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Socio Economic Implications for Individual Responses to Air Pollution policies in EU+27

Citizen responses to urban air pollution: a focus group analysis

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1. Introduction

In order to become effective, decisions on air quality policy made at the European level need to be translated into national, regional and/or local legislation and policy measures. This implies that they need to be operationalised through the actions of individual officials, field workers, police officers etcetera, and need to be accepted by and incorporated in the everyday practices of individual citizens. This implementation process is inherently multi-scalar and each step of translation entails a risk of inefficiency, goal displacement, or even outright rejection and resistance. This paper focuses on the last step in this translation process, namely the incorporation of air quality policies by citizens, or, seen from the other side of the coin, their respective rejection of and resistance towards it.

Concretely, the analysis this paper presents is based on a pilot research involving 11 focus group interviews with citizens affected by (or affecting) local air quality measures. More in particular, the research focused on traffic-related air pollution. This is not only because traffic is often the most harmful source of emissions in urban environments, but also because many city dwellers are being confronted with policies related to traffic on a daily basis. This more narrow focus allowed us to move beyond the mere exchange of ‘opinions’ in the direction of a more in-depth understanding of reactions to air quality policies, which also include ‘experiences’. Focus groups allow us to scan the *diversity* of possible opinions and reactions to the existing air quality situation and the measures intended to address air pollution, and also to try to arrive at *in-depth* insight into perceptions and behaviour with regard to air quality, as well as the reasons and motivations behind acquiescence, resistance or pro-activeness in relation to air quality policy measures and behaviour change. Furthermore, focus groups help to gain insight into the kind of group dynamics that generate social norms or expectations with respect to environmental issues. In other words, the goal is not only to acquire a better understanding of the perceptions and behaviours of individual persons in relation to air quality and related policies, but also to study social interactions and dynamics which arise when air quality becomes the topic of common action and debate.

In what follows we will first zoom in on the research design, explaining the methodologies of the presented study. Secondly, we will present the theoretical framework we used to make sense of our data. More concretely, we start from a scheme that Bjarne Bruun Jensen developed in the domain of environmental education in order to understand the types of knowledge students need to engage in ‘pro-environmental behaviour’ (here understood broadly, and thus including both direct and indirect, individual and collective actions). Concretely, four domains of knowledge are distinguished: (1) knowledge on the bio—physical nature of the problem and its effects, (2) knowledge about the root causes, (3) knowledge about strategies towards change, (4) and visions on alternatives. In a third section, we present for each of the cities an analysis of the respective focus group interviews along the lines of this framework. A fourth section brings the respective findings together and discusses similarities and differences. In a fifth section conclusions are presented.

2. Research design

In order to conduct this pilot study, a working group was set up in the framework of SEFIRA (Socio Economic Implications For Individual Responses To Air Pollution Policies In EU +27). This group consisted of the University of Urbino “Carlo Bo” (Italy), KU Leuven (Belgium), Szkoła Główna Handlowa w Warszawie (Poland) and Lund university (Sweden). Among the seven countries represented in the SEFIRA consortium, four were selected for case studies: Belgium, Italy, Poland and Sweden. This choice was based on air quality figures synthesised by the Environmental Performance Index (EPI), and developed by Yale University (2016), in order to ensure that a variety of environmental and geographic conditions were represented by the cases. For each country a city and its relative metropolitan area were identified to represent countries’ general air quality condition. In selecting the cities, the number of inhabitants was one of the criteria; the cases thus include two medium-sized cities (Antwerp and Malmö, each with less than 600.000 inhabitants), and two larger metropolitan areas (Milan and Warsaw, with more than 1 million inhabitants). Whereas both Warsaw, Milan and Antwerp are characterised by huge levels of (traffic-related) air pollution, the air in Malmö is relatively clean. However, also between the cities with a lot of air pollution important differences exist, amongst others in terms of the attribution of the pollution and the policy measures proposed. These differences allow us to follow an explorative comparative case study design (Yin, 2008), thus combining intra-group homogeneity with an inter-group comparison (Conradson, 2005).

In each of the cases three focus groups were organised (Cameron, 2005; Longhurst, 2010) (see further, for one exception on this rule) which allowed us to add one extra comparative dimension next to the comparison between cases. Concretely, the specific cases respectively involved citizens who were part of the following three categories: (1) local inhabitants of the respective cities who live in areas with a high traffic density, and a lot of pollution related to it; (2) local inhabitants who live in areas with a low traffic density, and with relatively cleaner air, (3) commuters (to the respective cities). As the focus of the study was on traffic-related air pollution, we also used this as a rationale on the basis of which the participants were selected.

In this way, we wanted to bring in two extra distinctive dimensions in our focus groups:

- 1) Commuters (focus group 3) versus local inhabitants (focus groups 1 and 2)
- 2) Local inhabitants who live in highly polluted zones (because of traffic intensity) (focus group 1) versus local inhabitants who live in less polluted zones (with less traffic) (focus group 2)

The original goal was that each of the focus groups would consist of 6 to 10 participants, gathered through snowball sampling (Baarda, De Goede, & Teunissen, 2005; Babbie, 2009). Yet, soon it turned out that this was very difficult to realise for Malmö. Exactly because air pollution is not a topic in the city (see earlier, as well of the findings of D3.1 and D3.2), it turned out to be very difficult to stimulate people to participate. In line with these observations, only the focus group with people living in a more polluted area was really successful. A second focus group, with commuters, eventually took place (after several failed attempts) but included only 3 participants. A third focus group, with people living in less polluted zones, failed to materialise. Therefore, finally, 11 focus groups were conducted, instead of 12, whereof three in respectively Milan, Antwerp and Warsaw and two in Malmö (one of which was a reduced version of the original set-up).

The following topics were explored in each of the focus groups: experiences of air pollution, perceptions of the distribution and sources of air pollution, opinions about local policy measures and

experiences of related behaviour change, behaviour antecedents with regard to reducing the own exposure and contribution to air pollution, etc. In order to make a comparison possible, a general focus group schedule was constructed which was at the same time adapted to each of the local situations, in order to do justice to their idiosyncrasies. All the focus group interviews were digitally recorded and analysed with the help of grids which ordered the results in a structured way. In order to be able to also take observations into account, every partner analysed her/his own case. These analyses were subsequently brought together by the partner of Lund University, who also wrote the conclusions.

Since the purpose of this research was an explorative qualitative analysis, we did not aim to arrive at general conclusions; rather, we wanted to map reactions towards air pollution and (the lack of) air quality policies, and we especially aimed to uncover the reasons behind these (re)actions. In other words, the goal of the focus group interviews was to acquire a better understanding of the perceptions and behaviours of individuals in relation to air quality and related policies. How do people perceive air quality? Which policies have public support and which do not? What are the reasons feeding this (non-)support? What are the conditions for a policy to be accepted by the public?

3. Theoretical framework

In his 2002 article 'Knowledge, action and pro-environmental behaviour', Jensen examines the conditions that lead people to take action towards environmental problems. Jensen's inquiry centres on two questions: "What knowledge do people have to acquire to undertake some pro-environmental action?" and: "How do we teach this knowledge?" Answers to the first question are relevant to our analysis, since they could teach us whether certain policies fulfil the requirements to achieve their purpose, namely make people act for the sake of improving air quality. The main argument is that people undertake actions concerning environmental problems when they have a broad understanding of those problems. For this to happen, environmental knowledge has to be assimilated in four dimensions. First of all people have to know that the problem exists, what effects it has, and where it is spread. In short one has to understand 'What' the problem is. The second dimension of environment-related knowledge is what causes the problem. This dimension pertains to the direct causes as well as the root causes, often of a social or economic structural nature. So: 'Why' do we have the problem? Further, for people to act it is important that they know what they can do. 'How' can we fight the problem? In this, a number of different actions are possible. First, Jensen (2002) distinguishes between direct and indirect actions. Direct actions are those that diminish directly one's impact on, or one's exposure to the problem. Indirect actions on the other hand are those that try to change things in other ways, often structurally. This could for example include taking part in a demonstration or petition. It could be giving a scientific lecture on air pollution, or it could be looking for the right person who you can ally with to change things. Second, a distinction is made between individual and collective actions. And finally, with respect to the fourth important knowledge dimension, one has to know 'Where' one wants to go. What are the visions, the goals that one wants to achieve by acting? Which alternatives do we have? Jensen notes that people are mainly being taught about the effects of environmental problems, that is, they are usually only taught one of the four dimensions. From an

emancipatory environmental education perspective, this is clearly not enough; to act one also has to know what the causes are, what the alternatives are for the problem, and how to reach these goals.

Figure 1 shows the adapted model of Jensen of the four dimensions of action-oriented knowledge towards the environmental problem of air pollution.

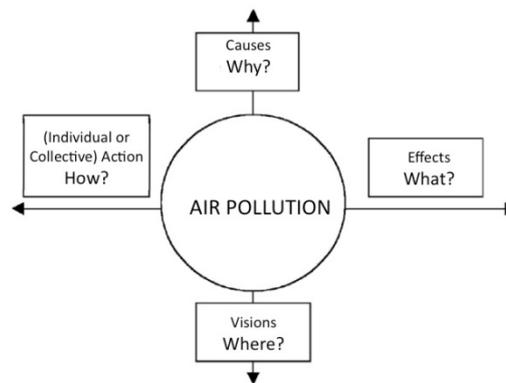


Figure 1 Four dimensions of air pollution-related knowledge (adapted from Jensen, 2002)

This model will be used to analyse the interviews. The following assembles some findings from the literature concerning the four dimensions of air pollution-related knowledge. They give an insight in the way people acquire this knowledge.

3.1. What are the effects of air pollution?

The 'What?' dimension looks at the knowledge or perceptions people have of the existence of air pollution, of its effects and of the places that are most polluted. Jensen mentions this as traditionally the only dimension being taught in environmental education. Considering air pollution, people gain this knowledge on the one hand by information spread through general education, newspaper articles, environmental awareness campaigns (initiated by governments, NGOs, action groups) and, on the other hand by sensory (seeing smoke, soot, smelling, tasting, ...) and physical (breathing problems, health issues, ...) experience (Bickerstaff, 2004; Bickerstaff & Walker, 2001, 2003; Bonnet, Amalric, Chev , & Travers, 2012; Wakefield, Elliott, Cole, & Eyles, 2001). The latter seems to be of crucial importance. This understanding of air quality is part of what Day (2007) calls the 'Ecological Landscape'; the perceived polluted places including the risk factors for the population. Although this is a social cultural construction embedded in daily experiences (Bickerstaff & Walker, 2003, 2003; Wakefield et al., 2001) it often does correspond to the 'objective' scientific, technical knowledge (Day, 2007; Petts & Brooks, 2006). On the other hand, when there is a gap between lay and expert knowledge, government and scientists all too often consider the public as ignorant for failing to understand the problems as they do (Bickerstaff, 2004; Petts & Brooks, 2006). Perceptions of air quality are also constructed through the context of the place people are (not) living in; the 'Materialistic Landscape' (Day, 2007). People commonly perceive city centres as having the worst air quality (Bickerstaff & Walker, 2003). Yet, when it comes to their neighbourhood they are less inclined to think it's very polluted when it doesn't

have other problems and when they like living in this particular place (Bickerstaff, 2004; Bickerstaff & Walker, 2003; Day, 2007). Conversely, if a site is subject to drug abuse, crime, graffiti,... then this place is quickly considered as suffering from air quality problems as well. In this way poorer neighbourhoods are generally considered more polluted (Bickerstaff & Walker, 2003, 2003; Day, 2007; Véron, 2006). However, this is not only a subjective estimation. A lot of research in the domain of environmental justice does point out that poorer neighbourhoods really do suffer of more pollution than their more affluent counterparts (Bickerstaff, 2004; Buzzelli, 2008; Pearce & Kingham, 2008; Véron, 2006). Several reasons are given for this, such as the lower market-value of the polluted land and unjust measures taken by government (Véron, 2006). Places do also get a symbolic meaning through which a culturally constructed 'Therapeutic Landscape' (Day, 2007) is attributed certain air qualities. The countryside, nature or just places with trees are perceived as less polluted (Bickerstaff & Walker, 2001, 2003; Day, 2007). Also places with water tend to be recognized as less polluted than for instance places with industrial buildings (Bonnet et al., 2012). Places with a polluted past keep this association in people's memory (Bickerstaff, 2004).

One of the reasons why these kinds of personal experiences are important is that the public is often sceptic towards public communication initiatives (Bickerstaff, 2004; Bickerstaff & Walker, 2003; Kenis & Mathijs, 2012; Wakefield et al., 2001). Bickerstaff & Walker (2001, p. 143) therefore conclude:

It follows that if policy and communication frameworks are to achieve durable change in public attitudes, and in turn behaviour, they must move beyond a top-down model of assumed public ignorance and a blind reductionism that isolates and deals with one dimension of the environmental system (air quality) in a physical and social vacuum.

