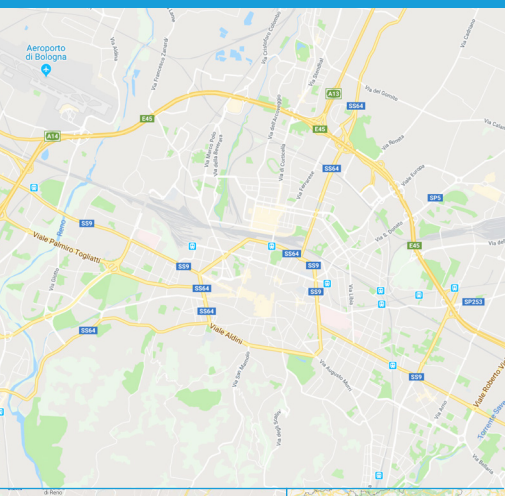
This section concerns the three LLs in Bologna, Hasselt and Vantaa that presented simulations to their municipalities during a meeting. Here we try to provide some context and details concerning the relationship between the LL and the municipality.
The municipality priorities with respect to iSCAPE related challenges and details of the LL simulations as well as learnings about simulation-related matters relevant to the municipality.

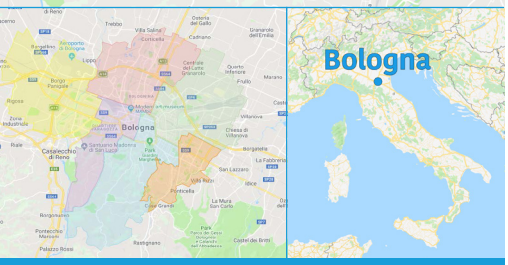
FCC provided guidelines for the meeting with the local authority, for more detailed information see 2.2 Framework on page 11 and see appendix for the high-level meeting plan.

The main goal was to show the result of the simulations, making it understandable and testing the efficacy as a policy making tool / method to justify policy change.

The details on the following pages are edited versions of submissions made by the LLs themselves.

Bologna





Introduction

Bologna, known as the 'University Town', is the capital of the Emilia-Romagna region, the seventh largest populated city in Italy and is located at the foot of the Apennines. Bologna is divided into six administrative boroughs (see map above) and has an international airport makes it a major transportation hub.

Size: 140,9km^2

Population: 388,567

3.1. Bologna

Mobility Context

The City of Bologna is an important hub for road and rail transport in the northern region of Italy. The city has the seventh busiest airport in Italy (8 million passengers in 2017), and its central train station serves 58 million train passengers annually. Bologna has a public transport network of buses and trains with a cross-road system which connects Italy, north to south and east to west. Besides public transport Bologna is accessible via the A1 from Milan, the A22, E35 from Verona and the A13 from Venice.
The most common mode of transport is via car (35%) followed by public transport (26%). In order to reduce the use of cars the city has introduced limited vehicle traffic zones in the city centre.

Simulation overview

In the meeting with the regional authority and ARPAE (Emilia Romagna Environmental Protection Agency), the LL shared the following two simulations related to the effect of traffic management policies on air quality: (D4.5)

- **Electric city centre**: light and heavy vehicles are banned from the internal ring road, and only electric vehicles are allowed in this area
- **Electric buses:** conversion of the bus fleet in Bologna to electric with increased bus frequency in the centre, and with all non-electric vehicles banned from the internal ring road

The effect of both policies was analysed in a current and future (climate change) scenarios, evaluated using downscaled climate projections for Bologna. Both considered climate change resulting from a business as usual scenario (i.e., where anthropogenic emissions (see definition on page 5) of greenhouse gases are not going to be cut).

3.1.1. Working with the municipality

Relationships

Relations with the municipality are good as evidenced by the numerous meetings with the LL and by both attending common city level events. The relationship is further cemented by interaction by both parties with the regional environmental protection agency (ARPAE, also an iSCAPE partner).

Dealings with the municipality were especially active during the Citizen Science workshops (see D4.7 - 'Citizen Science Communities Report' for more details). With some municipality stakeholders actually using the iSCAPE sensors during the workshops.

Activities

After the citizen science workshops, the LL was invited by the municipality to present the results of their engagement activities.

As well as the Citizen Science (CS) workshops, the LL together with ARPAE is working with the Metropolitan City of Bologna on a LIFE project called the "Veg-Gap" project (http://www.lifeveggap.eu/), which mainly aims to develop a strategy for providing new, reliable information in support of designing urban Air Quality Plans (AQPs) with a focus on urban ecosystems/vegetation characteristics. At the launch, the LL and ARPAE presented the main results obtained in the iSCAPE project, before exploring possible synergies and cooperation with the new project.

Note that the meeting arranged for this deliverable was attended by representatives of ARPAE and the regional authority, with both organisations well acquainted with the municipality goals and constraints. The municipality was unable to attend.

Meeting attendees

- 3 attendees from the regional authority (including specialists in physics and environmental education)
- 4 attendees from ARPAE (including specialists in environmental sciences, chemistry, and business administration)

3.1.2. Municipality priorities

What iSCAPE questions is the municipality most concerned about?

The municipality was most concerned by climate change and in particular the physical and chemical issues concerning pollutant concentrations and distribution. For example:

- How do physical and chemical processes change as the climate changes (e.g. increase of mixing length, photochemistry, reduction of wet deposition)?
- How much NO_x (and PM) is from primary and secondary sources? As primary sources are something that the municipality feel they could tackle, where as secondary sources would require working with other municipalities and regions
- How can the existing monitoring systems be better supported?

Apart from these concerns, the other major concern was domestic (residential) heating and how it would be affected by policy or climate change.

3.1.3. General simulation questions

What questions does the municipality have regarding simulations?

Before even viewing the prepared simulations, the LL was asked the following questions, focussed on the nature of the pollutants and input conditions of the simulations, those questions sparked a discussions and will shape potential future collaboration.

- Have the NO_2 concentrations been considered only as secondary pollutants or as primary as well? What are the ratios between primary and secondary fractions on NO_2? Is it possible to evaluate this ratio? If so, how?
- Is domestic heating accounted for in the simulations? If so, how? How does it change according to the various scenarios (policies or future)?
- How is background pollutant concentration defined?
- How does the effect of climate change among physical and chemical aspects relate to pollutant concentrations and distributions and how do those aspects influence the reliability of the simulation results?
  For example:
  - Some of the physical and chemical processes can change due to climate change (e.g. increase of mixing length, photochemistry etc.)–are these considerations evaluated by the model? How accurately?
  - Can the simulation model (including chemical aspects) be coupled with a purely chemical model to better highlight things like photochemistry ?
  - With respect to NO_x (what are the percentages of NO_2 and NO in it? How much is from primary and secondary sources?). Similarly for PM.

- On analysis, can the policies if implemented achieve the legal limits imposed for pollutants?

As these were the priorities of the municipality, just knowing the answers to the above questions helped set expectations for the completeness of the simulation. There were even suggestions about collaborating with the LL on new simulations.

Fig. 1: Municipality meeting in Bologna

What concerns does the municipality have regarding simulations?

Main concerns related to the spatial scale and the resolution of the simulation. Spatial scale being the area covered (e.g. the city of Bologna) and resolution being the simulation granularity (e.g. for traffic simulation - roads being split into smaller units or kept as single units). These are essential 'ingredients' of attracting policy-maker attention.

Other key concerns include the following:

- Any parameters should be evaluated by simulations of the current situation with the current policy, and with any future policy e.g. temperature and humidity distributions
- Any future simulations must take current and on-going plans and policies into account e.g. on-going air quality plans and regional policies
- Future scenarios (like RCP8.5 of IPCC) need to be handled with caution, because the effects of climate change on local air quality can be unpredictable.

The key to attracting policy-maker interest is to offer results that are grounded in reality, which is to say that the simulations should be compared to current policy, at both the urban scale and at neighbourhood granularity, and are realistically achievable over shorter time-frames (1-3 years). So it is key that the LL does not simulate unrealistic scenarios – scientific exercises – without immediate practical application for the municipality. It must also be realised that not everything can be considered in a simulation as users and citizens are complex and act individually and simulations are behaviours based on specific data.

How does the municipality use simulations at the moment (if at all)?

Simulations are currently being run for the municipality e.g. to see how long they can close traffic channels and how this affects air quality, and for forecasting pollutants during the summer and winter. Simulations are being conducted by all of the stakeholders, not just the municipality, but they all follow the direction provided by the municipality.

What requirements does the simulation need to satisfy to be worthy of consideration by the municipality?

- Make simulations to be more affordable for policy makers
- Verify as best as possible the NO and NO_2 components of the NO_x share and the percentage of primary versus secondary pollutants
- Introduce new scenarios (mostly in terms of new policies) that better fit the current legislations or that can give more realistic perspectives over shorter periods

3.1.4. LL Simulations

Policy simulation 1: Car Traffic Restrictions - City centre closed to non-electric vehicles

The main traffic area in Bologna is the city centre (inside the inner ring road) which is also the main commercial area. The simulation presented to the city stakeholders – both in the current and in a future climate change scenario – aimed to showcase the improvement in air quality that would be obtained if the city centre were closed to non-electric vehicles. In the simulation, light and heavy vehicles are banned from the internal ring road, and only electric vehicles, cyclists and active mode travellers are allowed in this area.

Results and findings of the policy intervention

- The implementation of this policy in the current scenario leads to a reduction of 32%-60% in NO_2 at Porta San Felice urban traffic air quality station during winter and summer months. A 8-9% reductions of PM10 was also achieved through this traffic policy simulation
- The implementation of this policy in the future scenario also leads to NO_2 reductions at the same air quality station in the range 40-60% (winter and summer respectively), while PM10 reductions remain roughly the same as in the current scenario, in the order of 9-11%.

What are the municipalities thoughts or follow-up questions about the simulation?

The city stakeholders asked: "How are the background concentrations considered?"

The main concern relates to the insertion of background concentration directly from measured data outside the city centre at the edge of the simulated domain; in fact, this choice implies the background concentration to be composed of both primary and secondary pollutants. A suggestion is to use a different value for background pollutant concentration to avoid the introduction of secondary pollutants in the initial condition of the simulations and compute the local concentrations due exclusively to local emission sources (traffic or domestic heating).

The city stakeholders asked: "Is there a seasonal trend in the concentration data? If yes, do they follow the measurement trends?"

To enhance the readability of results, details of pollutants distributions should be shown for the whole city, and then separately for each 'important area' within the city. Some areas outside the historical centre were poorly represented and this could cause errors in the simulations since there is an underestimation of emission sources. Poorly represented areas of particular concern were major external roads

and highways.

Since the policy applies mainly to the historical centre, why are external major roads also affected by big changes? Since only electric vehicles are allowed in the historical centre by the policy, the changes in the external areas must be considered accurately: for example, not all the city centre cars will be substituted by electrical vehicles, but some of them will be moved to the external areas increasing local emissions.
The Bologna LL was able to address all of the questions asked and refined the model by making adjustments to the ground/input/ add other roads etc.

Based on the way the LL conducted the simulations, the traffic simulations were not very useful, nor a priority. This is because it is not realistic to assume that everyone in Bologna will be driving an electric vehicle in the near future. However, this policy could affect the long-term strategy to put more fees/charges on the road. There are already 50% electric buses in Bologna, so a more realistic measure of change to electric vehicles was needed.

As previously outlined, the climate change scenario implemented assumed a business as usual emissions scenario, with no relevant change in anthropogenic greenhouse gases and pollutant emissions. Under such a scenario, climate change projections indicate that in 2050 in Bologna it will be much warmer and have less rain, especially in summer. The city stakeholders were not totally convinced that the simulations were able to catch these changes in meteorology and how they will impact on air quality (for instance, changing the chemical reaction rates). As a result the stakeholders were more interested in seeing how traffic management policies impact over the short term rather than the long-term, as they were not confident that the reduction would be that relevant in the future. In general, however, the time horizon of the city stakeholders was much shorter and restricted to a nearer future e.g. next 10 years (2030).

Comments or issues found during the meeting

Most of the questions and suggestions on this topic related to the choice of background pollutant concentration adopted, as well as the poor representation of the suburban areas where major roads and highways are not well represented:

What impact could the simulation have for the municipality (e.g. financial, municipality processes etc.)

The simulation provided a positive outcome for the City of Bologna in the following areas:

- Improvement in air quality, especially in the city centre
- The city centre would be healthier and more pleasant for cyclists and pedestrians
- Municipality and government (or at least regional authorities) should invest in

electric vehicles (benefits for citizens to buy and more places to charge electric vehicles).

What positive impact could the simulation have for citizens (e.g. well-being, mobility etc.)

- Less traffic congestion in the city centre.
- Less polluted city centre, with direct health improvements for the citizens.
- More pleasant to be in the city centre for shopping, tourism, or similar activities.

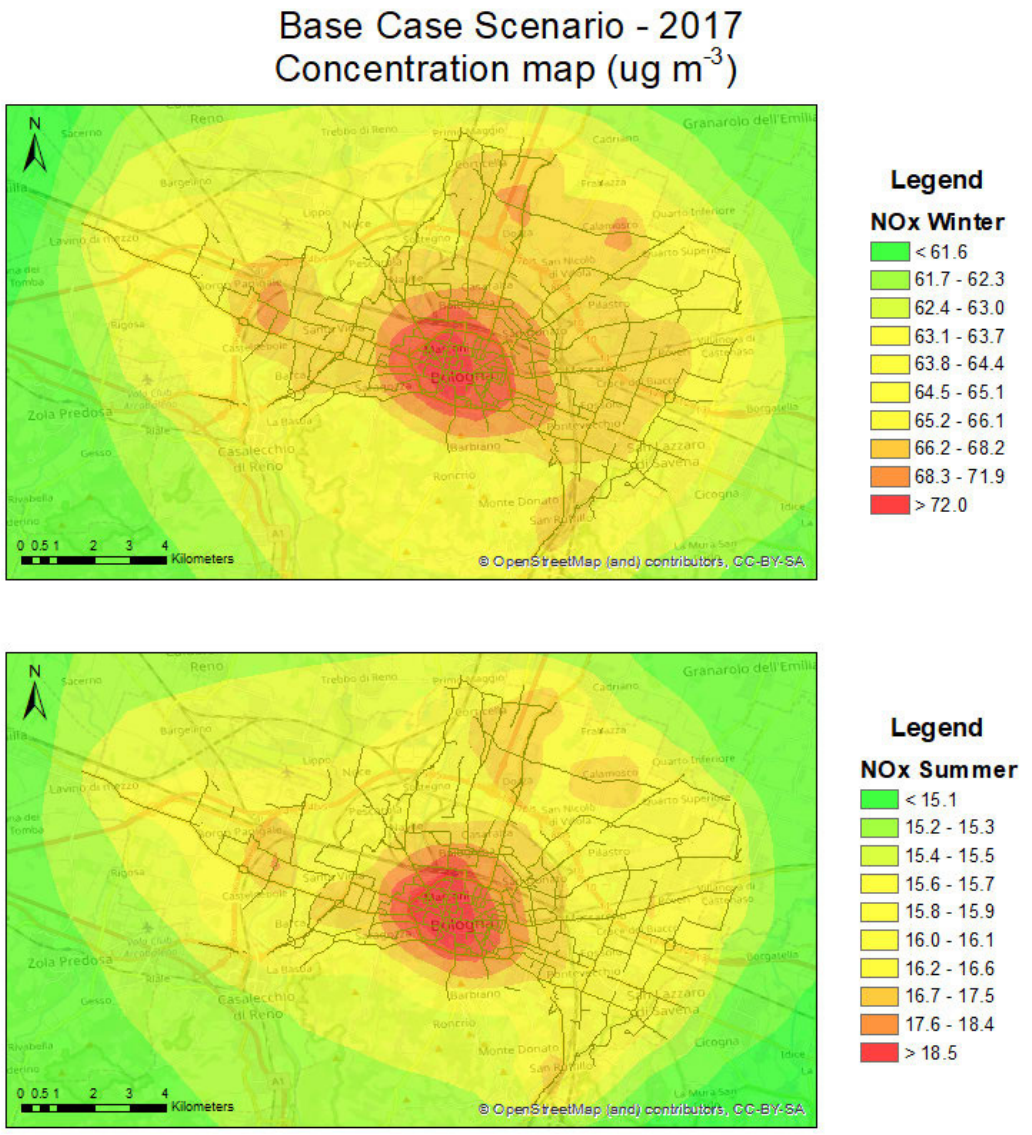


Fig. 2: Concentration maps for NO_x (top: winter, bottom: summer) in the 2017BC scenario for Bologna. The maps represent concentration values averaged over the period considered.

- Also practising sport (for instance, running) in the city centre would be more pleasant and much healthier.

Policy simulation 2: 'Electrification of urban bus fleet plus city centre closed to non-electric vehicles

For the second policy simulations the LL created a scenario were the Bologna urban bus fleet was converted to electric, and the overall bus frequency was increased. Furthermore, all non-electric vehicles were banned from the internal ring road. As for the first policy, both current and future (climate change) scenarios were considered.

Results and findings of the policy intervention

While the implementation of this policy greatly reduced the NO_2 concentrations (31-60% in the current and 40-60% in the future scenario respectively) at the Porta San Felice urban air quality station, it slightly increased the PM10 concentrations (3-5% in both actual and future scenarios)

Even though the number of buses in the city centre was increased, it might have been better to incorporate the outskirts of Bologna as well to document a larger impact for a more realistic scenario

Similar to policy simulation 1, NO_2 concentrations decreased. However, unlike policy simulation 1 there was no decrease for PM10. This can be attributed to the non-exhaust emission due to the increased frequency of electric buses.

What are the municipality's thoughts or follow-up questions about the simulation(s)?

With respect to policy simulation 2, additional questions concerned the following:

- Quantifying the increase in the frequency and the number of buses
- Quantifying the reduction in the number of cars that can be expected by increasing the number of buses.

These questions can be addressed by conducting further simulations and analysing the results.

What impact could the simulation have for the municipality (e.g. financial, municipality processes etc.)?

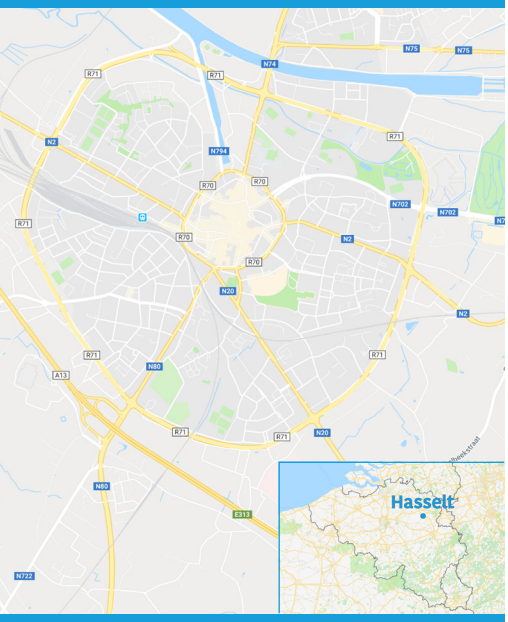
Through an investigation into the number of buses and the estimation of citizens switching from private transportation to public modes of transport, it is possible to determine the size of the bus fleet required to maximise the overall reduction of pollutant concentrations.

With the simulation showing the negative impacts of this policy on PM10, the municipality was advised to consider other investments other than electrifying the bus fleet and increasing bus frequencies. The simulation provided evidence for saving money and informing the involved parties from a “bad” investment. Additionally, it could help the municipality to rethink their urban planning and traffic management policies.

What impact could the simulation have for citizens (e.g. well-being, mobility etc.)

It could impact the behaviour of citizens in increasing the use of buses and public transportation, which in the long (and even short-term) demonstrates an improvement of city-centre air quality and potentially minimises congestion during peak hours.

Hasselt



Introduction

Hasselt is part of the a grouped collection of 17 municipalities in the Limburg province of Belgium. Amongst the municipality's top priorities are a number of mobility (especially car related) issues. The city of Hasselt has problems with congestion in the city centre and the lack of public and active mode of travel. For this reason, the iSCAPE Hasselt LL focused on this challenge during the simulations.

Size: 102km^2
Population: 77,000

3.2. Hasselt

Mobility Context:

The Hasselt LL developed their two policy simulations due to the following mobility conditions:

- Hasselt is at the junction of two major motorways: the European route E313 and 314. The inner ring road keeps traffic out of the commercial centre of Hasselt city, which is almost entirely pedestrianised
- Hasselt and the Limburg province has approximately 50 bus routes, including 22 routes dedicated to serving areas just within Hasselt. Most of the bus routes have been redesigned, however operators have reduced the size of the bus fleet. More than 80% of households own a car and public transport is mainly used by low-income individuals, students and senior citizens.

Simulation overview

In the meeting with the Hasselt city, the LL shared the following two simulations:

- Car restriction at the inner ring and some nearby roads
- Increase in public transport at specific routes in the city

The tools used for the simulation work were FEATHERS and MATISM:

FEATHERS
It is an activity-based travel demand model. Based on the data availability, models within FEATHERS can be estimated/calibrated for any region. FEATHERS can be used to test a variety of transport policies and demand management scenarios.

MATSIM
It is an open-source framework for implementing large-scale agent-based transport simulations. MATSIM (as a supply-side model) is usually coupled with the demand-side model (such as FEATHERS) to provide detailed results on the transport network.

3.2.1. Working with the municipality

Relationship

The LL enjoys a good relationship with the Hasselt municipality. The municipality has supported the LL journey at every stage e.g. during participant recruitment campaigns, dissemination events etc. The strongest relationship is with the Mobility Department as there has been close collaboration between the two through activities such as guest lectures and involvement in local mobility oriented projects etc.

Activities

The Citizen Science activity undertaken by the LL (See D4.7 for more detail) is an example of the proactive involvement of city of Hasselt in LL activities. The City of Hasselt representative played an active role in communicating the message to Hasselt citizens, and as a result the LL received an overwhelming number of registrations for the event.

Similarly, city of Hasselt took part in the Summer School arranged there by the LL in September 2018.

Meeting attendee

Representative from the Mobility Department, city of Hasselt.

3.2.2. Municipality priorities

What iSCAPE questions or areas the municipality is most concerned about?

City of Hasselt is most concerned about issues that indirectly address air quality problems. These are as follows in priority order:

- Implementing car free zones within the city
- Introducing more “green and blue” areas
- Using hedges and trees to separate bicycle lanes from roadways (thereby enhancing bicycle safety and improving air quality)
- Limiting street parking in the city (within outer ring road of Hasselt and also near schools)
- Introducing e-mobility such as e-buses and e-taxis in the city and connecting city suburbs with the city centre with e-buses
- Creation of new parking spaces near the outer ring road

Which of these questions could be turned into simulations?