The participatory process that they (among others) are pleading for makes it possible to broaden the understanding of an environmental problem with lay knowledge and to recognize the public values and norms concerning these problems. Therefore environmental governance is best organized by local institutions since they are better placed to grasp the local sensitivities. Community involvement is thus supposed to bring greater legitimacy for the imposed policy measures. (Bickerstaff, 2004; Bickerstaff & Walker, 2001; Petts & Brooks, 2006; Rydin & Pennington, 2000)

3.2. What causes the air pollution?

In the 'Why' dimension we examine the perceptions the public has of the (root) causes of air pollution. In general people perceive traffic and (of less importance) industry as the main (urban) polluters (Bickerstaff & Walker, 2003; Day, 2007), and indeed a lot of studies do confirm this being the case (Buzzelli, 2008; Véron, 2006). Findings from SEFIRA research confirm this data, showing that among a sample of 16100 citizens of seven EU countries, traffic and industry score as the highest concerns for air quality (see SEFIRA CAWI questionnaire, 2016). Therefore it is often considered that car use should be the main focus of policy efforts if sustainable improvements in air quality are to be obtained (Bickerstaff & Walker, 2001; Kopnina, 2011). However, reconfiguring car use is not the most easily realisable policy goal. People's behaviour is embedded in daily practices which get an affective meaning through (collective) identity, culture and tradition (Reeve, Scott, Hine, & Bhullar, 2013). Car ownership in particular is so much more than just a means of transportation. People often associate their car with

affective meanings such as independence and individual freedom, or with their social status and identity among others (Huber, 2013; Kopnina, 2011). Therefore people often refuse to see their behaviour as problematic by denying that there is an air pollution problem, by minimizing their impact or by putting the pollution responsibility with others. Policy-making should take account of these socio-cultural values and norms, or risk encountering resistance and therefore undermining the acceptance hence durability of their policies. (Reeve et al., 2013) Or as Kopnina (2011, p. 575) puts it: “policy makers should not exclusively focus on instrumental motives for car use, but they should also consider the many social and affective motives”.

3.3. What are the possible strategies, the possible actions? How can we change things?

This third dimension puts the focus on the kind of knowledge people have of possible actions to take. As mentioned above this comprises both direct and indirect actions, individual and collective actions. What (direct) actions are possible to pollute less and/or be exposed less? What (indirect) actions can we take to change structures?

A lot of people feel powerless because they don't know the possible actions to take, or the possible alternatives (i.e. the fourth dimension) to strive for. They don't believe they can make a change (Bickerstaff, 2004; Bickerstaff & Walker, 2003; Kenis & Mathijs, 2012; Wakefield et al., 2001). So, as Bickerstaff (2004, p. 833) puts it: “One of the key insights revolves around the notion of agency—that is an individual's perception of whether or not they have the ability to bring about change through their behaviour”. In this context, Wakefield and colleagues argue that through social capital it is possible to overcome this powerlessness, because through networks necessary information can be transferred within a community (Wakefield et al., 2001). Moreover, Rydin and Pennington (2000) show that social capital also increases the chances of participation. The idea that one is not able to change things partly vanishes because of the large number of members that can be part of a network and the trust that reigns in its social ties. Therefore, these are at the same time grounds upon which collective action can start (Kenis & Mathijs, 2012; Rydin & Pennington, 2000).

3.4. Knowledge about alternatives and visions. Where do we want to go?

The last dimension concerns people's knowledge of alternatives. Are they able to formulate a vision of what they want to achieve? Remarkably, this last dimension is least developed in the literature, just as it seems to be the case in people's consciousness (Kenis & Mathijs, 2012, 2014). Rydin and Pennington argue that social capital can help to decide upon an objective and fine-tune it into a qualitatively better alternative (Rydin & Pennington, 2000). Apart from that, not much information seems available concerning this dimension. One of the questions that will guide our analysis is to what extent these findings from the literature are reflected within our focus group observations, or, to the contrary, whether we would have to question some of the given statements, and/or can add new material in other to elaborate others. In other words, the following questions will be central to our analysis: ‘How do people perceive (the different dimensions of) air quality?’, ‘What (direct and indirect) actions do they (not) take towards air quality?’ and ‘What do people think of the proposed policy measures?’.

4. Four cases

4.1. Antwerp

4.1.1. Introduction

In Flanders, where air quality levels are amongst the worst in Europe (“Belgium has second-worst environmental quality in Europe | Flanders Today,” n.d.), Antwerp is a hotspot for air pollution (see D3.1). This is mainly caused by its big harbor, which is a Belgian and even a European transit hub, along with the daily-congested ring road, which crosses through densely inhabited parts of the city, even though its major traffic is destined far beyond the city. Since 2000 the regional government of Flanders has been planning to make the ring road into a full circle (instead of the crescent it is now) in an attempt to solve the daily mobility problems the city is facing. When these plans eventually reached the citizens and the city council of Antwerp, they ignited a chain reaction of protest that has been growing since. One of the local action groups ‘Ademloos’ (which means ‘Breathless’ in Flemish) managed to halt these much-disputed plans through a referendum, for which they collected the needed number of signatures, amounting to more than 10% of Antwerp citizens. In order to convince this considerable constituency, they organized scientific meetings in which they informed the population of the bad effects of air pollution, in particular particulate matter (of which concentrations would be worsened by the proposed plans), on human health (Loopmans, 2014). Thus the mobility problem of the region turned into an air quality problem for the city and its citizens. This means that through the actions of the action groups at least 10% of the Antwerp citizens became aware of the problem of air pollution, its effects and its causes.

The latter is probably also one of the reasons why it was rather difficult for the researchers to compose heterogeneous focus groups; both the residents of the high traffic area and the inhabitants of the low traffic area were quite concerned about the problem. (Of course, there was heterogeneity on other levels, for instance in the sense that the groups consisted of a mix of people with lower and higher education.) Importantly, during the session with the low-traffic group the researchers got the impression that there was no full liberty of speaking; it felt like certain opinions or behaviours were seen as taboo (as when, for instance, a person was feeling guilty for still owning a car). This is certainly due to the fact that all respondents were members of the transition group of their neighbourhood. Note that nobody came to the session by car, even though it didn’t have place in their own neighbourhood. Above that, it was very difficult to form the group of commuters, as we definitely wanted to have car drivers in it. At the end of the day we managed to include three car commuters in this last but small group of five. Originally there would have been four car drivers, but one could not come since she could not use her car that night and thus found herself in the impossibility to reach the session. This is found to be in contrast to the transport behaviour of members of the other groups. So, the focus groups were not the ideal representation of Antwerp’s population, they were nevertheless a mix composed of people living in different places, having different levels of education and using different means of transportation. Above that all the age groups were represented; there was even one child included.

4.1.2. What are the effects of air pollution?

Knowledge about effects

As stated in the literature review, a lot of knowledge on the effects (and distribution) of air pollution can be gained by sensorial experience. People smell the pollution (but also get used to the smell), they see soot on their windows or on the leaves of trees, they see the plumes or torches of factories, and hear the traffic in the neighbourhood. Many of the focus group participants alluded to these sensory experiences:

(FG2.02) Indeed when you enter the city it stinks, IT JUST STINKS HERE. And after a couple of hours you can't smell it anymore. (FG2.03) It's habituation. (FG2.04) Yes, habit huh.

(FG3.02) But look at Amoras, next to the A12, which burns our waste. That is really dingy, the stuff they spew into the air there, the whole day. There are always fumes there. (F) How do those fumes look like? (FG3.02) Well, they're not green or anything. But I can't believe that's it's water vapour; they're burning waste there. The people living in Stabroek, that's where I'm from, they must suffer from it, I'm sure.

(FG3.02) I think you notice it on your windows. They are really nasty. It's really black what's coming off of there. (FG3.01) Especially on the inside.

A lot of the interviewees indicated that even when they do not smell the pollution that much, they experience the effects of it physically. Especially when biking people get short of breath in more polluted places, or they feel they have to do more effort.

(FG2.05) I can really feel it breathing when I bike to work. I do not smell it so much, but I feel it while breathing. I cycle to Deurne and when I'm in the Plantin Moretuslei [... (FG2.06) [Yes Plantin Moretuslei is number one. If you're stuck at the red light or behind the bus. (FG2.05) I just have to cycle slower, I just feel it.

Interviewees experience that the quality of the air affects their health and that of their children. Some people have to use puffers because of asthma or other bronchial sicknesses. The child participating in focus group 3 did not recognise the effects of pollution, while another child does, according to her dad.

(FG1.01) I am always using a puffer, an aerosol, before I didn't need that. Now, I cannot go without it. But when I go to Morocco, I do not need it anymore.

(FG1.02) And the children are so often sick, like asthma or bronchitis, the bronchial tubes.

(FG3.03) Kids also often have asthma. Both my children use puffers. (FG3.01) Especially when it's foggy. (FG3.02) You have it quicker in town. (FG3.04 who is a child) I've never noticed anything of those things. When I have a runny nose, it's only because of the cold.

Knowledge about distribution

With respect to the distribution of air pollution, places with traffic jams and those that in general are close to a lot of traffic (i.e. the ring road, highways and busy streets of the inner city), and the harbour (including a lot of industries) are considered by participants to be the worst polluted.

(FG2.08) Around chemical plants, that's one red area, I think. ... Because when I cycle there I can feel it.

(FG2.06) There's that rotten junction onto the A12. There, there are constant traffic jams, it's very bad there. Traffic jams are polluting. But, of course, without traffic jams it is also polluting. (FG2.04) A zone of 300 to 400 meters along the ring is polluted.

(FG3.01) I think that it's the most polluted around the ring road, a wide swath, and the access roads to town. (FG3.02) Is that as broad as that? ... (FG3.01) 500 meter on both sides of the ring. And the access roads are so polluted because you have a lot of freight traffic on them. The Plantin en Moretuslei is even the worst of the whole of Antwerp. Actually: the whole town is very polluted. Here next to the ring for instance, where the old gas factory used to be, they wanted to make a new residential quarter, but they weren't allowed because of the air quality.

Based on these experiences, people are able to project the effects of pollution caused by future projects. They especially consider the effects due to the closing of the ring road in Antwerp.

(FG3.02) And what's the deal with this residential quarter [on the west side of the river]? (FG3.03) I think that now the pollution is quite ok there. That is until they're going to close the ring road, the Oosterweel trajectory. Then it's going to be worse there. (FG3.01) In theory it should be making it better on this side [the eastside] of Antwerp, because traffic should be less then. But that's probably a fable too.

However, people realize that the distribution of the pollution also depends on factors such as wind direction and topography. Some participants for example stated that how they are affected by pollution originating from (the industry in) the harbour, but also from the ring road, depends on the way the wind is blowing. Fog is also mentioned several times as a condition that makes air quality worse.

(FG3.03) Doesn't it have to do with the direction of the wind too? I think that one has more particulate matter at the East of the ring road than at the West. Because of predominant western wind.

(FG2.08) The only thing that bothers me at home, concerning air pollution that is, when I open the window at the backside of the house; when there's a northwest wind, I smell the harbour. The harbour is a big polluter, I think. (FG2.09) Yes, I think the Netherlands and Bergen op Zoom and so have more problems with it than we do. Because mostly we have a southwest wind. But when you see those torches, it's just incredible that they don't do anything about it. (FG2.08) 15% of the time is north or northwest wind, and then we suffer from it. (FG2.01) And

when there's fog. (FG2.09) We only get the pollution of the harbour when the wind is bad. Otherwise, we only suffer from our own pollution.

In two groups, participants also mentioned the degree of pollution as a function of height. They immediately added the negative consequences of it: the smaller the person (for example children) the worse the effect. On the other hand, some participants also see possibilities in these properties of the exhaust gases. They argue that exactly because of these characteristics, the gases could be shielded more easily by material barriers.

(FG1.04) You have this piece along the ring road, that bicycle lane. (FG1.06) Yes, when you cycle you're with your nose in the pollution. (FG1.01) And prams, those are at the exact height of cars.

(FG3.02) There were also tests where they looked at the height. Apparently when they measure the air quality it is on a height of 4 meter. But then they measured at 4 m, 2 m and person height. It seems to be worse closer to the ground. (FG3.03) Because it's heavier? (FG3.02) Apparently the gasses don't rise very high. The smaller the person, the more polluted the air he's breathing in. So, if you put high buildings along the ring road, then the particulate matter reaches town more difficult. (FG3.06) Those sound walls are better for the environment too. They retain the gasses and the particulate matter too.

Participants generally like to compare Antwerp to other cities. They like to mention the places where the situation is worse, but this is also put in perspective: "It's maybe worse in other places, but it's certainly not good here either". At the same time, people mentioned other places, other cities, where the air quality situation is supposedly better. People look at them and think about the possibility for Antwerp to adopt similar measures (other examples are described in the part about alternative visions).

(FG1.07) I've been to Istanbul, and there it's much worse than here.

(FG3.02) We had that in Sofia, a couple of years back. It lays in the valley, so there's a smog that keeps hanging there. And D [her other son] really had a problem with it for a couple of days [she makes a wheezing sound]. Until we were gone there. You really feel it there. It smells, bwaah.

(FG1.07) Once a year I go to Switzerland. There I open my lungs. They're not allowed to drive cars ... And when you come back, then you smell it. (FG1.02) Is that in Saas-Fee or so? When I was a child it was already like that. (FG1.04) Bruges has that too. A big part of Bruges is car free.

Attribution of pollution to places with a symbolic meaning

What about the attribution of pollution to places with a symbolic meaning, like home, the inner city, parks or the countryside? It is difficult to know what the real level of pollution at people's homes is, but many consider the air quality situation where they live as pretty much acceptable. However, there are others who do not think this way.

(FG1.07) Where we live it's rather ok. The pollution at the city hall is much worse.

(FG2.05) I think we have better luck. We live pretty much in the middle of the square, the St. Andriesplaats, ... we are surrounded by low-traffic zones and trees. But this is a rare situation.