Most of these mobility and air quality problems/questions can be addressed via a range of simulation tools (e.g. mobility simulation platforms, air quality simulation, driving simulators etc.).

What could the impact of addressing these questions be?

All of these simulations would result in improving the air quality in the city, supporting safer, accessible and greener ways of transport such as cycling and walking pathways.

3.2.3. General simulation questions

What questions does the municipality have regarding simulations?

- What data is being used for developing the simulation models?
- Potential for error in the simulation model?
- Why a specific simulation model is being used?
- Applicability and uses of model/tool for simulation in other regions for policy testing?

The municipality is seeking reassurance in terms of the validity of the data and the model, the degree of certainty of the results (low error), and knowing that others (preferably Belgian cities/regions, or large Dutch cities like Rotterdam) could use findings from the model.

What concerns does the municipality have regarding simulations?

Apart from concerns about the various assumptions being made in the simulation model and the limitations of the model itself (all of which should be made clear upfront), the other big concern for city of Hasselt was that of accessibility, both in terms of the complexity of the model and the complexity of the simulation tool itself.

The local mobility experts currently use a 4-step approach (based on trips, with each trip considered independent) for modelling whereas the LL uses an activity-based model (where activities are connected in chains and therefore not necessarily independent). The results for the latter were much more accurate and extensive. However, any use of a new simulation tool would have to be justified and the local experts would have to be trained to use it. This is both a concern and a barrier, but not necessarily a blocker.

What obligations does the municipality have regarding simulations?

The city of Hasselt has no obligation to a particular simulation platform, however there is an obligation with data. Data used for model training and validation should be authenticated by a Flemish agency. For large-scale mobility simulations data should be from a Flemish state agency whereas for local scale simulations data from city of Hasselt can be used, though not all data is available at the moment.

How does the municipality use simulations at the moment (if at all)?

For air quality monitoring within the city there are no simulation tools being used. The municipality relies on a Flanders-based model produced by the Flemish Institute for Technological Research, VITO.

However, The City of Hasselt are using a simulation tool for local traffic problems within the city, in which they produce microscopic simulations that operate at the intersection or roundabout level. There are currently no simulation tools being used for macro-scale mobility simulations. Primary reasons for this are that Hasselt is a small city with a highly transient population in terms of mobility which would lead to inaccurate results. Plus, such modelling would require additional expertise.

What requirements does the simulation need to satisfy to be worthy of consideration by the municipality?

The city of Hasselt does not have any specific requirements other than authenticity and validity of the data (i.e. must be from Flemish agencies). That said, they are open to proposals based on simulation results that offer high impact and that align with their objectives.

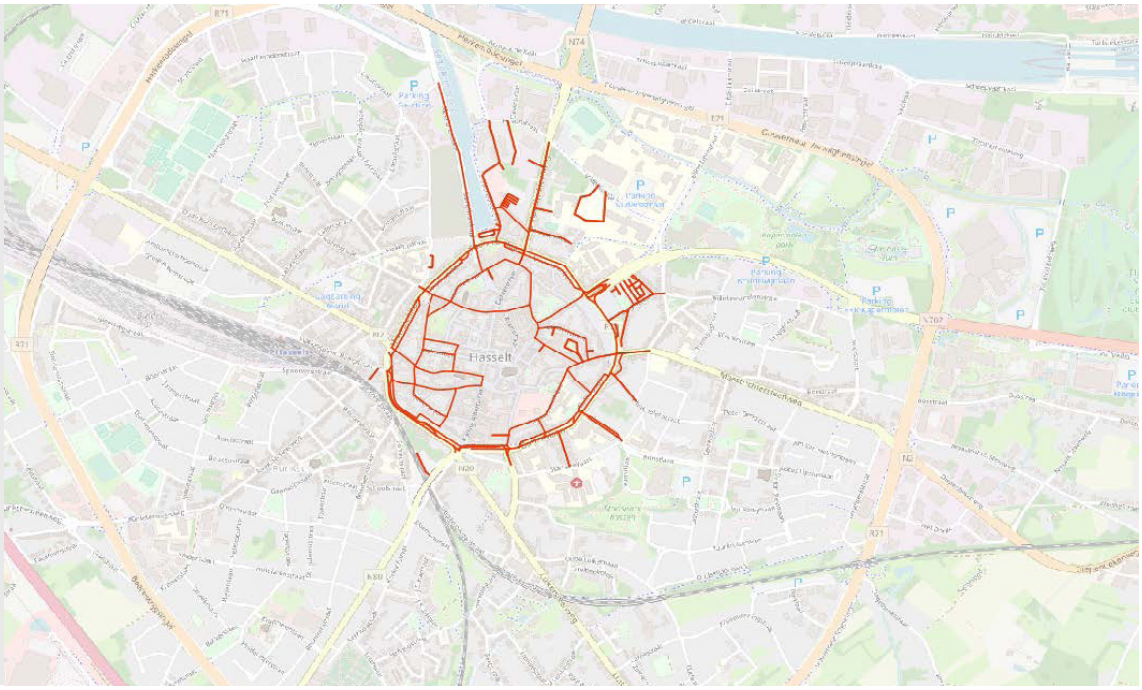


Fig. 3: shows Hasselt inner city

3.2.4. LL Simulations

Policy simulation 1: Car traffic restrictions

This simulation was well received during the meeting with the municipality. This type of policy intervention has been implemented and tested in many cities across the world, with the so-called congestion zones often restricting/limiting diesel /older cars accessing the city centre. The Hasselt LL tested an intervention where 319 links in the road restricted car access, whilst bus routes were kept intact. By introducing a very high penalty (in relation to a standard penalty fee) for car drivers in the MATISM simulation platform, it can be estimated that individuals have shifted their mode of transport. The platform also highlights polluted roads where traffic could become a problem.

Results and findings of the simulation

- Drivers are using longer routes to reach their destinations by bypassing the restricted links on the road network
- Due to the restricted car access zone, there are 22% fewer cars and increased use of public transport for trips directed towards city centre.

What are the municipality's thoughts or follow-up questions about the simulation?

City officials showed interest in the car traffic restrictions policy i.e. implementation of car restriction around the city centre. They requested the detailed document about the simulations and had some specific questions such as the freight traffic treatment model (i.e. how simulation model incorporates freight traffic (vehicles carrying goods) and from where the data was obtained), possible shifting of problems from one region to another region, testing of this policy in combination with other relevant policies such as car sharing, shuttle bus service, and new parking locations outside inner regions.

The city of Hasselt is interested in comparing the findings with other simulation results. The meeting highlighted that they wanted more technical information. Their enthusiasm in specific details will help the LL prepare future/follow-up meetings where they focus on more concrete details.

What impact could the simulation have for the municipality (e.g. financial, municipality processes etc.)?

The simulation provided a positive outcome for the city of Hasselt in the following areas:

- Decrease in congestion on the inner ring and approaching roads

- Inner city will be more cycling friendly with less impact on-street vehicular pollution
- City centre will be more accessible in less time.

What impact could the simulation have for citizens (e.g. well-being, mobility etc.)?

The municipality is already considering the implementation of a similar policy to the car traffic restrictions simulation, with several restrictions on car access already within the city centre, but not yet on the inner ring yet. Additionally, there is also

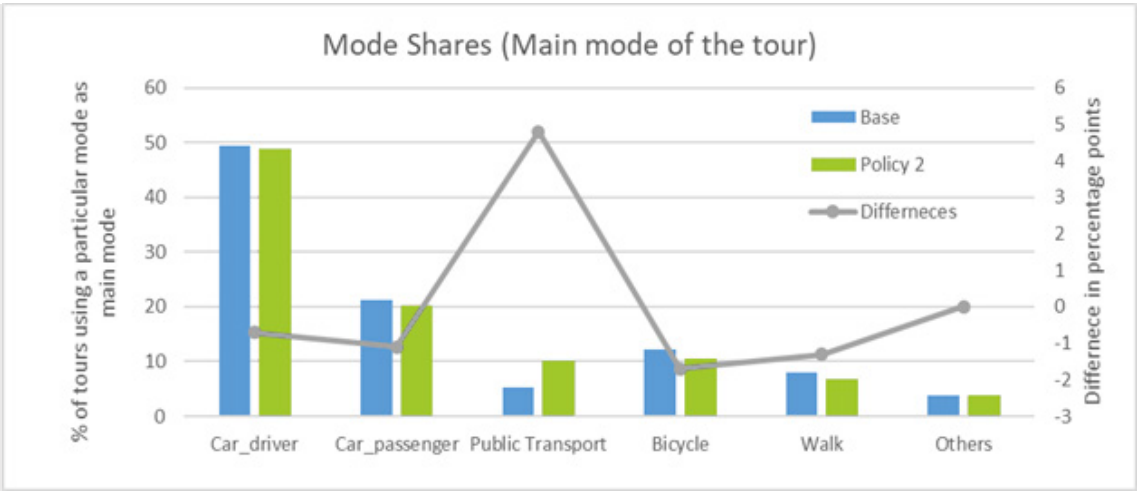


Fig. 4: Mode shares as main travel mode of the tour (along with differences with base case)

a political will to support such a policy, as going green was a popular driver with citizens in the recent election campaign. There is no major financial impact, however there are discussions happening regarding the utilisation of additional space for cyclists and green space possible one lane and green space created out of it.

Policy simulation 2: Enhancement of the bus services

Based on limited use of public transport in Hasselt, a scenario the LL implemented in the simulation platform increased the use frequency of buses and bus routes by 50% based on the estimated size, the bus fleet needed to be increased by 35%. This change required more bus drivers and staff. The simulation showed an increase in public transport use, but a decrease in cycling and walking.

Results and findings of the simulation

- The simulation resulted in increased use of Public Transport mode share by only 4.8% percentage points compared to the base case (i.e. the overall share of PT for this scenario is 10%)
- Car use has been reduced but it is not significant as the majority of the bicycle and on-foot travellers have shifted their mode to Public Transport rather than car users
- Car traffic is reduced only 1.8 percentage points from the base case. The major reason could be that even with low waiting times due to increased frequency, bus is still not an attractive travel alternative for individuals who are captive car users
- The inner ring road and radial roads in Hasselt are having similar car traffic in the peak hour as noted in the base case. This indicates that changes in the car traffic have occurred in the non-peak hours.

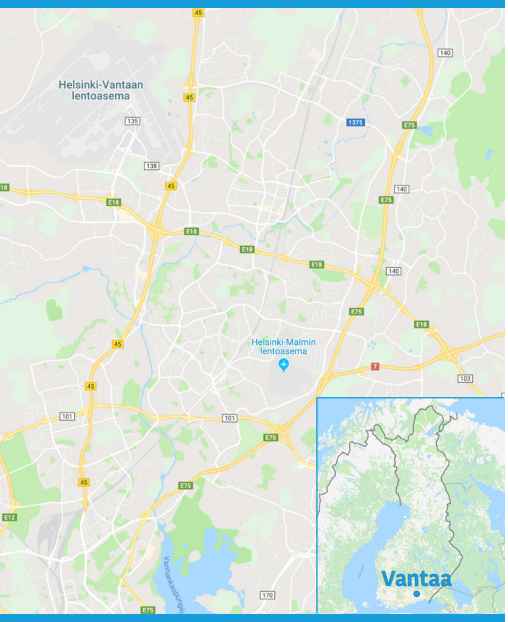
What are the municipality's thoughts or follow-up questions about the simulation?