(FG3.01) I never open my window. Apparently it doesn't change that much, but it's the idea you're sleeping next to the ring road. (FG3.02) It's coming in anyway, through the windows and cracks.

Looking at a pollution map, one person was astonished to observe she is living in a 'red zone'. She had not realized that the place where she lives is very polluted.

(FG3.01) I think that it's the most polluted around the ring road, a wide swath, and the access roads to town. (FG3.02) Really, is it as broad as that? I thought where we live, that it was quite ok. That it isn't really clean, but quite ok.

Some of the interviewees consider green places in the city with grass and trees, like parks, as healthier places. Others dispute this view and are asking themselves if one is not fooling himself by thinking that. One person for example noted that trees in some situations make air pollution worse because of the tunnelling effect they have on a busy street.

(FG2.09) I have a courtyard of a square meter, something bigger, and that is completely in green. So I have my own purification plant.

(FG1.04) I bike a lot in the park, and in the summer I read a book in the park. (FG1.06) But I don't think it's that healthy here in the park. (FG1.04) It's better than going to sit on the Lakborslei. (FG1.06) And there's a lot of noise in the park. (FG1.04) That depends on where you're sitting.

(FG2.03) Why do you put the Leie in orange and the Turnhoutse Baan in red? (FG2.08) Because there are trees. (FG2.03) I think this is psychological, "there are trees so it will be less severe."

(FG2.04) Plantin Moretuslei is number one [for pollution] because it's tunnelled by the trees.

The inner city is generally depicted as very polluted, but other participants argue that this is not the whole story: sometimes the wind carries the pollution out of the city resulting in higher levels of pollution in the suburbs or countryside.

(FG3.03) In Ghent they saw that the particulate matter in the town itself isn't that bad, but that the filth is descending behind Ghent.

(FG2.06) In the city one has certain air currents, which we do not see. They end up somewhere outside the city, in a place which is much more polluted than here.

Furthermore, the suburbs and countryside know their own sources of pollution too. Therefore, the question whether the air quality situation is really better in the countryside is hotly debated. Some participants for example questioned whether air quality levels are better there, as people living there drive their car more often. People also mentioned pollution coming from agriculture.

(FG2.01) What I think about the air quality in Antwerp: when you've been to the countryside or to the Ardennes, and when you come back into the city, close your eyes and you know you're there. I like living in the city, very much so, I could not do otherwise, but a few times a year I have to go get my oxygen out of town. I think this is very important for your health.

(FG1.04) It's more polluted in the inner city and more towards the south of Antwerp. For the rest you have more nature, Kalmthout and so. (FG1.01) But is that correct: 'Where there is green, it's always clean air.' Is that always true? (FG1.02) No, you can think of the agriculture zones. There's a lot of pollution there because of fertilizers, pesticides and herbicides, and everything else they use in the classic way of agriculture.

(FG3.02) But when you go to Essen, where you live, that is totally different. (FG3.06) Yes, that's totally different. (FG3.04) But there must be a lot of traffic there too. (FG3.06) Yes, but it is more spread out. (FG3.03) Well, you can ask yourself the question if the suburbs or the countryside is so much better. If you look at the map of Belgium, all these roads ... (FG3.01) On the map of the world Flanders is indeed a stain. (FG3.02) In the countryside there's even more car traffic than in the city. (FG3.06) Because there's less public transport. (FG3.02) Yes, you have to go by car. (FG3.06) In the countryside they will take their car quicker, while in town you take the tram or the bicycle. That is maybe a bad habit in the countryside. (FG3.01) In town it's not very efficient to take the car either. (FG3.06) It's a habit and lack of public transport. We don't have trams.

Participants also consider the waterside as less polluted, not because of the cleansing capacities of water but because of the fact that air currents can transport the pollution (of the harbour) away. Yet again some are wondering if they are not fooling themselves. Others say it depends where the wind is coming from.

(FG1.02) We have the polluting industries on Linkeroever. The Schelde keeps a lot of that away from us. It's kind of a barrier that protects Antwerp.

(FG2.04) On the other hand, when I go Nordic walking, near the dam wall, along the water, I have a better feeling there. (FG2.03) Yes, I have that too. But I wonder if we're fooling ourselves. Maybe it's just imagination.

(FG2.08) I often go biking for 30 km, and when the wind comes out of the wrong direction (i.e. from the harbour) then I really feel it. But normally I like cycling along the water, and then you still have good air. But when the wind comes wrong then I will certainly not go ride there.

Acquiring knowledge on air pollution

As said above, people experience polluted places in a sensorial and physical way. But there are a lot of facts known to people which are impossible to witness through one's own experience. At which distance from the ring road is there still a lot of pollution? Which streets in the centre of Antwerp are

the worst polluted? What effects do trees have? Does pollution get blown out or in the city? ... In other words, people must also be informed in another way. Hence, some participants referred to information they remembered getting from the media, for example in TV documentaries or in newspapers. Public communication also seems to play a role. An example is the website of Kind & Gezin (literally Child & Family), a governmental organization advising on child welfare, which recently started a project to inform parents about illnesses related to air pollution. Another is the "AIRbezen project" which tests strawberry plants on pollution (this is a project of the city in collaboration with the University of Antwerp).

(FG2.01) What is particularly worrying, in terms of health, especially with young children, is this mucus they get. The children actually suffer from all this. The most dangerous is what you can't smell nor see. (FG2.08) You can find the numbers at the "Kind & Gezin" site. They say that babies and toddlers are much more likely to suffer from asthma and that they need inhalators, much more than before.

(FG2.06) They are working on it. They came in our garden project to collect strawberries to research them. And it seemed ok. They've also come for Swiss chard and a few leaves of the ivy.

Other public communication efforts are noticed too, but sometimes meet with scepticism: "How is it possible that the air is always ok there?" or "They say it's going to be better here, but is that really so?". A lot seems to depend on where the communication comes from.

(FG2.06) Isn't there a meter by the Eco House which measures the air pollution? (FG2.07) Yes, and on the Astridplein too. But that's always green. (FG2.03) It's possibly fraudulent, like with Volkswagen.

(FG3.02) And what's the deal with this residential quarter [on the west side of the river]? (FG3.03) I think that now the pollution is quite ok there. That is until they're going to close the ring road, the Oosterweel trajectory. Then it's going to be worse there. (FG3.01) In theory it should be making it better on this side [the eastside] of Antwerp, because traffic should be less then. But that's probably a fable too.

If actions of social movements are picked up by the media, they often provide citizens with information on air pollution. Here is the example of the Environmental Front in Ghent, a local environmental umbrella organisation:

(FG3.03) In Ghent they hung up those sheets outside, in order to demonstrate how contaminated it is. Eventually they did not hang there so long, but they were really grey.

Some of the interviewees went once or several times to meetings and info evenings of the Antwerp action groups. A lot of scientific evidence they are having seems to originate from there.

(FG2.04) I regularly go to meetings of stRaten-Generaal, Ringland, Ademloos to listen to the information you get there of Dr. Avons. He's informing us time after time about the evolution of scientific research on particulate matter and its harmful effects. ...

(FG2.04) But if you listen to Dr. Avons on those meetings, there's a decreasing effect away from the ring. Those first 200 m., of course, are in the red, but even a km into the city you will still have pollution of the ring.

4.1.3. What causes air pollution?

Proximate causes

Although people found it hard to decide which is the main cause, most interviewees attributed air pollution in Antwerp to traffic and/or the industry (of the harbour). Considering the industry of the harbour, a disagreement emerged on how polluting the industry actually is, and whether the port is especially polluting because of the factories or because of the traffic it is generating.

(FG3.02) Industry is very polluting too. (FG3.01) It depends which industry is polluting and which isn't. (FG3.04) I don't think industry is so polluting. (FG3.01) I think the pollution of the harbour is mainly because of the traffic in it.

(FG3.03) And the harbour. You always have to take that in account. You have to do something with that. (FG3.01) Yes, the harbour is generating a lot of traffic, that you can't do without. That has to go partially through Antwerp.

In any case, people consider traffic as a major polluter. Several worry about the ever increasing volume of the traffic. There is a conviction that if something is done about the volume of the traffic it will improve the air quality.

(FG1.07) Most of the stench is coming from the factories. (A1.02) Most of the stench? I wouldn't say that. The car traffic is getting busier and busier.

(FG2.06) Along the Leie the bridge is gone now. That does result in less traffic, so it is nevertheless less polluted there.

Along with traffic volume, different kinds of fuels are acknowledged as causes as well. For cars, it is mainly diesel that is seen as the carburant to get rid of. But also the fuels the ships in the harbour are using are understood to contribute to air pollution as are the airplanes passing in the sky.

(FG3.03) I think one has to abolish diesel cars.

(FG3.03) And all the ships in Antwerp? (FG3.06) Are those burning diesel too? (FG3.01) That's heavy oil fuel. (FG3.02) Where do those ships come? (FG3.01) In the north, but further too. Actually everywhere in the harbour, in the docks.

(FG2.07) I lived for a long time under the flight path of Deurne. I wonder, even though they are flying high, but still there's many (airplanes) a day ... it must also all come down, no?

In two groups it was mentioned that it is not only the local industry that is affecting the air quality in Antwerp but that, when there is a lot of eastern wind, the industry of the Ruhr is polluting the city as well.

(FG1.08) Much of the pollution also comes from Germany and Ruhr. (FG1.01) But that is in the East. We rarely have an eastern wind. (FG1.02) But now, in winter, there is an eastern wind. And then there are no leaves on the trees. It's just blowing through them.

(FG2.09) We have little trouble, unless when it is east wind. And an easterly wind that's what comes to us from the Ruhr. We all think it's only Antwerp polluting, but we also get a gift from the neighbours. That just stinks.

Others sum up some other causes of pollution like wood burning and central heating in homes.

(FG1.02) In the winter you can smell burning wood. That's big pollution too.

(FG2.04) I think home heating is also a major source. All of these fossil fuels. (J) But what (if you're heating with) with gas? Is there actually still particulate matter? Because 80% of the central heating in Antwerp is gas heating. (FG2.07) What about having gas, but old chimneys? There must be lots of particulate matter coming out of there. (Others) No, today you have standards. You can't have gas heating with an old chimney.

Root causes

Almost all root causes mentioned in the focus groups are related to the ever increasing volume of traffic. The current economic structure is considered as crucial in this regard. First of all, it is generating a lot of freight traffic, especially in a just-in-time economy. Above that, freight traffic is usually using diesel fuel. Internet shopping, resulting in many vans driving around, is also mentioned. Another aspect specific to the Belgian case is the persistent use of company cars as a way to give fiscal advantages to employers as well as employees. They were mentioned in two groups.

(FG2.04) We can say that the car and especially the freight traffic, with the Just in Time Management, has grown enormously. From this documentary you will learn that pollution is in some places locally. But globally in a city like Antwerp, I fear that despite all the efforts and standards, it's still increasing. (FG2.01) Freight traffic is growing rapidly.

(FG2.08) What you have a lot now, are those packages from DHL, Internet orders. You see them pass every day. And I think there's very few packages in those vans. Because these Internet orders I think there's a lot of extra traffic with those small vans.

(FM) Are there any measures that make the air quality worse? (FG3.02) Well, it's against my own benefit, but company cars are. And those aren't going to be abolished soon, luckily. (FG3.04, her son) Yes, you love your BMW eh, me too.

Looking at Antwerp from a national and European perspective, the city and its harbour are considered of economic interest because of their role as a transit hub. Focus group participants thus identified a conflict between the national (economic) interest and the urban (environmental and health) interest.

(FG3.03) Well it's double in Antwerp, isn't it? Antwerp is a real transit city. You can really break the city economically with those paying measures. It's really a hub for Belgium and Europe, isn't it? This discussion has always been there. Even with the construction of the railway system in Antwerp. It's the national interest vs. the city interest.

Of course the city also has its economic interests, relating not only to the harbour but also to visitors and tourists. It is said that Antwerp wants to attract visitors by creating a lot of parking places and thus inviting them to come by car. The residents themselves are said to be encouraged to find another solution to park their car.

(FG2.08) The whole parking policy is wrong. Now there are 1500 parking spaces around the "Groenplaats" ... those parking garages are wrongly planned. They actually suck the car into the heart of the city. They should make it impossible for an outsider to find a car space. In Amsterdam, you'd be crazy to drive into town, you can't park anyway.

(FG2.06) Now the politicians do no longer want to have as many cars parked on the street. They would prefer that either you have a garage or you go park outside the city. So that the visitors have again place to park their car in town. They want the residents to move their cars to the "linkeroever" [the other side of the river], and when they need their car they can go get him. And consumers can park nicely in town.

Problems can also be traced to a personal economic level: people have to work to earn a living. Flanders is structured in such a way that a lot of people have to commute a considerable distance each day in order to get from their living place to their work, and back.

(FG3.03) I do think that in the first place you have to tackle the commuting. By means of transit oriented development. (Hahaha) No, those ring roads are an enormous problem for cities eh. (FG3.01) Yes, there's people coming from Bruges to Antwerp to work, from Antwerp to Brussels, ... There's an unbelievable amount of traffic flows, every day. Because people don't live close to their work.

Another root cause is seen in the historical spatial planning of the ring road and other related roads. The ring road is considered to be badly conceived, as a result of different kinds of political interests at play.

(FG3.01) You also have to look at it historically. The Antwerp ring road is only a small ring road. Originally this was only conceived for the people that have to be in Antwerp. There would have been a bigger ring road too. (FG3.03) But they blocked that. (FG3.01) Indeed, all these communes were very agitated; they didn't want a highway in their backyard. Well, if you look now how many people that are using the ring road that really have to be in town, it's relatively little. And this ring road is really going through town eh. All around it is town too. So all that transit traffic all goes through Antwerp.

(AK) What do you mean with: "That whole ring shouldn't have been there."? (FG1.06) The ring road is made next to the ramparts, the muros. Nobody who is sane in his mind puts the ring road there. It should have been put much further away from town. (FG1.02) In the beginning they were planning an inner circle and an outer circle. (FG1.06) I'm talking about the times when those big guys from Schoten en Brasschaat could prevent that. (FG1.02) Those were plans of the sixties. The inner circle is there, but they retained the outer circle. The mayors and ministers from the outskirts. And the residents too. And still. The truck drivers are saying it themselves ... if you would be able to connect the two parts further outside. And these two pieces should have been there in the sixties already.

One person said that making more and broader roads attracts more traffic. The easier you make it for cars, the more traffic you are generating.

(FM) When they make the traffic go easier, you think that they are attracting more cars then? (FG3.03) Hey, I'm not pro car or so. No no, I have a PhD in transport. In LA they have highways with 12 lanes. When you make more space for cars, you are creating more traffic. It's a vicious circle. ... This is my opinion: only discouraging helps, not facilitating. So that it's not nice anymore to take the car.

At the same time, the infrastructure is not very suitable and encouraging for taking the bicycle into town.

(FG1.0?) You're always talking about ideals. You could, you could, ... but does it really happen? I teach near to the Rozenveldplein, and I'm going by bicycle. But when I pass there I'm always standing still. (FG1.0?) Yes, in town it's actually very difficult by bike. (FG1.0?) For example: the Turnhoutsebaan is a real killer road for bicycles.

(FG2.05) I would be very happy if there were to come more bike parking, and also better cycle paths.

Furthermore, a root cause that is mentioned over and over again is the infrastructure for and the organisation of public transport, which is considered as discouraging people from taking the bus, tram or train. This argument is not only made concerning Antwerp but also regarding other cities, such as Brussels. Participants complain especially that public transport is too slow, that it is inconvenient and time-consuming. Because of the way the transport system is organized, people need to change connections often, and that it is not very practical, especially given long waiting times at those connections.

(FG3.06) In principle I can go to Brussels by the public transport in an hour and a quarter, an hour and a half. But that's only to this certain place in Brussels. Because when I have to go somewhere else, I have to take a tram. (FG3.02) That's the main problem. Because you're, although there's traffic jams, still quicker in Brussels. If I could be in a quarter of an hour or half an hour in Brussels, then I would do it. But really a lot faster eh. Not a quarter of an hour or so, double as fast.

(FG1.05) I'm lucky, I only have to take one tram. But when they were working in Merksem it was hell. I have to be honest: our trams are rather ok, but tram 24 sometimes you have to wait for half an hour before there's one passing. And there's always something: it's standing still, or ... (FG1.03) A traffic jam eh. (FG1.05) A subway would be easier. (FG1.06) Ho, ho, I don't like subways that much. (FG1.03) I have a bike, a car, everything. I use everything but it depends on my time. If I have to go to a parents' meeting, I could be having them in Deurne, in Schoten or in Merksem. When I have the time, I'll take the tram. But if I have several on an evening, I can't get there by tram. I have to take the car.

This loss of time is attributed to a lack of decent infrastructure for public transport (for instance public transport which is separated from road traffic) or to the fact that buses, trams, or trains do not come frequently enough.

(FG1.02) They are working well on the bike lanes. But there's no relation between all these traffic measures. They make it difficult for cars, but on the other hand they don't make it easier to take the public transport. When I have to wait for a tram in the morning, theoretically there's one coming every ten minutes. But that's not what happens. There's no sequence.

(FG3.01) Well it's also this problem, it's a big frustration of me, I take every day the bus, but I'm still in traffic. That's very frustrating. You're taking public transport ... (FM) So if public transport would be faster, more people would take it? (FG3.01) Yes, a good suburban network. Tram 15 coming from Boeichout is a big success too. (FG3.02) Or tram 7, that one has a apart rail bedding. If you want to do that by car, are you crazy, then you're just queuing. I always take the tram or bike to go into town.

(FG1.03) And if you have three of four kids, try to get on a tram with them. They're always full. (FG1.02) There has to be more trams.

People also complain that they cannot get home by public transport late in the evening. This is difficult, for instance, when travelling from Brussels to Antwerp, but also within Antwerp itself.

(FG2.07) Four years ago I've got rid of my car. So I use a lot of public transport. Actually I don't think that works so badly. But I can't go to Brussels or to Turnhout to see performances anymore, because I can't get back home. I used to do that a lot though. Not anymore.

(FG2.06) Because if you're going to eat somewhere, you cannot get back after 11:00.

Finally, one person stated that the steps of the carriages and the stations are not fit for disabled people.

(FG1.06) I was immobile for a while. I couldn't drive a car. I couldn't get out because public transport wouldn't work for me. The steps were too high, too many changes of tramlines, ... Those people have to be able to use public transport too.

(FG1.05) Yes, for instance on the Astridplein you cannot get on or off if you're disabled.

Some people consider the desire for everything to be easy, comfortable and fast also as a mentality problem. Characteristic for the current era, this desire supposedly explains why not more people use public transport, in addition to the fact that the latter also often malfunctions.

(FG1.07) It's the people. When they have to go to the baker, they take the car. (FG1.01) We want everything to be easy. We want to go from A to B, but we don't want to change trams or busses. 'Wait a minute, I'll have to wait for the next bus there.' No, we don't want that. We want everything the easiest way.

(FG3.01) It's also a mentality problem, I think. In Antwerp now there is tram 8 from the Park & Ride in Wommelgem. It brings you to town in a couple of minutes. The purpose was that people coming from Hasselt or that direction could leave their car there and change onto the tram. Well, the tram is especially a good thing for the inhabitants there, but there's no commuters using it. There are really few people using the Park & Ride, and the tram is as good as empty. Maybe it's because when you arrive in Antwerp they still have to change to get to work. Anyway, you're much quicker with that tram to the end station than by car.

For others, the problem is simply on mentality, whether the public transport system malfunctions or not. A number of company car drivers in the group confirmed the following statement: "Even if people are wasting double as much time in a traffic jam, they still won't change to public transport." Some of the participants even acknowledged themselves that their choice for using a company car was "pure egoism."

(FG1.07) When people bring their children to school, they want to drop them in front of the school gate. So they don't have to walk too far. Would be bad for their feet eh. (FG1.02) When I went to primary school I lived in Switzerland. We had to walk three kilometres to get to school. And in Africa, they have to walk a lot of kilometres too. (FG1.01) Yes, but in front of the school they are only allowed to drive 30km/h, but on the other streets it's sometimes very dangerous.

(FG3.01) They're planning to make a shuttle boat in the harbour, for the people that work there. (FM) Well, your colleagues might take the boat then, instead of the car. (FG3.01) Once maybe. I still think: even if people are wasting double as much time in a traffic jam, they still won't change to public transport. (FG3.06) That's right. (FG3.02) Yes, that's the way it is. Theoretically we can take the public transport, but still we're taking our company car. Because it's so relaxed to be in your car. I don't like it with all those people around me [in the train or bus], I really don't. It would have to go much, much quicker before I would take public transport.

Finally, one person wondered if overpopulation could be a root cause of air pollution. If so, the group concluded there is not much that can be done about that.

(FG1.x) I'm wondering if it's also not because Antwerp is so small and there's too many people living in it? Overpopulation? Belgium is a small country with a lot of people. I think there's an important cause there. Belgium can't handle that, it's too small. I think if Antwerp were twice as big, then there would be less pollution. (FG1.y) That I don't know. We keep moving with our cars, whether we live in Kalmthout or in Deurne, we keep on moving with cars. The car is never standing still. (FG1.x) Yes, but it's like with a small room. If you have a lot of people in there it will be stuffy. If you put those people in a bigger room that would already be much better. (FG1.06) Well, you can't make Belgium bigger. (FG1.x) Yes, but Antwerp is overpopulated eh. (FG1.04) But take New York, there's as many people living there as in the whole of Belgium. So it's actually not so bad at all here eh.

4.1.4. What are the possible strategies, the possible actions? How can we change things?

Direct actions as a way to minimise one's own exposure to air pollution

Some people are not going out to sport when there is a smog alarm (i.e. a lot of particulate matter in the air). Others mind less, and take the bicycle or go running anyway. One person never opens his window because he is living close to the ring road.

(FG2.08) I often go biking for 30 km, and when the wind comes out of the wrong direction [i.e. from the harbour] then I really feel it. But normally I like cycling along the water, and then you still have good air. But when the wind comes wrong then I will certainly not go ride there.

(FG3.01) I have a friend and before he goes jogging he's checking the air pollution in Antwerp. (FM) Is there anybody that doesn't go biking or running when there's bad air quality? (All) No, I don't mind.

(FG3.01) I never open my window. Apparently it doesn't change that much, but it's the idea you're sleeping next to the ring road. (FG3.02) It's coming in anyway, through the windows and cracks.

Some people consciously seek out places which are less polluted. They believe this is beneficial for their lungs and health in general.

(FG1.07) Once a year I go to Switzerland. There I open my lungs. They're not allowed to drive cars ... And when you come back, then you smell it.

(FG2.01) I like living in the city, very much so, I could not do otherwise, but a few times a year I have to go get my oxygen out of town. I think this is very important for your health.

(FG1.06) When it's warm or cold, I stay inside, because I have pulmonary affection. When it's warm I go to the seaside. Then it feels like my lungs are being rinsed. Not to Ostend, but to Henneszee.

People tend to adapt their behaviour in favour of their children. They carry them higher in the air, they choose a school further from the ring road, or they refrain from making city trips.

(FG3.03) Since we have children, we're making less city trips. We're going less to cities. (FG3.02) But not because of the air quality? (FG3.03) Yes, yes, I don't want to go to a city with my little sweethearts.

(FG3.01) Next year my daughter goes to high school. We're having the choice between Atheneum Berchem and Stedelijk lyceum. They're a kilometre and a half apart. The Atheneum Berchem is located next to the ring road, and that's the main argument not to choose for it.

(FG3.02) When the kids were small, I always carried them in a baby carrier, because in a buggy they're really at the height of the exhausts. That is really filthy. (FG3.03) Yes kids are really a ... (FG3.02) Yeah, then you go thinking. I still have that sometimes, what are we doing to our kids, their health ...

'Direct' actions to limit one's own impact on air pollution

None of the interviewees says s/he has positively changed his or her own behaviour *as a response* to air quality measures put forward by the government. A small exception should be made for measures which impose a financial penalty for non-compliance, such as driving too fast when there is a smog alarm.

(FM) Did you change your behaviour because of one or another measure? (FG3.03) No. (FG3.02) I have to confess: no.

(FG3.06) [with a smog alarm] I drive 90. But that's to get no fine. (FG3.02) Yes, because they're flashing [speed controls]. Otherwise I would just drive as fast as normal, sorry but ... (FG3.06) [Driving 90] I find that very boring.

However, a lot of interviewees have undertaken some action to limit their own polluting *because of their conviction* it is important to do these kinds of things. In other words, they see their pro-environmental behaviour not as a consequence of governmental initiative, but as a very conscious choice to have smaller impact on the environment. Most of them try to limit their ecological footprint in several ways. Half of the participants of group two (FG2) no longer own a car. Some people try to avoid flying as well, and if they take a plane they consider this as if it were a sin.

(FG2.07) For 20 years I placed a firm footprint with my diesel car; every day Antwerp-Brussels. Four years ago, for several reasons, I got rid of my car. It was immediately a very nice feeling having diminished my ecological footprint.

(FG3.01) I very consciously don't have a car, I even don't have a driver's license. I take the bus or my bike. But that's very conscious, it has nothing to do with one or another measure.

(FG3.03) I try to fly less to the States. I don't fly there anymore unnecessary. A transatlantic flight is about the same as driving your car for a year, I think.

In two groups there were people who use the possibility of car sharing, in this case Cambio. Cambio is a private car-sharing company, though, there is some involvement of public authorities, as, for instance, some parking places in the public domain are especially reserved for Cambio users.

(FG2.04) We have deliberately discarded our car. That's part of our transition thought. And instead we bought folding bikes and a Cambio membership. So occasionally I do use a car, but that is very limited. We also eat less meat. We don't ... well we've flown only once in the past ten years.

Others have consciously chosen to work in town, so they can exclusively rely on public transport or bicycle.

(FG2.03) Most of what I do is by bicycle or tram. I've also consciously chosen for a job within the city. I have had an offer to go work out of town but I refused.

(FG2.01) It has always been a very conscious choice to work within the city, and I always chose to cycle. We never had a car. There were several reasons, including the lack of parking. We also minimize the use of disposable materials. And if I really need a car, I can always rely on the car of J. But that's actually only a few times a year.

One person said she cannot miss a car to go to work, but chose a car on gas to have a smaller ecological impact.

(FG2.02) I have a car on gas. That's less polluting. I try to use it as little as possible, but I need it for work regularly. For the rest I use the bicycle. This year I stopped eating meat, for ecological reasons. I try to use as little plastic as possible. As a consumer I try to minimize my waste. Garbage should actually not exist. But I can always do better ... sometimes I fly somewhere.

One person said she limits her heating and showering, for both ecological and financial reasons.