The municipality is not particularly interested in the enhancement of the bus services, as it involves increasing the bus infrastructure. They mentioned that Hasselt city made efforts regarding this in the past, but did not obtain the desired results. The policy simulation showed that the changes are not as effective compared to a car-restriction scenario. Overall, the municipality appeared frustrated about public transport, and have lately stopped sharing results with the public.

What impact could the simulation have for the municipality (e.g. financial, municipality processes etc.)? What impact could the simulation have for citizens (e.g. well-being, mobility etc.)?

The municipality was not interested in this particular policy simulation and the conversation during the meeting was focused on implementation of car restriction around the city centre.

Vantaa



Introduction

The city of Vantaa is affected by increasing climate issues especially during the winter months. For this reason, the iSCAPE Vantaa LL focused on this challenge during the simulations.

Vantaa is part of the capital region together with Espoo and Kauniainen, which are located beside Helsinki.

Size: 238km^2
Population: 225,682

3.3. Vantaa

Mobility Context:

Vantaa Vantaa is a big transportation hub as it has the largest airport in Finland. The Helsinki city centre is only 30 minutes away, which results in many commuters entering and exiting the city on a daily basis. The most common mode of transport is cars with 68%, followed by active modes of transport by 25%, with the least common being public transport. Even though the city has an advanced network system of metro, buses and trams in the city of Helsinki. However, there is a need to make public transport more attractive in Vantaa and Helsinki.

Simulation overview

The Vantaa LL has been working similarly to Hasselt and Bologna on simulations, focusing on how traffic regulation and public transport might:

- Reduce the appeal of driving in a city by implementing low speed and car-free zones
- Increase parking facilities around the main shopping zone
- Establish an infrastructure that is suitable for cycling such as separate bike lanes

However, their increasing collaboration with the masterplanning team and expertise in **meteorology moved their focus towards climate change projections for Vantaa city**.

Simulation platform/software used:

SURFEX model for the present and future climate simulation.

3.3.1. Working with the municipality

Relationship

The relationship with the municipality of Vantaa is good and has strengthened during the project. The municipality recognises that FMI is an expert institute in climate and air quality related topics and observations. Before iSCAPE there was limited direct interaction between the municipality and FMI, though they have been working indirectly with each other for many years via the Helsinki Region Environmental Services (HSY), a joint organisation consisting of the Helsinki-region large cities (Helsinki, Espoo, Vantaa) all working on air quality monitoring, wastewater collection and treatment, and refuse.

The relationship between the LL and the municipality blossomed in Autumn 2018 when the LL demonstrated what they could do and how their work could prove useful to the Vantaa masterplan. There were previous engagements with the municipality but these proved to be less fruitful possibly because the 'right' stakeholders at the 'right' seniority level were not present.

Activities

During the meeting in Autumn 2018, the LL encouraged the municipality to suggest municipality challenges that could be addressed by simulation. Given that the municipality was developing their new masterplan for how the city was to be developed in the coming decades, it seemed right that the simulations should be able to inform that masterplan. The development of the masterplan did not need to be too detailed (i.e. too high resolution) yet examples of detailed neighbourhood-scale simulations can be used to understand how the city should be developed in large scale (e.g. effect of heat island, street canyons etc). This is where the LL started their simulations for the municipality.

Meeting attendees

City architect/planner and Head of Environmental Services, City of Vantaa

3.3.2. Municipality priorities

What iSCAPE questions is the municipality most concerned about?

The municipality is most interested in learning how the local climate and air quality can be affected by city planning (e.g. tall houses, trees and road positions) in specific regions and they believe high resolution simulations would help them with this.

Other areas of interest include understanding how noise and traffic issues from the Helsinki-Vantaa international airport can be tackled. This is a particularly "tricky" issue as the municipality has no influence over the airport, yet the noise and air quality issues affect housing and house prices.

What is the priority order of these questions for the municipality?

The priorities for the city of Vantaa are to understand the relationship between the following with respect to the future climate:

- Building height vs. precipitation/moisture effects
- Building height vs. wind impacts.

Which of these questions could be turned into simulations?

All of the municipality's questions can be simulated by the LL.

3.3.3. General simulation questions

What questions does the municipality have regarding simulations?

The biggest question from the municipality was "what can be simulated in the first place?". This comes from the municipality (or at least the municipality stakeholders) being in a position of not having simulation capability or expertise.

What concerns does the municipality have regarding simulations?

The chief concerns are the accuracy and reliability of the simulations. For example, in the case of climate projections, how accurately can variables like temperature, precipitation and wind be projected into the future?

The LL managed to educate the stakeholders on how to use simulations in general and what models/simulations the LL can provide. The LL provided practical examples and demonstrated when data needs to be collected (e.g. hourly, weekly, monthly etc., depending on the problem), and that there are more models/examples of some variables compared to others (e.g. more temperature related examples vs. fewer wind examples).

The LL currently helps the municipality create simulations specifically for the Vantaa region as opposed to relying on results from the wider Helsinki region. Vantaa is historically behind Helsinki in terms of research, partly due to budgetary constraints.

Fig. 5: Municipality meeting in Vantaa

How does the municipality use simulations at the moment (if at all)?

Not at all, except for following what is happening in other Finnish cities (especially Helsinki).

With respect to **noise levels**, the municipality often commissions (sub-contracts) a noise level model e.g. for planned areas close to highways. Noise is also something that activates citizens as it can be experienced in the moment and citizens are very interested in knowing what noise levels are allowed.

Air quality modelling is done for the whole capital region including Vantaa by HSY, and it is not a municipality obligation.

Flood simulations are provided by the Finnish Environmental Institute for the whole of Finland. Vantaa uses the flood risk zones shown in the flood simulations so that they can restrict the building of houses in the areas at risk of flooding.

What requirements does the simulation need to satisfy to be worthy of consideration by the municipality?

Simulations provided by expert institutions such as FMI would be considered ‘worthy’ if accompanied with an explanation of the simulations accuracy and usage.

3.3.4. Vantaa Simulations

Simulation details:

Unlike Bologna and Hasselt, Vantaa (and Finland in general) has a different seasonal profile where winters are very long, dark and cold. Climate simulations also showed different results in comparison to the other six iSCAPE cities: while the simulations in Hasselt and Bologna showed increased temperatures especially during the summer months, Vantaa showed the most pronounced changes during winter. Besides the warming trend, increased precipitation and decrease of solar radiation due to increased cloudiness are more present in the winter months than in summer.

During the city meeting, the LL shared the climate change projections for Vantaa with the masterplanning team. The LL presented the high-resolution simulation (500x500m) using the SURFEX model. These simulations can be used for understanding, for example, the present effect of the heat island in southern Finland and Vantaa as well as how this could look in the future and how big an impact green infrastructure could provide. Simulation results were provided for the Vantaa centre grid square. The Vantaa LL chose a realistic model e.g. 20% increase in green infrastructure, the LL described the model and how this could look.

> “Using actual and realistic numbers that relate to the city they are working on, helps to convince the city stakeholders to buy into the simulations such as the heat-island results.”

Results and findings:

What are the municipalities thoughts or follow-up questions about the simulation?

According to the LL the city of Vantaa and city stakeholders are very excited about the simulations:

> “It’s very interesting, this is what we were looking for the masterplan.”

They are intrigued to find out ‘how real’ the simulations are. Furthermore, the masterplanning team requested to use the slides about the simulations for future presentations. If the city stakeholders are motivated and want green infrastructure implemented then this can be realised and it’s more likely that they can make it

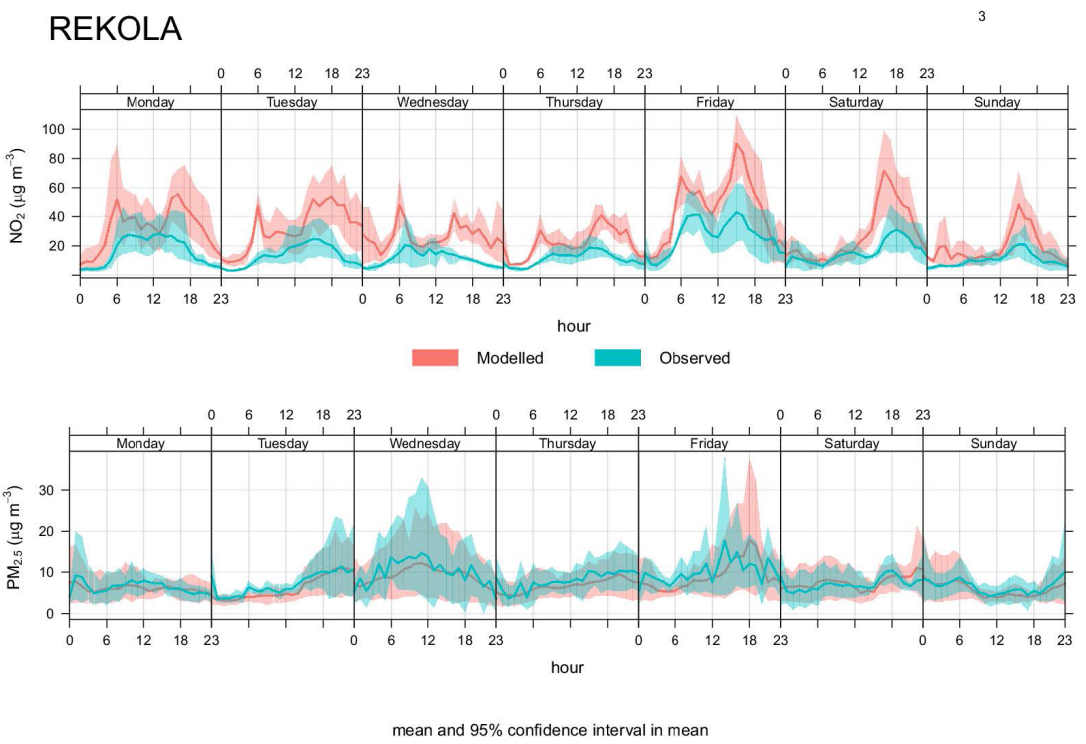


Fig. 6: Mean measured and simulated weekly diurnal patterns for NO_2, and $PM_{2.5}$ concentrations in the month of January 2017 in Vantaa at the three air quality stations.

happen.

What impact could the simulation have for the municipality (e.g. financial, municipality processes etc.)?

- The municipality would get a better understanding of the actual benefit and impact of green infrastructure for adapting to climate change, especially with regards to the heat island effect
- The Vantaa LL showed the masterplanning team how to use the simulations, but in the end, they will decide how big the impact from heat island will be. Currently, there is no imminent danger of extreme heat island effect in Vantaa, although also in Finland hot summers are visible in the mortality statistics. However, the city of Vantaa will continue to introduce green infrastructure especially because the citizens of Vantaa are in favour of it
- The city is merely looking for impacts that would help them see how they should plan/construct the area, especially in summer when it's hot. Currently, the city doesn't do modelling within their own department, and they subcontract air quality and noise level measurements either on their own or jointly with the Helsinki Region Environmental Services (HSY, a joint environmental consortium of the cities in the capital region of Finland).

What impact could the simulation have for citizens (e.g. well-being, mobility etc.)?

The LL believes citizens should live in healthy cities, which in the case of green infrastructure would reduce the heat island effects considerably. Based on feedback the LL received, the information on the impact on climate change was considered useful for the citizens, and it was agreed that the simulation results would be shown in a citizen seminar/occasion in autumn jointly with FMI (to be discussed).