(FG2.06) I'm heating now because you are here. But normally I only start the heating at the earliest on November first, and preferably December first. That's for the environment but also for my wallet. I do not use much hot water, only for showers and I don't shower every day.

Do people believe they can make a difference?

Sometimes it is difficult for people to believe they can make a difference. Do they believe their actions are helping? Several respondents revealed that it is a big support to find like-minded people and share thoughts. This was deemed necessary to keep them motivated. A lot of the participants of group 2 believed that supporting the ideas of the action groups could really have an impact.

(FG2.05) We have put children on this world, and now we have grandchildren. I am pondering over it. What do we leave behind for them and is there something we can do about it? What can one do alone, and does it have an impact?

Sometimes it gets me down, and then I look for like-minded people to find back energy. I do make an effort everyday though.

Raising awareness as an indirect action

Interestingly, all three groups include people engaging in indirect actions. A first form of indirect action is to help raise awareness about air quality issues. Though some considered this as very important, other participants contested this, claiming that awareness raising as such does not make a difference.

(FG1.02) Raising awareness is important too. You have to raise awareness constantly. It has to happen repeatedly. (FG1.04) But they're raising awareness for years already. You hear it constantly, but it doesn't change anything. (FG1.06) Actually it should be: Giving the right example. That's education too eh.

(FG1.04) I would want to see those car free Sundays back. That would be nice. They could begin with that. Your whole town is full of bicycles and rollerblades. They can begin with that to raise awareness. (FG1.01) Why aren't those happening anymore? (FG1.06) It was a crisis measure. (FG1.02) They still happen, but only in the inner city.

(FG3.01) I do think that raising awareness is very important. Just look at the smoking ban. (FG3.02) When you have a compulsory measure. (FG3.01) Yes, with a compulsory measure it's very important.

Collective action as indirect action to put pressure on the government

Some participants are already engaging in collective action to put pressure on the government, while others are primarily advocating such action, to collectively take to the streets to promote alternatives.

(FG2.04) But the government does not act. So we are forced to promote, from the bottom up, such alternatives in response to a policy 'as usual'. If they don't have a vision for a future-oriented, equitable and sustainable development, we must put pressure on the government. We will have to enforce that.

(FG1.04) Who owns the factory, big boss, big capitalist. Ecological groups have to react against the government, then petrol car will stop. Without petrol, alternative energy important, when comes the electrical car. Only [we have to come] to the streets to, to make pressure. ... (FG1.04) Alternative for the car. There have to come more people on the streets, then the government will change politics maybe, then more electricity will come from sun energy. This is very important for the air.

4.1.5. Knowledge of alternatives, visions and measures that should be taken to accomplish them

Less cars

All of the interviewees (including the company car users) agree that reducing the number of cars would make a major difference. But how to make this happen? What possible policies are effective? And are they welcomed by inhabitants? One of the main policies that are discussed in this respect relates to financial measures. Some participants thought that these measures were the only way to have less cars, while others are very sceptical about this. The latter question whether those measures are (or would be) very effective: people would always find a way to sidestep them. As one participant said: "People's behaviour wouldn't change by it". They would not be happy about it either. Moreover, financial measures are often considered as socially unjust; the poor would end up paying the piper, not the rich. Examples given included a congestion charge and road pricing.

(FM) How do you make it difficult for the car? (FG3.03) Financially. The wallet.

(FG3.03) Weren't they going to install a congestion charge? So you have to pay before getting into Antwerp. Kind of a péage? (FG3.01) Yes, that would make it a lot more fluently in town. People would take their car less. (FG3.03) They do that in London. (FG3.02) I think that's a good one.

(FG1.05) Is that paying for each kilometre you're driving? (FG1.04) On the ring road and so, like péage? That is not going to end up well. They are going to look for shortcuts on small roads, and then those will be getting overloaded. (AK) The system would be that you pay for each road you take. It would be organised via gps. Actually you could compare it to increase the price of the petrol. (FG1.06) Do you now what? I think those that drive fat cars, and paying 600 to 700 Euros of road taxes a year, will be glad to hear that. I'm paying 132 euros a year. I've calculated that I can't drive 5000 kilometres before I'm at my limit. I don't think it's fair. I have a small city car, which is polluting a lot less and I don't know what for other ecological things. At the end of the day, I'll have to pay much more than those others. (FG1.01) People won't like that. Why does it always have to happen with money? Can't they do it in another way? The common people always have to pay for it. They [the government] have to take care of it in another way. This is a very easy way, no? (FG1.04) The problem is that they are deciding, and there's nothing you can do about it.

(FG1.01) Is that really going to help, that you have to pay more? (FG1.04) They hope that because you have to pay you will leave the car at home. (FG1.01) I don't think our driving behaviour will change because of it. (FG1.04) Yes, I know. (FG1.06) But all these measures won't pass the poverty test. People in poverty are really going to feel that in their wallet. (FG1.07) I like to pay road taxes, but then for good roads. Not for the roads we're having here in Belgium.

An alternative strategy to have less cars in town would be to invest in better infrastructure for bicycles. Several participants argued that Antwerp has not been sufficiently targeting this.

Admittedly, the local authorities introduced the system of rental bikes 'de Velokes'. However, there is a waiting list for them, which shows people are willing to participate in this initiative, but there are not enough possibilities for them to do so. Furthermore, this measure is not seen as the most important one to encourage bike use. The participants argued especially in favour of more bike parking space and better bicycle lanes.

(FG2.01) The whole system with the 'Velokes' is also okay. They do have a lot of success. There is a waiting list.

(FG1.02) Very important as alternative: the system of borrowing bicycles. That's very important and coming in second place after public transport. (FG1.?) That's a big success in Antwerp.

(FG2.05) I would be very happy if there were to come more bike parking, and also better cycle paths.

Also, car sharing is seen as an alternative. One group proposed allowing families to only have one car. But this was found to be unjust by other participants, because it would constitute a disadvantage for women.

(FG1.01) Less cars per family. Really, 4 kids and they all have a car in front of their door. Next to us they have three, on the other side two. (FG1.02) Every home has somewhat three cars. And they all want to park in the street.

(FG1.06) One car per family. (FG1.04) That's utopia. (FG1.06) And it's misogynistic. Usually it will be the woman who doesn't have a car no more.

All participants saw living in the city or living closer to work as a possible solution for the daily high number of road kilometres for commuting. How to realise this is another matter. Some argued employers should only recruit people living not too far from the workplace. Others looked at experimental projects existing in Holland, such as job swapping.

(FG1.02) I'm always biking. Once upon a time I came living in Deurne against my will. Afterwards I was thinking: 'Actually that was a very wise decision. I'm close to everything, I don't have to do many kilometres, I don't even have to take the bus.' I think people should live much more in the city instead of in the countryside. They will have to commute much less. Go live closer to work.

(FG3.02) In Holland they have this supercool site, where you can change of job. If you have job X and somebody else has job X' somewhere else. You can say to each other: "Aha, you're living where I work, and you work where I live, let's switch jobs." (ML) At the KU Leuven, it used to be the policy. You couldn't go work there if you didn't live within 20 km distance. (FG3.06) I once applied for a job at Colruyt. You had to live within 5 km around Halle. Otherwise you couldn't work there. (FG3.02) That would solve a lot of problems. (FG3.03) Yes, adjusting this work-house relationship, that would be good.

A related possibility to decrease traffic in general is to encourage freight traffic by water and train.

(FG2.04) We must implement a policy which discourages the increasing freight traffic. Regarding raw materials and pollution it would not be a good thing if a certain policy would result in even more trucks. Freight should be by water and train.

Reducing emission per car

An alternative to lowering traffic volumes are technological improvements in order to reduce car emissions. Participants engaged in a debate about the effectiveness of certain measures on this terrain and about the question whether or not they would be socially justifiable. Amongst others, it was argued that even as cars become cleaner, the problem is still not solved if in the meantime the number of cars always increases.

(FG2.04) And I don't have an idea on the mitigating effect of a number of measures being taken. Because there are measures. But I fear that they are outweighed. There is an increase in volume [of traffic].

Speed limits were also proposed as an alternative. However, people wondered whether this would really result in reduced emissions.

(FG2.05) Such a zone 30, does that really help? (FG2.02) A traffic jam on the ring, is actually a zone 30. So does it have an effect?

(FG1.03) If it is foggy, there's a smog alarm. Does that really help?

Some people think the government should abolish diesel cars, and promote electrical cars instead. But this is seen by others as socially unjust because poorer people cannot afford a 'green' car.

(FG3.03) The government is still supporting diesel financially. ... I think one has to abolish diesel cars. (FG3.01) But what about all the freight transport?

(FG1.03) In my street there's a lot of cars, public transport, and a lot of old cars. Maybe we should think about these old cars? If the government would do actions to buy new cars, ... (FG1.03) Electrical cars? But you can only drive two hours with those. Somebody that needs the car constantly

(FG3.06) The 'green car' I find unjust, because it's so expensive.

With regard to the Low Emission Zone (LEZ) Antwerp is introducing similar feelings exist. Though it could lower air pollution to a certain extent, this is a measure that is considered as socially unjust for two reasons. To start with, as already mentioned above, poorer people cannot afford a 'green' car. It is argued that technocratic solutions do not take poverty into account, that they often reinforce social injustice. Furthermore, some people are concerned that there will be backdoors for those who can afford it, though not everyone agreed with this. As one person noticed: "It's not because you're poor that you can poison the others". There is also the fear that LEZ is just a stopgap, presumably because this measure does not reduce the volume.

(FG2.06) There is now a plan to no longer allow cars older than ten years in the city. (FG2.03) But they're going to make it in this way that if you want to go in

anyway, you can pay for it. So if you have money, you may drive in anyway. (FG2.06) Yes, in this way you punish people with little money, because they have an old car. (FG2.08) This is socially unjust.

(FG3.03) That LEZ is unjust, I think. (FG3.04) Yes, if you have an old timer you can't enter town no more. (FG3.02) Yes, but you're poisoning town with it. I don't think it's that unjust. (FG3.03) But people with a smaller income rather choose for a second hand car. (FG3.02) But there's also second hand cars that are ecological. (FG3.01) This measure is especially for diesel cars eh. (FG3.02) I don't think it's unjust. You don't enter town no more with a polluting car. It's not because you have less money that you have to be polluting the rest. (FG3.03) I find it tricky. With all those apocalyptic climate predictions, this technocratic reflex with it, I think it's generating social injustice. They don't take the poverty into account. But maybe it's not so with these measures?

Traffic measures should be accompanied by other measures

Whatever the measures taken to tackle traffic-related pollution, everybody agrees that they should be accompanied by other compensating measures which make it easier to use the car less.

(FG3.01) I think they should give people an alternative, for all those measures. So you can choose: or you pay, or you don't pay.

(FG1.02) They are working well on the bike lanes. But there's no relation between all these traffic measures. They make it difficult for cars, but on the other hand they don't make it easier to take the public transport.

Most participants have clear ideas about the kind of compensating measures needed. A first one is to make towns car free (or at least pushing more cars out of town) accompanied by a parking policy of 'park & ride' (on the outskirts of the centre) and better public transport. Better transport meant for participants: more buses, trams and trains, with better infrastructure, and later at night. Once again, people like to look at other cities where such policies are implemented successfully. In general the interviewees agree that a combination of such measures could work.

(FG2.08) In Maastricht and Cologne they ensure that the residents can park their cars in the street or in the environment. Visitors are kept out of the centre through car parks. Here [in Antwerp] they do not want to start that system. There are 3500 places in the central parking, of which the efficiency is very low: 40% in the week and 80% on weekends.

(FG2.04) But it must be linked to a public transport system ... and as government you have to choose to get that car traffic radically out of the inner city. Make the inner city car-free. (FG2.06) But public transport must therefore be made better. Not only more, but also on later hours. Because if you're going to eat somewhere, you cannot get back after 11:00.

(FG3.02) Out of Schoten, you also have a tram like this. (FG3.01) And from Merksem. That is successful. So much that they have to build another Park & Ride. People from Waasland and Ghent are using it a lot. It's much more efficient than using the Waaslandtunnel.

As seen above, some of those 'park & rides' already work very well. However, even the successful examples do not reach everyone. One of the interviewees mentions the same park & ride as above (near the Waaslandtunnel). She would only stop commuting by car when the city would be completely closed to traffic;

(ML to FG3.03) Do you use the Park and Ride? (FG3.03) I work in the city campus. So I use the Waaslandtunnel, and I just have to turn right and I'm at work. I'm really the cliché of the suburban commuter. (ML) So they first have to shut the Waaslandtunnel before you take public transport? (FG3.03) Yes. And it isn't that congested there either. The congestion is mainly in Berchem. In the Waaslandtunnel it's much easier. The difference is really big. Coming in this way, there's traffic but it's fluent.

Other park & rides are not successful at all, probably because of the inefficient functioning of public transport.

(FG3.01) In Antwerp now there is tram 8 from the Park & Ride in Wommelgem. It brings you to town in a couple of minutes. The purpose was that people coming from Hasselt or that direction could leave their car there and change onto the tram. Well, the tram is especially a good thing for the inhabitants there, but there's no commuters using it. There are really few people using the Park & Ride, and the tram is as good as empty. Maybe it's because when you arrive in Antwerp they still have to change to get to work. Anyway, you're much quicker with that tram to the end station than by car.

One person fears that car-free towns might generate gentrification.

(FG3.03) With car free towns you're developing gentrification. Or that's what they see with car free streets at least. I don't know what it does with a whole city. (FG3.04) Does it exist car free towns? (FG3.02) Yes, Urbino.

An alternative to the proposal above is to prevent people from coming to (the outskirts of) the city by car altogether. Participants noted that this could be achieved by organising more and better suburban public transport. Here Paris was cited as an example.

(FG2.04) The light rail network would unlock the north west of Antwerp and the Kempen. That is one of the proposals of stRaten-Generaal.

(FG3.05) So if public transport would be faster, more people would take it? (FG3.01) Yes, a good suburban network. Tram 15 coming from Boechout is a big success too. (FG3.02) Or tram 7, that one has a apart rail bedding. If you want to do that by car, are you crazy, then you're just queuing. I always take the tram or bike to go into town.

(FG3.01) Make living in town more attractive. (FG3.03) But how big can a city become? At a certain point your public transport won't be efficient anymore. (FG3.01) In Paris the public transport is very efficient. And there's 10 million people living there. The suburban network is very well organised there. And the subway ... well, there's a lot of cars driving there as well. (FG3.02) Yes, you're a lot quicker there by public transport than by car. (FG3.03) Are the suburbs then so well connected to town? (FG3.01) Well yes, you have the RER. I think this is an absolute condition. (FG3.06) Yes, a condition for all the other measures in fact.

One person noted that public transport was not that bad at all, and stated that it had made progress compared to some years ago. According to him, an increasing number of people are using it, which is something he supports, amongst other reasons because it serves as a means for building social cohesion.

(FG2.07) But concerning Antwerp, I see that the trams are used much more. They are much fuller than two, three to five years ago. I think that's positive, and one of the side effects is, I think, that people are more understanding towards each other. An immigrant who's now first stepping on before he lets anyone step off, is now less accused of the fact he comes from somewhere else and that he is not doing well. And there's less talking behind one's back: 'He's a brown, he's black ...'. (ML) Thus, public transport is a place where people learn to live together. (FG2.07) I think so, yes.

Infrastructural solutions for traffic (pollution)

People consider changes in the infrastructure of busy roads such as highways and the ring as crucial. The main infrastructural change that is preoccupying people in Antwerp is the closure of the ring road. The action group Ringland has worked out an alternative which would be capping a big part of the ring road. A lot of effort is successfully invested in educating people about this issue. Ringland is maybe the main example of the development of an alternative in which many people in Antwerp participate, and which makes them feel that something can be done against pollution.

(FG2.04) The Ringland project will also need to show that, with the new technology, this fine dust-story and the sound story, which is also very harmful ... that they are going to be able to manage that with the new technology, but I do believe in that. Personally, I think it is a very important project for Antwerp. I am very attracted to their campaign which they are now conducting brilliantly for several years; it's well-founded, smart. At one of their meetings, they said that the money we would be saving in health care because of Ringland, is a huge return on the investment. It would be financing a large part of the investment.

(FG2.04) Considering the [pollution] map we made, I think you do see a clear potential for Ringland. ...

Still, not everybody is as positive about the project. Not only the government is (still) blocking it, some interviewees also ask critical questions, for example, about its technical feasibility.

(FG2.04) I find it shameful and criminal this whole 'ring-story', 'this car traffic- and freight traffic-story'. There should be a much harsher and harder response to this and now politics is still blocking that magnificent project Ringland.

(FG3.01) But they're also talking about tunnelling the ring road. (FG3.05) Is that going to make it better? (FG3.03) Then you're going to have a uneven spread of the particulate matter, namely at the exits. (FG3.01) That is still a big problem. If they ever going to start tunnelling, and it looks like it more and more, then they still have to look for a solution for those exits. Until now there's no affordable technique to do that. (FG3.03) And those filters don't get everything out of the air neither. (FG3.02) And at some time they have to be emptied. And where are you going to put that, that filth?

An adaptive spatial planning

In the meantime, it is seen as important to make sure that residential areas, for instance, cannot be built close to the ring road anymore.

(FG3.01) ... Here next to the ring for instance, where the old gas factory used to be, they wanted to make a new residential quarter, but they weren't allowed because of the air quality.

Other visions

Two groups consider having more vegetation in the city as a measure against pollution.

(FG1.06) Recently I've read an article that we're could already solve a lot of the air quality if we would put grass in our gardens, and when we mow it leave it laying there. There's a lot of carbon being absorbed. Also vegetables give a lot of oxygen. And it's also good for bees because they're almost extinct.

(FG2.01) More green in the city. If everyone would put something against his façade then we would have come a long way. It would surely store a lot of pollution. (FG2.03) But would this really solve something? Or are we fooling ourselves? (FG2.09) No, it takes the temperature of the city down and also purifies the air a bit. (FG2.06) But they have to approach this on a bigger scale, not just telling the residents to plant something. They should make masses of walls "green". ... (FG2.08) There's trees in the "Brouwersvliet" now. As a result, the temperature there is several degrees lower. This has been scientifically proven. So: more strategic green in the city.

Insulating houses with government subsidies is seen as another policy potential.

(FG1.06) If I were mayor of Antwerp I would begin insulating houses, and parking in the houses, ... subsidize boilers that use less. Traffic you have to tackle on another level. But you will get far already if you insulate the whole of Antwerp.

(FG2.09) Passive housing might be the solution.

Also, alternative energy is considered as very important.

(FG1.04) I'm saying alternative. Me Japan for example 200 countries in the whole world, a lot of capitals, a lot of small towns, Mercedes everywhere. Alternative energy is very important. First nuclear, now sun-energy power plants. Alternative energy very important. ... The problem is politics, CO2 always higher. An alternative for the car is needed. Electricity, electrical bike, electrical car, car on sun energy, that is a radical solution. Politics is the problem. People react against new measures. Alternative for the car. There have to come more people on the streets, then the government will change politics maybe, then more electricity will come from sun energy. This is very important for the air. More bikes, more public transport, that's not going to help. If someone is sick, and you're giving him medicine instead of an operation, that will only help for a couple of years. The operation is the radical solution!

Furthermore, several participants include more democracy as a key element in their alternative vision. They think that the government should involve citizens much more actively in the decision making process.

(FG2.01) Yes, what do you choose: a healthy inhabitant or the car? (FG2.04) It gives us extra healthy years. And also the quality of life augments for a large part of the residents. (FG2.07) Ringland is a project that could bring more justice. And the way it came about seems just. This proposal is known by citizens and supported by them, and an ideal alternative to all the things we have heard here over the last few years (bridge, tunnel). (FG2.08) There will also be coming about 8,000 homes. This pays the lid on the tunnel. For the government, this can be an inexpensive approach.

(FG2.08) It is a core task of the government to encourage behavioural change. (FG2.05) But only with a participatory government. (FG2.03) But we as Belgians, when they seek to impose something on us, we do not like huh. The government must then be creative enough to not impose too many issues. Anyhow it needs time. But they need to involve us, the citizens. I'm thinking primarily of meetings like we are having here tonight, but then on a larger scale. And technicians, the technocrats must advise the government. We did not elect them, but we trust them. ... (FG2.04) One must establish a real dialogue. They have looked at participation from the bottom, in a genuine process, as a nuisance and not as an enrichment and an opportunity. But there's coming more and more resistance.

But on the other hand, this should apparently not be taken as a rule to adopt at all times.

(FG2.04) But if you look at these example cities: Zurich, Copenhagen, ... you see that they have implemented a sound policy for decades and at times even against the wishes of the citizens! But in the long run, if you draw the line, the citizens can be convinced. As a government you must have courage and vision.

4.2. Milan

4.2.1. What are the effects of air pollution?

4.2.2. What causes the air pollution?

In Milan, experiences of the effects and causes of air pollution were somewhat differentiated per focus group. Participants of the commuter group for example were very motivated and concerned with questions of the urban environment. Some of the participants are activists in environmental associations or movements and appeared to have good knowledge of air pollution sources and causes. Commuters often travel to the center of Milan, or within the metropolitan area, for work and therefore are only partially affected by the low traffic zone or other traffic restrictions that have been implemented in the city. Participants didn't express negative attitudes about the downtown Low Emission Zone (named AREA C), which has been in force since 2011 and established a toll charge for entering the city center. This measure affects commuters only minimally, while it had a controversial impact on small businesses and social activities in the city center. More generally, participants' perception of pollution seems to differentiate according to the seasons of the year, whereby winter is perceived to be the most polluted season because of the high impact of household heating. They tend to make a distinction between why and where they can feel the impact of air pollution. With respect to sources, participants highlighted a number of specific human activities, with road traffic, waste incinerators, heating and air traffic most commonly named. Participants from the high-traffic zones focus group in particular demonstrated detailed knowledge of where and how air pollution is present, particularly pointing out the differentiated responsibility of road traffic. Pollution is defined also by contrasting the situation in Milan with that outside of the city, and by highlighting the difference in air quality between working days and holidays. Those who cycle around the city from home to work show a clear awareness on where they experience most pollution.

(FG1.01) I cycle to work from my house to the city center. I come from Cernusco sul Naviglio where we have many parks and a lot of trees. I feel a great difference in the quality of air. From season to season I can feel the difference in the smell of air especially from the railway toward the center. In the 'bubble' of the city center it seems that it is something better. There is a big difference from the place where I live behind the railway, passing beside I feel three passages of state in the air that I breathe.

Participants from the group with city center residents held differentiated ideas about air pollution sources and causes. They perceived air pollution by direct and indirect physical sensations and signs. Old household heating, waste and construction works are mentioned by this group as directly responsible for urban air pollution.

(FG2.04) Many residents have old heating plants from the '50s, in my office in winter we have to keep the windows open because it's too hot inside. The pollution are industries, in winter house heating, the problem of pollution is global not only in Milan. If you see images in China, Beijing, there are the industries that pollute. Here you have pollution but in a different level than China. We western

citizens respect more the environment than other nationalities like Chinese, Egyptians, that throw everything in the same place.

(FG2.02) There are aspects in which you perceive that you absorb something, the water when you wash your hair the water is black, in Liguria after a week that does not happen.

(FG2.03) When I put down my make up I notice that I am dirty

The focus group with participants from high traffic zones is the one that put the greatest importance on traffic as a source of air pollution. Also in this focus group, the unequal distribution of air pollution was highlighted, implying a greater impact in areas of the city with large numbers of low-income inhabitants.

(FG1.01): Bacula is a big bridge over Mac Mahon square where there are a lot of cars, pollution there is very high. Who has the possibility to live in less polluted areas, the social stratification is there, if you see the differences in the prices of the houses it is very high.

(FG1.04): I work with elderly and immigrants and they all live between via Padova and viale Monza [shows on map that have been described as very polluted areas].

The participants of the three focus group in Milan show a common recognition that air quality in Milan is bad and they often describe it by comparing it with other cities or with the rural environment. They know the everyday effects of air pollution and express a number of strategies for how to cope with it. In contrast to the findings of Bickerstaff and Walker (2001), who hinted at a degree of cognitive dissonance in the behaviour of the groups they studied, participants in the three Milan focus groups readily recognized the problem in their neighbourhoods. They openly admitted that their place of living was polluted and that air quality could have a negative impact on their health.

(FG3.10) We have to live and deal with a little bit of air pollution. I don't care so much except the peaks, I insult the lorry that passes by when I go by bike but sincerely I think that we have to deal with a little bit of air pollution here.

(FG3.02) I also remember that when I was young, I was born in 1972 there was a lot of pollution, now I know it was SO₂. Now it has virtually disappeared but that does not mean that air is good in Milan.

(FG2.05) I make the difference between today and the situation of 15 year ago, there has been a great improvement especially after ecopass and the incentive for public transport. 15 years ago it was much worse, there was less attention from institutions and people. Ecopass at the beginning I perceived as a negative thing, I changed my habits and I accepted it and I liked it. Today I would say that we must be more effective in this direction.

(FG3.06) There are aspects in which you perceive that you absorb something, the water when you wash your hair the water is black, in Liguria after a week that does not happen.

(FG1.06) My son is very allergic and suffers from many respiratory diseases, now lives and studies in Venice and when he's there he's ok. As soon as he comes back here in Milan he starts suffering again. He feels the difference in the quality of air. In Venice there is no smog, no cars.

(FG1.04) I am from Sanremo, when I come back home I notice a difference with Milan, when I am here I suffer from my lungs and I suffer flu. I am influenced by noise of traffic.

All the three groups show great capacity of describing the differences between various urban environments and the variation of pollution during the times of the year, the week or even of the day.

(FG3.03) My perception is that air is not wonderful but is not the worse possible. In winter you feel that air is heavy, the throat soars, you feel the air is dirty.

(FG3.09) Going by bike I cross the city I see the difference from summer to winter. In the zone of Niguarda I go easy, then from the ring road to area C I feel intoxicated, then in Area C I can breathe and then I am intoxicated again when exit from there.

(FG1.05) I live in a small road but in the morning a lot of people uses the car also for short trips, to buy the newspaper. There are two schools close to my house. Especially in the morning there is a lot of traffic when parents bring children to school by car even if they live at 200 meters from the school. On Saturday and Sunday mornings air quality is better.