The meeting also highlighted the potential for health-related modelling, as one Vantaa LL member worked on climate change and its health effects during her PhD studies (https://helda.helsinki.fi/handle/10138/252450), which will be a very useful resource for future work. The masterplanning team would be less interested in health and economic modelling as it is not their expertise nor field of work, but they indicated that for other divisions of the Vantaa city team, this would be very relevant.

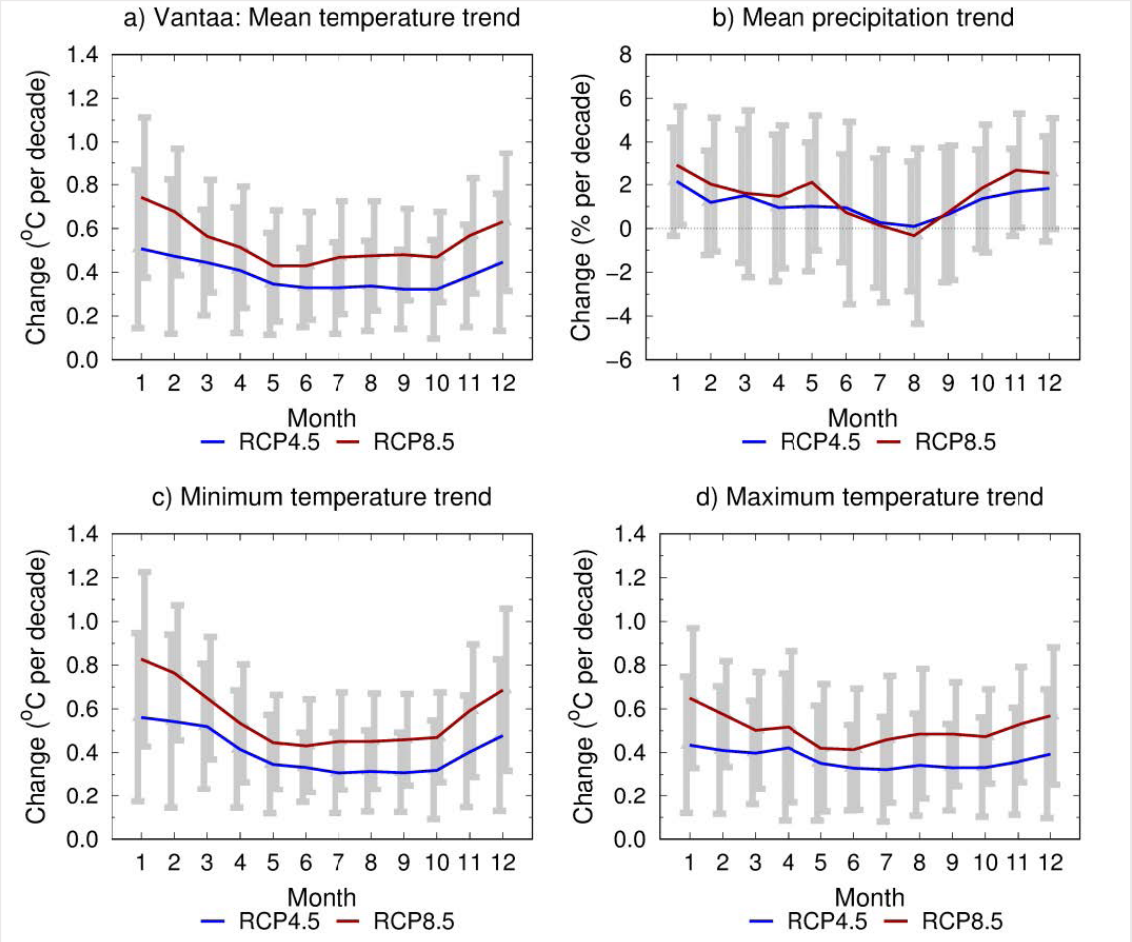


Fig. 7: Projected trends in (a) monthly mean air temperature, (b) monthly precipitation total, (c) monthly mean of daily minimum temperature, and (d) monthly mean of daily maximum temperature between the periods 1981-2010 and 2040-2069 in Vantaa under the RCP4.5 and RCP8.5 scenarios.

4. Cities without simulations

This section concerns the three LLs in Bottrop, Dublin and Guildford that did not present simulations to their municipalities. Here we try to provide some context and details concerning the relationship between the LL and the municipality. The municipality priorities with respect to iSCAPE related challenges as well as learnings about simulation-related matters relevant to the municipality.

FCC provided guidelines for the meeting with the local authority, for more detailed information see 2.2 Framework on page 11 and see appendix for the high-level meeting plan.

The main goal set up was to present the simulation as an option to understand the issue of the air pollution and to test the interest and efficacy of simulations as a policy making tool/method. For LLs who did not run any simulation, the interactions with the local authority/municipality was an opportunity to explore the need of simulations and air quality measurements (in any kind) and potential of running simulations in the future etc. However, the conversations included also their air quality engagement activities and LL updates (but this was not the focus).

The details on the following pages are edited versions of submissions made by the LLs themselves.

Bottrop

4.7. Bottrop

4.7.1. Working with the municipality

Mobility Context

Bottrop is positioned in west-central Germany. The city has a culture of car use and a high level of traffic congestion, the Ruhr district is designed around the use of cars.

Relationship

The situation in Bottrop is unique amongst the six iSCAPE cities in that both the TUDO LL and the municipality are iSCAPE partners. In fact, at the end of the iSCAPE project the municipality becomes the host organisation for the LL and will take on all of its activities e.g. the annual Wandering Trees parade. So, it is no surprise that the relationship between the LL and the municipality iSCAPE team is a strong and healthy one.

Activities

From the outset of the iSCAPE project the municipality iSCAPE team has been actively involved in LL activities e.g. the Wandering Trees Parade 2018, social impact assessment of LL activities, and two Citizen Science workshops (see D4.7 for more detail).

Recently, the LL and the municipality iSCAPE team held the Wandering Tree Parade 2019 which involved trees moving to primary schools within Bottrop (May 2019) and built on the successes from last year (see D2.5 for more detail).

Meeting attendees

iSCAPE team, City of Bottrop

Fig. 8: Images showing the Bottrop meeting with the iSCAPE municipality team

4.7.2. Municipality priorities

What iSCAPE questions is the municipality most concerned about?

The municipality has both immediate and future priorities. The immediate priorities, where political action is needed now, are addressing the air pollution from both motorised traffic and the local coking plant. An immediate methodological priority is to identify or create an appropriate air quality model and generate evidence.

The following are some of the questions that the municipality has with respect to its immediate priorities:

- What should a city-wide air quality model look like?
- Which data (regarding traffic) is required?
- Which methodology and what costs does it accrue?
- What financing options are there?
- How can air quality be interpreted in connection with coking plants/road traffic?

Other future priorities that the municipality is investigating include:

- Urban heat stress - how urban heat islands are distributed in the city.
- Urban green infrastructure - includes iSCAPE interventions.
- Photocatalytic coatings - how could that be utilised and tested.

Which of these questions could be turned into simulations?

It is felt that all of the municipality priorities can be addressed with simulations as well as other methods.

4.7.3. Evidence required for policy change

Having a robust air quality model is key. Data for an array of topics is needed to enable the model such as traffic data, pollutant data of individual cars, spatial data on traffic frequencies etc..

4.7.4. Potential impact of simulation

Municipality

The results that can be generated by the air quality model have the potential to influence political pressure, and therefore action, on issues that the city faces as well as feeding into the municipal planning processes e.g. strategic environmental assessment (SEA) in urban land-use planning, and environmental impact assessment (EIA). In addition, the results could form the basis of a Sustainable Urban Mobility Plan.

Citizens

Initially simulations can be used to raise awareness amongst citizens, possibly leading to greater citizen engagement and activism on air quality issues. Once measures have been implemented, the hope is that the city has measurably better air quality and citizen well-being.

4.7.5. How are simulations being used at the moment by the municipality?

Simulations are currently used as inputs into planning processes and as a basis for decisions (weighing processes, informal and formal planning instruments) e.g. noise analysis and climate analysis.

The municipality undertakes less complex simulations itself and these are conducted by the department responsible for the content in cooperation with other relevant departments (e.g. Department of Statistics). However, any elaborate and complex simulations are commissioned from other parties (e.g. engineering offices), usually via a tendering process or via research projects such as iSCAPE.

4.7.6. Requirements for simulation

The simulation should be appropriately detailed and should satisfy all scientific quality criteria (objectivity, validity, reliability, etc.). The analysis should be transparent and an interpretation aid should be included to help interpret the simulation results e.g. What does a high particulate matter value mean? What consequences does this have and what measures must be taken? etc.

There are requirements for the data to be:

- Reliable (collected by good quality sensors and measuring instruments).
- Complete.
- Historical and on-going (as appropriate).

Dublin

4.8. Dublin

4.8.1. Working with the municipality

Mobility context

Dublin is the capital and largest city of Ireland. Similar to Bottrop the Dublin has a culture around car usage, there is a lack of public transport and infrastructure that provides safe cycling routes. The historic city centre of Dublin has small roads which make it difficult to implement better and innovative modes of transport.

Relationship

The LL has a long standing relationship with the municipality as they have been part of several joint air pollution and noise mapping projects funded by the Irish Environmental Protection Agency. They have also been part of several projects within the Smart Dublin ecosystem (including industry partners) including current collaborations with Google (to validate the data for their Environmental Insight Explorer) and MasterCard (to validate the data of their CityPossible platform for Dublin City).

Activities

The LL and the municipality meet every second week with the municipality (specifically the Smart City department, and the Smart Dockland and Smart Dublin teams) to discuss all the on-going projects.

Meeting attendee

Principal Environment Health Officer, Dublin City Council.

4.8.2. Municipality priorities

What iSCAPE questions is the municipality most concerned about?

An immediate priority for the municipality is to minimise health impacts due to air pollution. A longer term priority is understanding the interlinks between air pollution and climate change so as to avoid problem shifting i.e. solving a specific problem but then generating another one. A fictional example of problem shifting could be the introduction of greater taxation on vehicles that produce greenhouse gases to alleviate climate change that then causes people to purchase diesel vehicles instead that have a high impact on air quality.

With respect to understanding the interlinks between air pollution and climate change, the municipality is interested in receiving input from the work of the LL that could then be integrated into a future climate action plan for the Greater Dublin Region.

A further municipality interest is that of using green infrastructure as passive control systems including the work of the LL and their Low Boundary Wall (LBW) intervention.

Which of these questions could be turned into simulations?

Both the interlinks between air quality and climate change, and the use of green infrastructure as pass control systems can be turned into simulations. The former should be received as part of the iSCAPE project, whilst simulations for the green infrastructure could be future work.

What could the impact of addressing these questions be?

Addressing these questions could provide evidence for actions to be included in the city development plan.

4.8.3. Evidence required for policy change

Any evidence will, as a minimum, need to:

- Account for both air quality and climate change to avoid problem shifting.
- Be compatible with both the current data used by the municipality and the municipality IT infrastructure.
- Be digestible and understood by non-experts (councillors) who prefer policy briefs to be concise and written in lay terms.

- Have results that can be shown in a dynamic and interactive way to the general public.

4.8.4. Potential impact

The general expected impact is that of improved citizen well-being and overall health. At the time of writing this report, the LLs do not know how this will be measured and monitored, however this could be clarified if the municipality is interested in monitoring socio-economic impacts?

4.8.5. How are simulations being used at the moment by the municipality?

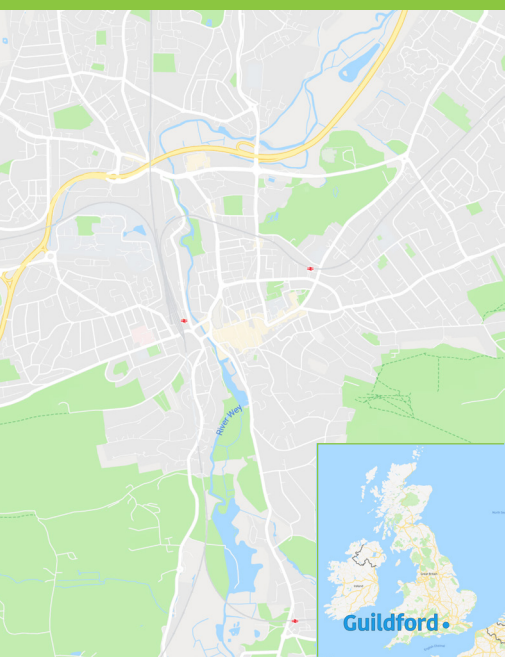
Currently, simulations are used by the municipality for screening any proposed interventions. These simulations are not used or carried out by one single department but by different departments. This is problematic as it does not account for any interlinks between air pollution and climate change. How this could be resolved was not discussed at the meeting but is expected to involve organisational restructuring or new ways of working both of which are likely to face significant internal barriers.

4.8.6. Requirements for simulation

In order to consider simulations, any simulations produced for the municipality will need to ensure that they:

- Account for both air quality and climate change to avoid problem shifting.
- Are compatible with both the current data used by the municipality and the municipality IT infrastructure.
- Have results that are dynamic and interactive.
- Produce accurate results.
- Are ‘user friendly’ to use.
- Complement measurements where needed in order to be compliant with the EU Directive 2008/05/EC (commonly known as the CAFE directive) on reporting local pollution.

Guildford



4.9. Guildford

4.9.1. Working with the municipality

Mobility context

Guildford is located just outside of London, besides the car congestion due to commuters, Guildford has two major airports close-by Heathrow and Gatwick that contribute to air quality pollution.

Relationship

The LL shares a very close relationship with Guildford Borough Council (GBC). GBC has been instrumental in the establishment of the LL and has been working with the LL since the beginning of the iSCAPE project to address issues related to air pollution in Guildford. Some of the LL's work has fed into the council air quality strategy, for example modelling to determine land-cover in Guildford.

Activities

The LL has been working towards raising awareness about air pollution and its mitigation using green infrastructure, and has conducted several multi-disciplinary research studies in areas ranging from green infrastructure to Citizen Science (see D4.7 for more detail).

GBC has been involved in several of these activities. They have helped in surveying the town to find the best locations for conducting experiments. In addition, they have been generous in the provision of some of their instruments and in supporting field-based research studies. GBC also hosted the interactive air quality quiz for almost three months, which helped the LL to gain visibility, and had a representative participate in the Citizen Science workshops (See D4.7 for more detail).

Meeting attendees

Environmental team member from Guildford Borough Council.

4.9.2. Municipality priorities

What is the municipality most concerned about?

There are several air quality related questions that the municipality is concerned with, however, the two priority issues concern air quality around schools and homes near major roads.

Some of the schools in Guildford are in close proximity to busy routes which adversely affects air quality levels around the schools, especially during drop-off and pick-up times. There is a significant concern about personal exposure levels locally and nationally, especially as children are highly susceptible to air pollution, making them more vulnerable to environmental risks.

High air pollution concentrations caused by heavy traffic around homes located near major roads (some of which lead to the centre of Guildford) are of great concern to the municipality. Accidents or significant traffic jams often cause a deterioration of the air quality levels and it can take several hours for the concentration levels to come back to normal.

Which of these questions could be turned into simulations?

Mapping air quality around the major roads can be simulated.

Fig. 9: The photo shows members of the Guildford LL attending the Municipality meeting in Guildford

4.9.3. Potential impact

Municipality

From GBC's point of view, addressing these questions would equip them with resources such as an action plan for clean air strategy, short-term planning for air pollution mitigation, green schemes etc. Also, it could potentially lead to a stronger relationship between the Surrey County Council who are the Highway Authority and whose support is essential if any change is to happen.

Simulation results could also inform the municipality about what kind of passive control system green infrastructure would be effective e.g. what kind of hedges and how they would affect the public locally.

The LL and GBC could then jointly publish a paper of the simulation results, with the GBC also producing guidance documents for the general public.

Citizens

Addressing these questions could potentially help improve the well-being of people by reducing their personal exposure to air pollution. Guidance documents from the municipality could lead to greater awareness about the problems and lead to behaviour change as more informed decisions can be made by individuals. For example, booklets or small online documents on how to minimise exposure or how to design hedges.

4.9.4. How are simulations being used at the moment by the municipality

The GBC has been running simulations in collaboration with other partners, however, no details about these simulations were shared with the LL during the meeting.

4.9.5. Requirements for simulation

For a simulation to be considered worthy, it should show clear impact supported by evidence. The results can be used to develop guidance documents which can be used by citizens for raising awareness as well as by the policy planners and designers. It is essential that the results are communicated such that non-technical readers can understand them.

5. Policy change

This section presents a summary of the policy change discussions that each of the six LLs had with their respective municipalities. Understandably there was variation in what was covered in the discussions and this section tries, where appropriate, to present a comprehensive view emerging from the discussions as a whole.

Note that this section will view the process of policy change through the prism of simulation.

5.1. The process to policy change

From the discussions a common thread of a policy change seems to emerge. The simple version of this thread starts, in this case, with the LLs who, ideally in collaboration with the municipality, create models and run simulations. They then publish their findings for their respective audiences including the municipality and the public. Public awareness would then be raised and the public would be able to make their voice heard to the municipality. Meanwhile, the municipality will evaluate the findings and consider all other factors including legal obligations, before making a decision.

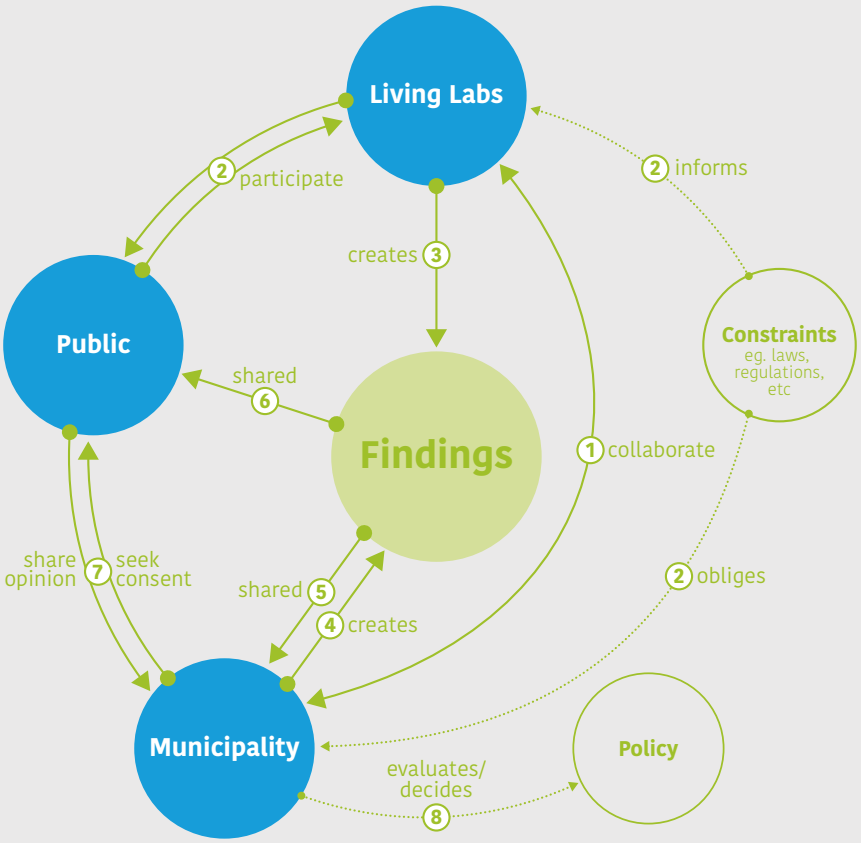


Fig. 10: The graphic is summarised policy change process from discussions between the six LLs and their respective municipalities

The above summarised process of policy change is elaborated further below:

5.1.1. The LL

Ideally, the LL would work collaboratively with the municipality to understand the municipality priorities and what the current policies are. Collaboration would also allow the LL to determine realistic and achievable boundaries for the simulation so that the simulation could be applied within the city, otherwise the municipality would view this as a purely academic exercise. The LL is able to understand the citizens and their needs in that municipality. In addition to working together with the municipality the LL is working together with the citizens, to reach specific goals.

Once a particular problem is chosen the LL can then identify or create the appropriate models and simulations that must meet quality criteria (e.g. data completeness, data source credibility, reliability of the model, wider acceptance of the model and or method etc.). The LL will also need to adhere to any legal and regulatory requirements, and any applicable standards). What is particularly important is that the analysis of the results must be transparent and available to the local authority as well as public.

The LL should also consider the tools required and whether the municipality has access to the same.

The LLs findings can then be shared with a number of audiences, including the municipality, the public and academia. It is imperative that the results are presented so that they are understandable to a non-technical audience.

5.1.2. Findings

These are either the findings from the LL or materials produced by the municipality for the public. The findings from the LL that are prepared for the municipality should provide an interpretation guide/guidance document that subtly educates the reader (usually a councillor) with respect to the findings.

5.1.3. The public

Theoretically, the public's awareness about a specific issue will be raised by the findings by either the LL or the municipality. The municipality (potentially in collaboration with the LL) will seek out public opinion or consent on either a particular issue, or on a specific set of actions, they can feedback their opinion and could get involved further.

The municipality

Ideally, the municipality would have been working with the LL and made clear what

their priorities were, what targets and constraints that they are working within, what simulation requirements need satisfying etc., all in an effort to better focus the exploration/modelling, and therefore, the chances of the results being accepted.

The municipality should work with the LL to ensure that the results are presented to the relevant internal decision and policy makers in a form that is effective and understandable.

It's at this point that the LLs are unsure of what happens next and how long it will take – one LL described it as a "long and winding road". What is known is that the 'politics' tends to come in at this point, where interested parties are lobbying within the municipality, and when any evaluation or verification is conducted (small pilots, simulation validation, cost-benefit analysis, problem shifting identification etc.), if at all.

5.1.4. The policy

Ultimately, the municipality will make a decision to either create or change a policy based on the evidence provided, and if successful the new policy comes into force.

5.2. What barriers would need to be overcome?

The main barriers to policy change that were identified in the meetings between the municipalities and their respective LLs were (in no particular order):

- The misalignment between the policy maker (municipality) and the researcher (LL). Where the former is looking to apply the science through practical, realistic, and achievable means, whilst the latter is looking to improve and push the science as they see great opportunity for improvement
- The misalignment of funding and resources between the two parties, as the LL doesn't have the funds (thus resources) but has the expertise, whilst the municipality is perceived to have the funds but not the expertise (or at least relatively less expertise).
- "Proof is the barrier" or, more accurately, understanding how to present the evidence in a way that convinces policy makers is a barrier
- Processing time in all of its forms is seen as a barrier. Some of the examples given were:
    - Time to get the relevant decision makers and policy makers to meet and reach consensus
    - Time for municipality approvals to be obtained
    - Time taken for public consultation, if any

    - Time taken for raising public awareness and education about issues

- Implementation barriers, including funding for the required infrastructure as well as barriers that are caused by the interventions themselves e.g. low boundary walls could limit accessibility to one side of the road and also limit parking, thereby upsetting local business owners.