(FG2.03) We talk about it for three months a year, from November to February and then it's finished. But you don't understand from where pollution comes from. It's a chain of causes, heating, cars, fog etc. boh, but if it's there also in summer it means that is a problem of cars. Then we have to know if data are distorted or not

With respect to the distribution of air pollution as it emerges from the mapping exercise, there were clear commonalities between where the groups situated the main sources of pollution. Consistent with the recognition that traffic was the primary pollution source, all three focus groups resulted in a map that highlighted the ring road around the city center as a main site of air pollution. The space within the Area C was generally seen as less polluted than outside of it. Major entrance roads and highways were also marked by all groups. The placement of waste incinerators was also mentioned in two of the focus groups, but people were not always sure where these should be situated on the map.

the metropolitan city, the evolution of the administrative governance will allow to consider the problems in a less parochial way. We that live close to Milan don't need to use the car but the people that come from outside park in our place and then the public transport for commuters, the train is very bad and don't works. On my territory everybody passes and I have to breathe their shit and I have no benefits only damages.

Soft mobility is in this context mentioned as the proposed solution, as are measures that would increase the use of public transport. These are seen as highly effective actions at the individual level exactly because traffic is commonly believed to be the primary cause of air pollution and its negative health impacts. In general also, the LEZ of Area C benefits from the approval of the majority of respondents, even though perceptions and opinions seem to be somewhat dependent on respondents' area of residence.

(FG3.02) AREA C is useful to change mentality, it can have an educational meaning.

Those who are more critical of the measure are generally part of the group who live outside of Area C; it seems they suffer the negative effects, particularly the displacement of traffic from the center to the first urban belt and ring-road of Milan.

(FG1.01) Let's put it we are not among the people that are privileged by Area C, how much it impacts the people that are outside that Area? We are not amongst the privileged ones. How much of this money raised by Area C is used to improve the air quality in the city?

And they also raise questions about equity:

(FG1.04) I am against that, the economic issue undermines the ecological principle that is at the base of this Area C policy.

Issues of fairness in the distribution of costs are frequently raised. Differences show up also in people's opinions about the effectivity of imposed measures, or in the positive impact of education and motivation on behaviour change.

(FG3.09) I see a difference, AREA C is effective as a compulsory measure for the citizen, because when there was the referendum there was a lot of unrest in the discussion on the social network. In my opinion they should enlarge it, the make people change mentality you have to impose it. I think that more people come to the city center because is more nice to walk there.

(FG1.04) Incentives are the best way to make people change behaviour when it comes to using the car.

(FG2.01) If you are forced to change then you realize that is better for you. In the past I used the car for everything, now it seems to me an absurd.

All the respondents from the high-traffic focus group admitted that many options for soft mobility are available, but that at the same time work schedules and taking care of children are mentioned as

reasons for not giving up the private car. They also agree that air quality in the city center has improved since Area C is in place. Here as well though, participants noted that the measure raised equality issues with respect to that distribution of costs and pollution impacts, between on the one hand the residents in the LEZ, and on the other hand the people living just outside of it.

(FG1.01) I agree that the city center is better now, if you want to live in the city center you don't need the car. The selection of who can enter should not be made on the money that you pay but on other standards, the problem is that now it's based on money. Because if you have a very polluting car but you can pay you can enter, that makes me angry.

(FG1.02) I am for equality, why do they have to breathe better than me? For me it has been made to let breathe better the people that live in the center, so it's just for a few, I remember when I was young I went in Piazza del Duomo by car. Now it's not possible. But why they can live better and we have to stay in the city beltway. But many people don't go there because many people don't want to pay 5 euro. And the people that have money they go inside.

(FG1.01) If you live in Milan, in the city center at least you don't need the car to do your courses. I use the car sharing, the bike sharing. If you could have an electric car to enter into the center I would use it.

(FG1.06): I take the car only for going out of Milan, I use the bike because it is nice, you discover Milan, I have the public transport card

Residents in the city center are favourable to Area C but are at the same time also aware of some problematic socio-economic impacts, especially linked to changing patterns in the use of public spaces in the city center, and to the perceived impact that traffic limitations have on businesses.

(FG2.03) I changed my life, for I don't want to pay 2 euros everyday that I use the car. I decided to leave it and I travel with public transport. I am happy, Papiniano [area south-west of the city center within the ring road] where I live is very well served by public transport. I don't need the car. I changed, I adapted. At the beginning I went very angry. Now they should enlarge AREA C and all the people that come to Milan from outside they should leave the car in dedicated parkings where there are the Metro Stations.

(FG2.01) I have been living in Milan since I am young, I remember when they closed to cars Corso Vittorio Emanuele, we got angry, then you realize that you can change your habits, now they could dare more and enlarge the circle of AREA C.

(FG2.06) I know that many professionals have moved the office out of the center or started to pay the entrance in AREA C to their customers. People have abandoned the city center because of all these limitations. Milan city center is emptying. We accept to renounce to something but we would see our money spent for the welfare, in a better way.

(FG2.03) Many historical shops have closed because of AREA C.

4.2.4. Knowledge about alternatives and visions. Where do we want to go?

There is a high level of awareness among the participants of the alternatives to polluting means of transportation. What varies is the distribution of responsibility; often responsibility for air pollution emissions and the related burden for intervention is shifted to institutions or to the community rather than attributed to individuals. People from the commuters group tend to limit their travels to the city center and to use public transport.

(FG3.02) Now in Milan is taking place more and more the bike. I discovered that in June Milan has overtaken London by the number of bike used in the bike-sharing services. The bike lanes are growing, even if we have few means, there is a big trend, if Milan starts that can become a positive trend at national level. Because when Milan starts it makes trend at national level, it's a movement that is growing.

(FG3.05) Now with the metro that reaches out of Milan, there is no point in taking the car to get to the center.

(FG3.09) I see a difference, AREA C is effective as a compulsory measure for the citizen, because when there was the referendum there was a lot of unrest in the discussion on the social network. In my opinion they should enlarge it, to make people change mentality you have to impose it. I think that more people go to the city center because is more nice to walk there now.

They show, more than the other groups living more close to the city center, an awareness of various behaviour that can have a positive impact on air quality, from cycling to recycling and reducing polluting waste and packaging. Because this particular focus group was organised within the frame of an environment festival in the public park "Parco Nord", a number of participants were people already engaged with environmental issues.

(FG3.03) I proposed to my children to go the Aquarium of Genova and we chose to go by train and not by car.

(FG3.04) I also avoid the packaging that cannot be recycled, I buy seasonal and km 0 foods.

People from the high-traffic zone group tended to justify their car use by referring to basic needs such as home-work travel, purchase of heavy goods, etc. For this group, behavioural incentives were preferred to control or legal coercion .

(FG1.02) I use the car to go to work, it takes 45 minutes. I use it only to go to work.

(FG1.05) I used the car to bring a load of bottled water at home from the supermarket, otherwise I walk or use public transport.

(FG1.04) Incentives are the best way to make people change behaviour when it come to using the car.

(FG1.01) We don't have a good education, and so we need also an incentive or a repression to change behaviour, that is linked to education, we have to expect something from the generational change. If you give me an incentive and there is a control, in this case if you give me the possibility as a society to respect the rules it is fair to give a sanction if you don't respect the rules.

(FG1.06) I would ban the mothers from bringing the children to school by car, they really use the car for just 200 meters! I heard that in front of the schools there is a peak of pollution when they enter and exit.

(FG1.02) Until something serious happens nobody is caring about that air pollution. It's institutions that have to start giving the good example.

The group of residents in the city center also show high preference for incentives to change behaviour and show attention to the reduction of motorized mobility. They tend to blame other citizens and/or institutions for polluting more.

(FG2.06) Now you see a change in mentality from property to sharing. Maybe it is not immediate but i see that people is changing life habits. When I was young to drive a car was the sing of the adult age, now young people travel more but don't feel the car as a status symbol.

(FG2.02) Before moving with your private car was a social need now it is changing.

4.3. Malmö

4.3.1. Introduction

The two focus groups in Malmö were organized at Sofielunds folkets hus, a community center in the center of Malmö. Composition of the first focus group (FG1, the high-traffic group) was largely in line with the criteria that had been established in the original focus group protocol. Most of the 9 participants fell in the lower range of the 25-40 age category, which mostly had to do with the fact that it was much easier to get younger people interested in participating. The exception was one woman in her early 40s. Our impression during the session was that the participation of this woman was very beneficial to the overall group discussion, mostly because she had a slightly differently life situation (e.g. she had 2 children) than most of the other participants (who were students or recent graduates) and therefore quite different experiences, perspectives and priorities with respect to different policy measures. This provided for lively debate between the participants and we therefore felt it was actually an advantage to have broadened the target group somewhat. During the discussions, the tables were ordered in a large circle, which was perhaps not the optimal set-up, so during the break we decided to move the discussion to a much smaller coffee table where the refreshments were served. This more intimate setting clearly facilitated the discussions in the second part of the focus group. People afterwards reacted positively to the exercise and indicated that they

wished to stay informed about the research. In the second focus group (FG3), participants were a bit older, which perhaps reflects the profile of the average commuter to Malmö. People here were in their 30s and commuted to work in Malmö from different places in the region. Of the three participants in FG3, one commuted to Malmö by public transport and did not have a car, while one owned a car but also commuted by public transport. The third participant commuted by car.

As was noted above, it proved very difficult to organize the other two focus groups in Malmö. This can be attributed mostly to the near complete absence of a public debate on air quality in Malmö, hence people's general disinterest in the topic. Quite a few people indicated to us that they simply thought the topic was not of concern to them, or at least not enough to warrant spending 2 hours of their time on a weekday evening. Up to three times we managed to collect enough people for FG2 and FG3, who then subsequently dropped out because of other engagements or simply did not show up. For FG3 for example, we had managed to get together 6 people but half of them cancelled or failed to show up. It was therefore decided to limit the focus group exercise for Malmö to the FG1, and to include the smaller focus group (FG3) with the proviso that it had a limited number of participants. Nevertheless, we felt that the smaller size of this group did have some benefits, in that it allowed us to go much deeper into some of the topics than was possible during FG1, where often we had to rush through the topics or cut the discussion short in order to stay within the agreed-upon timeframe.

4.3.2. What are the effects of air pollution?

From the document analysis and the interviews carried out for the earlier part of the research project, it is clear that the air quality situation in Malmö compares well with that in many other European cities. Malmö does not exceed any of the European limit values, though it does exceed the (more stringent) Swedish values for NO₂. This was to some extent reflected in the focus groups. Many participants indicated that they thought there was no debate about air quality in the city, hence that air quality was something of a non-issue for most residents. They also noted that the air quality situation in Malmö was not something they worried about, or even that they had not really given air quality much thought before being asked to take part in the focus group. People in general were more concerned with traffic noise. This was the case for participants from both focus groups. One participant from the high-traffic group for example said

(FG1.03) I don't think the air quality in Malmö is perfect, and it is a city so... But I have not really felt that it disturbs me, it is not something I have actually thought about and that has concerned me. There is nothing I can complain about really, it is nothing that really affects me... if we just talk about the air that I breathe and not noise disturbance from traffic and things like that.

Another, from the commuter group, said

(FG3.02) I have also not thought about [air pollution], more than it is more traffic here, compared to Lund. But then Lund has almost no traffic in the city centre, people bike there in a different way, there are no big traffic intersections in the city. But I have never thought about if the air quality is worse here (...) What people talk about at my work place is more the problem of traffic noise.

Significantly though, people's experiences of the air quality situation in Malmö were highly influenced by the experiences they had from living or travelling in other places. People that had lived in more polluted cities believed that the air quality situation in Malmö was very good. Three participants had lived elsewhere and remarked on the differences.

(FG1.02) I come from Buenos Aires so... [laughs] I notice a big difference, it is much better here (...) Even in central Malmö, where I live, I don't think the air that I breath is bad.

(FG1.03) And then it feels like I have lived in other cities where the situation was worse, so it is a bit like: yeah, sure, it is a city, and if I compare it to the forest I would also say the air is bad here, but it is actually nothing that I'm worried about...

(FG3.01) I have lived in Kairo, Egypt, for a couple of years and there you really feel and see the bad air quality, it is terribly bad. After that experience I think that the problem of air quality is bigger than people think, in most major cities, for sure. But compared to that, the air is clean in Malmö, there it was smog. You could go through central Kairo for half an hour and when you blow your nose it will be black.

On the other hand, people that lived in more rural areas or smaller Swedish towns, or that regularly travelled there, were more likely to believe that the air quality situation in Malmö was not very good. Some people also said that they became aware of the air quality situation in Malmö after they had been absent from the city for a while.

(FG1.04) I'm originally from Österlen [rural area in western part of the province] and during summer I usually stay there. And when I come back here, that is when I also think about [air pollution].

(FG1.01) I don't think that much about it when I'm here, but I travel quite a lot up to Småland [a different, more rural, province up north] and when I notice the difference, then I think 'Oh, can it be like this?!'. But when I'm here I don't think that much about it. So you get used to it, and it is when you experience the difference that you really notice it.

Participants usually based these perceptions of air pollution on sensory experiences. They for example associated air pollution with bad smells, with visual experiences of traffic-dense streets, with dirt/soot on their windows, with noise, etc. This confirms the findings from previous research, namely that people's perceptions of air quality in a certain place are often based on their own direct experiences, and the associations they make, rather than on publicly available information in the media or elsewhere. A lot of participants made allusions to these sensory experiences, while hardly any reflected on things they had heard or read about.

(FG1.07) I'm also from Småland and every time I go there and come back I think about the difference when I come back to the city. You notice it. But also how quick it goes for the windows to get dirty again after you have cleaned. It is tremendously faster compared to other places where I have lived. You especially

note in on the windows but also that it gets more dusty in general. It is things like this I think of.