5.3. What concerns would need to be overcome?

The biggest concerns that need to be overcome mentioned in the meetings between the LL and the municipality were:

- Finding ways that the interests of both the municipality and the researchers (LLs) can be aligned such that the outcomes are pushing the science on one-hand, and can be applied in the city on the other. Suggestions for this include creating 'complex scenarios' that could be modelled for mutual benefit, which would then raise the credibility of the local researchers with other scientists, and thereby encourage more scientists to collaborate with municipalities
- Ensuring the reliability of models and the appropriate scale of analysis
- Ensuring that the results fit with municipality plans, strategies and policies. This could be addressed through collaboration
- Finding effective ways of communicating the findings such that citizens and policy makers understand them and their implications
- Identifying strategies for finding consensus between those that may have conflicting interests, budgets and priorities (e.g. organisations like municipalities, regional authorities, municipality departments that may be operating with a silo mentality etc.).
- Not knowing whether air quality will be a priority in the face of other concerns e.g. parking, car use etc.

5.4. What dependencies would need to be overcome?

The most common dependency arising from the meetings was the need to check with several municipality departments both as a matter of process and as a way to ensure that other departments are not working on competing or overlapping solutions for the same problem.

Other dependencies mentioned include:

- The need to have passed through all the legal control mechanisms over which

the municipality has no control e.g. national and regional processes and control mechanisms

- The need to navigate through previous binding decisions that have medium to long-term effects e.g. The coking plant in Bottrop has long-term effects over which the municipality has no influence or jurisdiction
- Public opinion can be a factor that must also be considered and negotiated e.g. in Vantaa the public want more green infrastructure which pushed against the need for more housing meaning a "taller Vantaa" will result.

5.5. Who should overcome the barriers?

The municipality (and policy makers) is overwhelmingly seen as having the authority and ability to remove or lessen barriers to policy change, though it was acknowledged that some responsibility also lies with national and regional authorities. Municipalities could be supported by research partners (e.g. LLs and universities) and other subject matter experts.

Few suggestions were made as to how these barriers could be overcome and these include breaking inter-departmental silos within municipalities (e.g. the City of Hasselt have inter-departmental committees to do just this), conducting public awareness campaigns, empowering, engaging and informing the public of the issues and any options for action. Finally working more closely in (funded) partnership with researchers.

5.6. What time-frames should be expected?

Although time-frames for policy change were seen to vary on a case-by-case basis, it was accepted that policy change generally took many years e.g. 3-5 years for formulating local plans and strategies, with some policies taking between 5-10 years.

Policy change for some issues (e.g. noise) were expected to take considerably less than other issues (e.g. traffic policies) as illustrated by the following quote from Vantaa:

> **"It was noted that noise-related issues can move very rapidly from simulation to a policy (months), flood risks and the determination of flood risk zones took longer (few years), while discussions about traffic policies (e.g. whether to build tram lines instead of roads) might take years and never end."**

5.7. Are there any alternative paths to policy change? If so, what are they?

The consensus was that there were no other ways to policy change other than those currently followed within the municipality. However, a suggestion was made by the Guildford LL to include the issue of interest (air quality for iSCAPE) in the municipality progress report which is published every 6 months in Guildford.

This question of alternative paths to policy change was asked of the LLs and municipalities because when speaking with an Urban Planning representative from the municipality of Vantaa in March 2019, it become clear to FCC (Vantaa LL also present at the meeting) that the Urban Planning team had the authority to adopt guidelines for their practise as they became convinced of their scientific validity. Obviously, urban planners are not the ultimate arbiter of what becomes a policy and what does not, but they have a strong input into the process. So the question becomes can policy change can only be achieved by an official declaration of the change by politicians or can it also be made (influenced) less formally by technical experts? If not, then isn't targeting such technical experts a quicker alternative path to policy change?

6. Next steps

6.1. Bologna

The LL are aware that results from the simulations created for the municipality can be used as input to discussing introductions of potential change. However the simulations will need revising to better fit current, and therefore suggest better future, regional air quality plans and legislation (especially concerning the NO_x and O3 problems). Before revising the simulation the LL is arranging a meeting with the municipality (not present at the meeting with the regional authority and ARPAE). The purpose of the meeting would be to hear first-hand about other problems the municipality faces and determine which of those could be addressed with new simulations and how the current simulations should be revised.

The LL realises the policy change process can be time consuming. As a result of the initial meeting the LL is certain the first step in air pollution policy change involving simulation is to convince interested parties that the simulation model is capable of reproducing the observations. Verification against real world observations (e.g. air quality data collected at air quality stations) would provide the required proof and reassurance.

They believe they have done just this with the simulations highlighted in this document (for more details see D4.5 'Report and Policy Option on AQ and CC'). The LL is confident that their results, when carefully verified in the current scenario against air quality observations from reference monitoring stations (as well as from additional measurements taken in two street canyons), will prove to be convincing and could contribute to prudent urban planning (and hopefully, policy change).

6.2. Bottrop

For this deliverable the LL met with the iSCAPE team from the City of Bottrop (who are also iSCAPE partners) as members of the municipality administration department were unavailable. As they have yet to meet with the municipality administration, they feel that any next steps should be defined after that meeting has taken place.

Although the meeting didn't happen, the Bottrop LL is still very much engaged with citizens, local community groups, organisations and schools. They had their second 'Wandering Tree Parade' and planned additional education and engagement events during the summer months (read more on the iSCAPE blog about the Bottrop LL). Future areas of interest for the city are expected to concern the urban heat island effect, urban green infrastructure and the benefits of photocatalytic coating.

6.3. Dublin

The LL plans to expand their activities related to air pollution by leveraging the network and activities of Smart Dublin. They are also targeting national funding to further develop their work in terms of fine tuning their solutions and also applying some of the solutions deployed in other iSCAPE cities.

They are currently pushing to have these potential solutions included in the city development plan so they will have the possibility to deploy them and have a real impact on policy.

6.4. Guildford

As an immediate next step from the meeting the LL will continue working on the iSCAPE project and sharing findings with GBC. There is the possibility of an open seminar to share results so far that could be shared with the University of Surrey and with the councillor that attended the meeting. Past seminars have included up to 10 councillors in the audience.

The LL has realised that a key activity they must undertake is to engage more people from the municipality (including designers and technical people that would help in better understanding of the issues and the process of policy change). Such an activity should identify people or groups that have influence and their needs.

With respect to some of the municipality's future priorities mentioned in the meeting, the LL could support GBC by running simulations related to reduction in air pollution based on the use of electric cars, finding pollution hot-spots around the city and roadside traffic. The municipality could then support the LL by allowing them to collect samples from the areas of interest (e.g. schools), with any appropriate findings perhaps contributing into future municipality air quality plans.

6.5. Hasselt

The meeting, as well as other engagement activities, have helped to strengthen both the bond and the trust between City of Hasselt and the LL. On-going activities include discussions with City of Hasselt with respect to several Masters and Bachelors degree thesis topics undertaken over the coming years that would address both city mobility and air quality problems in Hasselt. Engaging students on local mobility-related topics is another way to work closely with the municipality when resources are limited.

6.6. Vantaa

The simulations have proved useful to the municipality, who are happy that the modelling could be financed by the iSCAPE project. With respect to iSCAPE, a final seminar will be held in Vantaa (Autumn 2019/Spring 2020) to present findings and achievements from the project.

Beyond iSCAPE, the LL/FMI will support the municipality in several ways e.g.:

- The loaning of the Smart Citizen Kits to the municipality
- FMI availability for climate and air quality seminars, as required
- Potentially continuing the modelling service on a commercial basis

The municipality, along with other Finnish cities, has a plan for achieving “carbon neutrality” by the 2030s which means they are especially receptive to any climate change expertise and evidence that helps guide policy.

7. Reflections

Not all of the LLs have enjoyed close relationships with their respective municipalities from the beginning of the iSCAPE project and the experiences of the iSCAPE LLs seems to indicate that this is a significant factor in the development of their interventions. Those that were very close to their municipalities earlier on in the project have been able to focus their interventions on the municipality's priorities, whereas others are only reached this point towards the end of the project.

In retrospect, it would have been worthwhile for all six LLs to have undertaken a formal process (at the beginning of the project, and then to be on-going) that involved the following (some of which the LLs have done):

- Determining which published municipality plans overlapped with the LL's area of focus as a means to identify municipality objectives and priorities (for more information see iSCAPE Deliverable 5.1 'A database and report for the baseline environmental and socio-economic assessment').
- Arranging LL activities in line with these municipality plans.
- Inviting municipality representatives to these activities.
- Attending municipality activities and events attended by the municipality.
- Identifying potential contacts (e.g. people, groups, committees and departments) within the municipality.
- Development of an initial communications plan on how these contacts would be engaged.
- Development of an initial marketing plan detailing how to publicise events and findings.
- Mapping out political cycles (when specific groups met etc.) and aligning the communications and marketing plans.

Having done the above initial LL activities would have been more closely aligned to municipality priorities at an earlier stage of the project. Once contact and relationships have been established the LLs should solidify that relationship through collaborative working and by refining their understanding of the contact's (and by extension, the municipality's) needs. To be fair, the iSCAPE LLs have been doing this. However, the LLs would have benefited from a more formal process to ensure the best chances for enabling and directly impacting local policy change. This is likely to have involved:

- Identifying municipality priorities.
- Identifying municipality capabilities, constraints and requirements.
- Ensuring that the chosen methodology has been validated for, explained to and been accepted by the municipality.

- Agreeing characteristics of desired outputs with the municipality (e.g. types of outputs, suitable targets or percentage change required, level of detail required, compatibility with municipality systems etc.).
- Researching and trialling effective communications (e.g. briefing documents for politicians who don't need technical detail) with decision and policy makers.
- Continuing to seek out other appropriate contacts within the municipality.
- Involving a diverse range of municipality contacts in mapping out how policy change happens within the municipality. Having multiple differing perspectives allows for a more holistic picture of the process to be developed. This should be revisited over time.

Even if the LL performed all of the above and provided the municipality with the perfect simulation (i.e. in line with policy, meeting all data and validity concerns, and using realistic projections for short to medium terms etc.), there is no guarantee policy change will happen. This is the point when the findings are given to decision and policy-makers. This is something of a black hole for the LLs as they have no visibility of or control over the process, which could be multiple processes undertaken by different agents in a variety of ways at different times, before coalescing around a central push for change (if at all). It is, therefore, essential to repeat that the LLs should not rely on a single advocate within a municipality but have a conscious plan for giving themselves the best chances for success by identifying and activating multiple advocates.

Even if the LL had multiple advocates, one of the major barriers faced by the LLs was that of time taken to realise policy change. Part of this problem is that municipality departments work in silos and do not work holistically and/or do not necessarily share information internally on common issues. This is clearly beyond the control of the LLs and needs change from within the municipalities.

There are at least two possible avenues to explore:

- The first, would involve identifying what, if any, services the municipality pay the LLs for. Payment for these services could help fund the university's scientific research within the LL, whilst delivering answers that can be readily applied for the municipality. For example, these paid for services could be conducted by graduate students under the supervision of a named professor. If this works well then perhaps over time this will encourage the municipality to become less risk averse and more forward looking. Perhaps moving the relationship from supplier-client to that of partners. This seems to be the direction in which some LLs are heading.
- The second would be to explore external sources of funding (e.g. like iSCAPE, EU funding) from which both the municipality and the university could benefit in both application and science terms.
- Another possible avenue to explore is the ecosystem within a municipality and the actors present (e.g. municipality, university, business etc.), their roles in the ecosystem, their needs etc., all with the goal of identifying who could help who and what possible funding might be accessible. For example, it may result in a project with benefits for all that is privately funded or part public, part privately funded.

Having met their respective municipalities, the LLs thoughts should now turn to formalising how they interact with the municipalities, how they communicate and how the relationship with the municipality outlasts iSCAPE. Additionally, how to engage citizens beyond awareness raising and conducting a workshop.

8. Conclusions

The work carried out by the six iSCAPE LLs for this deliverable concerned the presentation of simulations conducted for their respective municipalities by three LLs, and the beginning of an investigation of defining the local processes of policy change by all six LLs.

Key simulation take-home messages from the meetings between the six iSCAPE LLs and the municipalities are:

- Ensure the simulation addresses municipality priorities
- Know local and national targets e.g. air quality levels
- Ensure the simulation model uses:
    - Validated data e.g. from a national authority or institution
    - A model that has been validated by other authorities or institutions, or demonstrate how the model is better
- Be transparent with the parameters used, and the accuracy and error margins of the model
- Clearly define the region being covered by the simulation
- Set realistic timeframes (short term <5 years)
- Set realistic targets or conditions i.e. include more conservative targets in the model that the municipality feels that they can achieve
- Offer simulations of possible futures that provide a comparison to a base case that reflects the current situation in the city
- Provide an interpretation guide or guidance notes for those who are less technical for each simulation.

Other simulation considerations include:

- Knowing whether the municipality uses simulations currently e.g. in-house vs. external suppliers
    - Knowing the type and format of these simulations
- Knowing what in-house simulation capability the municipality has, if at all
- Considering the compatibility of the simulation provided to the municipality and any in-house capability
- Offering some form of public facing visualisation of the outcomes.

With respect to policy change, as mentioned in a previous section, even if the LL had performed all of the above and provided the municipality with the perfect simulation there is no guarantee that policy change will happen. Once the simulation results are handed over to the municipality, the LL has no visibility of what happens next or when. But there are some essential realisations that have been learnt by the LLs that will help give their work improved chances of affecting policy change. These include the importance of:

- Learning the needs, priorities and constraints of the municipality
- Involving the municipality in deciding the research areas (e.g. deciding on an area for simulation)
- Identifying realistic scenarios, timeframes and targets
- Cultivating multiple advocates within the municipality that support the research
- Iterating how (simulation) results can be designed so they are more easily understood by non-technical decision and policy-makers within the municipality.

The LLs have, through these meetings with their respective municipalities, learnt much about simulations and local policy change that previously had only been understood informally. They have also come to realise the importance of involving municipalities early and of the absolute importance of making simulations grounded in reality. And, perhaps the hardest of all, they have discovered the importance of making the simulation results understandable to non-technical audiences. The LLs are encouraged to continue learning the nuances of local policy making and to formalise specific plans on how to do this.

9. APPENDIX

D4.6 – Report on local stakeholder engagement – A plan of action

BACKGROUND

WP4 is concerned with location-based frameworks and the deployment of behavioural solutions. University of Hasselt (UH) will lead this WP and will be responsible for modelling and asses ex-ante the behavioural interventions identified in WP1 and also for modelling the effects of policy options on the behaviour of citizens.

Task 4.4 is specifically concerned about "engaging local stakeholders through workshops and developing citizen science communities". The objective of Task 4.4 is to engage local citizens, businesses, authorities and researchers in exploring policy options and measures analysed in previous tasks with an impact on people's transport mode choice and resulting activity patterns.

D4.6 addresses the "engaging local stakeholders" and modelling elements of Task 4.4 by focussing on the municipalities.

See appendix for descriptions of T4.4 and descriptions for D4.6.

WHAT

To enable the writing of this deliverable, the LLs will be required to convene a meeting or meetings (in-person or remote) with representatives of their municipality.

Case 1

If the LL has run any (air quality/traffic/other iSCAPE) intervention simulations in the municipality, then the meeting's goals are to:

- Walk through one or more of these simulations
  - Understand any municipality concerns around simulations
- What impact could the simulations have
  - For the municipality (financial, well-being, municipality processes etc.)
  - Citizens
- Discuss how the simulations could support policy change
- Understand the process of policy change for that municipality (incl. barriers, concerns, timeframes etc.)
- Understand which (air quality/traffic/other iSCAPE) simulations the municipality wants to run in the future (& why)
- Understand the impacts they are hoping to make
- Fill a short questionnaire on change in policy quality and quantity for T6

Case 2

If the LL has NOT run (air quality/traffic/other iSCAPE) intervention simulations in the municipality, then the meeting's goals are to:

- Understand which (air quality/traffic/other iSCAPE) questions that the municipality wants answered and why
  - Determine the priority of these questions/problems
- Understand the impacts the municipality is hoping to make
- Understand the process of policy change for that municipality (incl. barriers, concerns, timeframes etc.)
- Fill a short questionnaire on change in policy quality and quantity for T6

HOW

Whom to invite?

- LLs to invite local municipality to a meeting.
- **Ideally,** the attendees will be a mix of decision makers, technical experts and urban planners. LL advised to invite any other relevant municipality contacts.
- There is no quota on the number of municipal attendees.

Before the meeting(s)

- FCC will provide a high-level meeting plan (this document), with specific questions
- LLs to amend the plan as appropriate given their relationship with the municipality
  - Changes to FCC questions to be cleared with FCC before meeting
- FCC will provide a 'Findings Template' that the LL will use to record the findings from the meeting
  - The template with be a Google sheets document (to be shared)
- The completed 'Findings Template' will be submitted to FCC by the LL

Meeting(s)

- Ideally, the meeting is face-to-face
- Suggested minimum meeting durations are:
  - Case 1 – 90 mins
  - Case 2 – 60-90 mins
- LL is advised to use their own judgment, with respect to meeting durations etc.
- LL to record notes from the meeting(s) – especially those that address the FCC questions
- If possible, take photos of any written notes on whiteboards, flip charts etc., and if possible, take photos with the attendees
- Submission of the T6's short questionnaire to participants

Post-meeting(s)

- LL to complete 'Findings Template' and submit completed template to FCC
- Submit a selection of photos, with annotations, from the meeting, if possible

WHEN

Deadline for LLs

The deadline will be **the last week of May 2019**.

Time for questions (short interview)

In the 1st week of June will be used by FCC to ask any questions of the LLs.

HIGH-LEVEL MEETING/WORKSHOP PLANS

CASE 1 – LLs with simulations

There is no promise being made by the LLs with respect to performing any simulations for the municipality. This must be clear to the LL and be made clear to the municipality.

OPENING

- Welcome attendees
- Introductions (if necessary)
- Outline the objectives
    - Show case (air quality/traffic/other iSCAPE) simulation(s) in the municipality
    - Outline a path to policy change
    - Understand what future (air quality/traffic/other iSCAPE) simulation(s) would help the municipality

SIMULATIONS

- Brief overview of the iSCAPE simulations activities by the LL
- Walk through one or more of the simulations
    - *LL to decide on which simulations*
    - *LL to decide on number of simulations shown*
    - *LL can add their own questions*

    - ABOUT SIMULATION IN GENERAL – REQUIRED QUESTIONS
        - What questions/concerns/obligations (e.g. legal) does the municipality have regarding simulations?
        - How does the municipality use simulations at the moment (if at all)?
        - What requirements does the simulation need to satisfy to be worthy of consideration by the municipality?

    - FOR EACH SIMULATION SHOWN – REQUIRED QUESTIONS
        - What are the municipalities thoughts or follow-up questions about the simulation?
        - What impact could the simulations have
            - For the municipality (e.g. financial, municipality processes etc.)
            - For citizens (e.g. well-being, mobility etc.)

POLICY CHANGE

- Discuss how the (air quality/traffic/other iSCAPE) simulations could support policy change and understand the process of policy change for that municipality (incl. barriers, concerns, timeframes etc.). Breaking the process into steps where necessary
    - *It may be useful to draw the process as the attendees speak*
    - *LL can add their own questions*

    - ABOUT POLICY CHANGE – ASK THE FOLLOWING QUESTIONS
        - Assuming that all the simulation criteria are met, what is the process to move from a simulation (or other evidence/models) to policy change?
            - *LL should explore this is detail*
        - What barriers/concerns/dependencies would need to be overcome?
            - Who should overcome them?
        - What time frames should be expected?
        - Are there any alternative paths to policy change? If so, what are they? For example, can a department or team implement a change? Or must there be a formal written declaration that a policy has changed?

THE FUTURE

- Understand which (air quality/traffic/other iSCAPE) simulations the municipality wants to run in the future (& why) and understand the impacts they are hoping to make

    - ABOUT FUTURE SIMULATIONS – REQUIRED QUESTIONS
        - What (air quality/traffic/other iSCAPE) questions is the municipality most concerned about?
            - Why?

        - What is the priority order of these questions for the municipality?

        - Which of these questions could be turned into simulations? [To be addressed by both the municipality and the LL in the session]

        - What could the potential impact of these simulations be?

CLOSING

- Recap on the main outcomes of the session
- Submit the short T6's questionnaire
- Thank everyone
- Inform the audience about what will be done with the outputs of the session
    - *LL to determine*

CASE 2 – LLs with no simulations

There is no promise being made by the LLs with respect to performing any simulations for the municipality. This must be clear to the LL and be made clear to the municipality.

OPENING

- Welcome attendees
- Introductions (if necessary)
- Outline the objectives
    - Understanding the AQ questions that the municipality has
    - Determining a priority for these problems
    - Outline a path to policy change

THE NOW

- Understand which AQ-related problems the municipality wants to learn more about and which it wants to tackle and why

    - ABOUT AQ NOW – REQUIRED QUESTIONS
        - What AQ-related questions is the municipality most concerned about?
            - Why? (E.g. financial, legislation requirements, public health etc.)
        - What is the priority order of these AQ-related questions for the municipality?
            - Why?
        - What could the potential impact of addressing these questions be?
            - For the municipality (e.g. financial, municipality processes etc.)
            - For citizens (e.g. well-being, mobility etc.)
        - What type of evidence would be needed for the municipality to start to address these problems?
            - [**If simulation arises,** then ask the following:
                - How does the municipality use simulations at the moment (if at all)?
                - What requirements does the simulation need to satisfy to be worthy of consideration by the municipality?]

POLICY CHANGE

- Discuss how the evidence could support policy change and understand the process of policy change for that municipality (incl. barriers, concerns, timeframes etc.). Breaking the process into steps where necessary
    - *It may be useful to draw the process as the attendees speak*
    - *LL can add their own questions*

    - ABOUT POLICY CHANGE – ASK THE FOLLOWING QUESTIONS
        - Assuming that the evidence criteria are met, what would the process be to move from evidence to policy change?
            - *LL should explore this is detail*
        - What barriers/concerns/dependencies would need to be overcome?
            - Who should overcome them?
        - What time frames should be expected?
        - Are there any alternative paths to policy change? If so, what are those? For example, can a department or team implement a change? Or must there be a formal written declaration that a policy has changed?

CLOSING

- Recap on the main outcomes of the session
- Submit the short T6's questionnaire
- Thank everyone
- Inform the audience about what will be done with the outputs of the session
    - *LL to determine*

iSCAPE

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