(FG3.03) I sometimes think about that it is quite a lot of cars in Malmö and sometimes it smells and you also notice a bit darker nuances... for instance in summer or in spring and I drive home around 3pm the air is a bit lighter compared to 5pm when it is a lot of cars, the it is sort of darker, and it also smells a lot more the closer to the rush hours you get.

(FG1.05) I think it is hard to separate the different aspects of what you get disturbed by... what is noise and traffic that takes up space, and what is air quality. In my head it is probably mixed together.

(FG3.01) When I'm here in Malmö I think about that there so many more cars here. So I have thought about [air pollution] visually, but I have not felt it.

The association that participants made between air pollution and the visual perception of car traffic in particular seemed very strong, and is reflected in the places that participants indicated as the ones they believe are most polluted. Hence, both groups indicated areas on the Malmö map which they knew were heavily trafficked as air pollution hotspots. This included Södervärn, Nobelvägen, Midhem, Amiralsgatan, the ring road around Malmö, and the entrance roads into the city.



Figure 3 Map of FG1, showing, in red, areas where participants thought air pollution was highest.

This largely reflects those areas where Malmö exceeds the limit values for NO₂, or those areas that have been highlighted as potential PM hotspots, though the number of streets that participants marked as problematic were significantly more than those streets that have known exceedances. Participants in the commuter group mostly referred to key entry roads into the city as the most polluted ones. Participants in the high-traffic group on the other hand commonly marked their own street as a polluted one and justified this with reference to their own experiences.

(FG1.02) Buses are more responsible, I feel it when I open the window.

(FG1.07) Here by Värnhem [where the participant lives], that is a problem area, there are always cars in lines.

In terms of the effects of air pollution, participants mostly made allusions to health, even though these allusions were exploratory and generally did not reflect any personal health worries related to Malmö's air quality. Two participants in the commuter group talked about the potential effect it might have on more vulnerable people in society, but even here they indicated that they had not given the question much thought.

(FG3.01) Here in Malmö, maybe those with asthma or allergies or other problems with respiratory diseases experience it more.

(FG3.02) In elderly care where I work we talk much about differences in health status across various city areas. Because there are big differences within the city, in average life span and so on. Is hard to say how much that is because environmental exposure, addiction and so on... and I have actually never thought about if air quality is an additional factor here.

In the high-traffic group, the potential effects of pollution on agricultural crops was mentioned, since two participants were engaged in urban gardening and wondered if pollution levels would have a negative effect on the vegetables that they were growing.

(FG1.03) I have not got the information that the air quality in Malmö would be bad. When I hear from others that the air quality would be bad I start to wonder because I'm involved in urban gardening. I have never thought about it really. I'm not afraid at all to eat vegetables that are produced in the city, in case the ground itself is known to be polluted with heavy metals or something like that. And it is interesting... because if I for instance would get some information saying that the air quality in Malmö is bad, then my idea about this would maybe change radically. But so far I have not heard anything...

4.3.3. What causes the air pollution?

Participants in both groups almost unanimously agreed on traffic as the main cause of air pollution in Malmö. In the commuter group the participants, who mostly commute by public transport, indicated private cars as the main source of pollution, and they remarked on the negative effects of everyone driving their own car.

(FG3.01) When I take the train and you just come outside the city and see the highway to Lund I always think about all those cars and so often it is just one person in each.

In both groups people also noted the heavy bus traffic, from the public transport company Skånetrafiken, as a possible cause of pollution, though participants generally agreed this is a problem that is limited to specific streets.

(FG3.03) I think private cars are mainly responsible for air pollution in Malmö. Except on certain individual streets where bus traffic is concentrated.

Some people in the high-traffic group were of the opinion that commuters were the main source of traffic congestion, hence of air pollution in the city. As one participant put it,

(FG1.02) I actually think that most people who live in Malmö don't use the car that much. The problem is all those who live outside and drive into the city that it is the problem.

That traffic was almost the sole cause of air pollution was seen by some participants as a rather unique situation, particular to Malmö, which one participant believed had to do with the lack of heavy industry in the city and the lack of pollutants from household heating:

(FG1.03) I think there are no major industries so I think it is mainly from traffic. And even for heating we have long-distance heating. In other cities it is a problem when they use coal.

Another factor that was mentioned was the specific way in which Malmö was built, and the way pollution was influenced by the city's dominant architecture. One participant for example remarked that "tall houses make the pollution from traffic worse," (FG1.01) while another had heard that

(FG1.05) Malmö's air quality is pretty bad compared to other cities in Sweden because it is close between the streets and not big green spaces in between. It is a dense city, which I think is good, but it also has these consequences.

This in fact corresponds to what was mentioned in interviews with policy makers and air pollution researchers, where they way that Malmö is planned was highlighted as a contributing factor explaining the city's challenges in reducing traffic-derived NO₂ emissions.

4.3.4. What are the possible strategies, the possible actions? How can we change things?

In one of the exercises, participants were asked to take a position based on the extent to which they thought enough policy measures are currently taken to tackle air pollution. In the commuter group participants indicated that they were aware about recent efforts to promote public transport and investments in biking infrastructure in Malmö's three train stations, all of which they found positive. In the high-traffic group however, the majority of participants stated that they could not take a position since they do not have enough awareness about the measures that had been taken. Participants found it hard to distinguish air quality measures from general measures the city had taken to reduce car traffic and increase more sustainable forms of mobility. These measures, most of which are also promoted by Malmö as NO₂-reducing actions, were however generally welcomed by participants. In general, both groups expressed a high degree of satisfaction with recent developments undertaken by the city council, even in the high-traffic group. Particularly popular were improvements to biking infrastructure and the introduction of separate bus lanes:

(FG1.08) I don't know that much, but when they rebuild the infrastructure, I mean roads and so on, it immediately becomes much better for cyclists, it feels like it benefits cyclists in the city. Every time they remake something it feels like it

becomes much better. Also with the new biogas bus, I just think it (...) These are things I think about and it feels very positive.

(FG1.02) I think there are many biking lanes, which facilitates biking and makes people bike more. And in the city planning there are many green spaces and that improves the air. The whole of Hyllie is under construction, and also Västra Hamnen with all its green spaces and environmental construction. I'm not that informed, but I know some and that they think of energy saving and so on, so I think that Malmö does a lot in terms of improvement. Then all these bus lanes are good and they make people choose public transport instead of the car. That is the idea. And it prevents cars to drive everywhere so I think the city of Malmö is heading in the right direction to improve.

(FG1.03) To be honest, I have a good impression of the City of Malmö, so I am a bit uncritical. When I moved here around 4 years ago, my impression was formed during 6 months or so (...) about the city, the politics and the priorities and so on. And I was many times surprised. I thought, compared to other places, that: wow, Malmö does quite a lot. So I was actually (...) and now it is almost as if (...) yeah, as if I often find myself in a situation where I defend the City of Malmö even if they maybe are not doing enough. (...) It feels like they are trying to strive in the right direction. They build biking lanes, they reduce on parking lots and all that.

Only one participant in the high-traffic group was adamant that not enough was being done:

(FG1.05) If you think of it [air pollution] together with the general traffic situation, not enough is being done. The liberals declared during the election that they want to tear up the general plan because they think it is hostile to cars, so obviously there are some forces in the municipality that think differently. But there must be a paradigm shift because this car driving is not sustainable.

In the voting exercise, the focus group facilitators asked about the opinion of the participants on individual measures taken by the city council. This confirmed the general support of participants for measures taken by the city council. In the commuter group, there was consensus that all of the measures voted on were desirable, though this is likely explained, at least in part, by the small size of the group. The following table lists the results for the high-traffic group:

MEASURE	GREEN	ORANGE	RED
Investments in biking infrastructure	9	0	0
Dedicated bus lanes	5	4	0
Improve access to alternative fuels	2	7	0
Environmental zones for cars (not yet implemented)	6	3	0
Introduction of congestion charge	6	2	1

While some measures were received neutrally by a number of participants, only one person voted against any of the measures on the basis that this would not be an equitable measure:

(FG1.06) I don't think this is most effective in the long run. Fees will not affect those who have money, they will continue as before. While those who don't have money will be most affected.

The potential for a congestion charge was probably the most debated measure in both focus groups, and some participants pointed to the possible conflicting interests between commuters and residents if this measure would be introduced. As one commuter here points out:

(FG3.03) It would be good to reduce car driving among those who live in the city. Because why should you drive if you live just nearby? But it would be negative for those who live outside and need to drive into the city to work.

In general though, most participants defended the congestion charge idea, which is interesting given the opposition that the introduction of such a charge in other Swedish cities has provoked. This difference is likely explained by the composition of the focus groups, which mostly consisted of fairly young people with a fairly high degree of environmental awareness. More generally still, a lot of participants were supportive of all kind of measures to reduce car traffic and improve public transport, especially in the high-traffic group:

(FG3.02) I think that [these measures] are good because we have to reduce the car traffic. People won't give up car driving voluntarily, meaning you have to do something. I mean, we have someone who drives to work that lives closest by all and then you just think: why?? Then you just have to do something to prevent people.

In the commuter group, one person expressed concerns about car-reduction measures on the basis that they would give confusing messages:

(FG3.03) I don't think it is a good strategy to shrink the space for cars in the streets, because cars have been developed very quickly, there are many hybrid cars and so on... and you can now get a subsidy from the state to buy an environmental car. But if the city still punish you for driving it there are double standards... different messages from the state and the city, because the city does not make it easier for you in the traffic because you buy something better (...) There must be some sort of incentive for choosing environment-friendly cars, because they are expensive.

Despite the general support for the city's actions, there was some skepticism about some of the other introduced or proposed measures as well. Participants particularly expressed concerns about the city's focus on alternative fuels.

(FG1.03) As far as I know, there won't be many electric cars in only 5 years. Biogas is cleaner than diesel and petrol, but I don't know how biogas influence air quality, and how it would change behavior. [FG1]

(FG1.05) I think it would be better to invest in electric public transport. They have it in Göteborg and it is nice because it is also quiet. There is a tendency to think that everything can be solved with alternative fuels, but we need to change behavior. This measure would also require that people would but new cars.

A further concern commonly expressed was about the unequal distribution of impacts that some measures would have.

(FG1.05) [on introducing environmental zoning for cars] I think that it becomes a problem. The one that can afford to buy an environmental friendly car can drive in the city, but the one that cannot afford a new car cannot and will be negatively affected. That is not fair from a class perspective.

(FG1.06) [on congestion charges] I don't think this is most effective in the long run. Fees will not affect those who have money, they will continue as before. While those who don't have money will be most affected.

Participants also raised some questions about the effectiveness of certain measures. It was noted, for example, that the reduction in car traffic in one street could lead to increased traffic in another, which indeed is a concern raised by policy makers as well.

(FG1.03) One problem when they close off streets for car traffic is that it will just move to another street. And I happen to live in a street where it has increased because of that.

Another participants was skeptical about the effectiveness of the investments in biking infrastructure, arguing that it was mostly facilitating those who were already biking:

(FG1.02) I see no change in behavior. Those who biked before are also those who bike more now.

With respect to behavioral change, the discussions in both groups almost exclusively centered on efforts to reduce the individual's contribution to air pollution. Hardly anyone in either of the groups mentioned ways in which they had changed their behavior in order to reduce exposure to air pollution. This can be interpreted as an outcome of the fairly positive situation in Malmö. When asked how specific measures had changed participants' behavior, a majority of the people in the high-traffic group noted that the city's promotion of bicycling had stimulated them to take the bike more often than they otherwise perhaps would have. 1 participant voted that this measure had not changed her behavior, while 3 voted orange and 5 voted green.

(FG1.01) There are better bicycle parking opportunities by the central station and the Triangeln station, so I bike there more now.

On the other hand, most participants (7 red, 2 orange) felt that the introduction of dedicated bus lanes and one-directional traffic had not had an impact on their behavior, which can be seen as a consequence of the fact that few of the participants commonly used cars to transport themselves within the city. One of the participants that did own a car and lived in the city center, and who had originally vote orange, however later clarified:

(FG1.02) It has made it less convenient to drive in the city, especially on certain streets so in most cases it is faster to take the bike in Malmö.

In the commuter group, one of the participants was unsure if investments in biking had changed his behaviour. While he was generally positive to these measures, he hinted at other limitations that prevented him from transitioning away from commuting by car:

(FG3.03) I don't know if it is because of the measures taken, but in my job I have biked for about a year now and it is much faster compared to driving. I have considered the option to commute by train and bike first from my home to the train station, and then from the train station to my work. But bringing the bike on the train during rush hours is the main limitation.

The commuter group discussed how the limited potential to bring a bike on public transport was one factor that prevented people who commuted to Malmö from abandoning car driving. The conclusion that emerged from this was that improvements in biking infrastructure by itself is not sufficient, and that it needs to be complemented with specific measures to facilitate the combination of biking and using public transport, particularly aimed at commuters.

A number of other factors were also mentioned for why participants had not changed their behaviour as a result of introduced measures. This mostly included perceived imperatives to act in a certain way because of circumstances external to the individual, and economic considerations. One participant for example clarified that being a parent forced her to act in a certain way, including owning and driving a car:

(FG1.02) [on measures to reduce car traffic] Your life situation is the decisive factor. If you have children you might not take the bus even if it is fast. Even these cargo bikes... it is just a matter of time – if the kids are small and you can put them there but later it is more difficult. They don't think it is that fun at 7 o'clock in the morning in December to start biking on their own, so that is the problem. Also the parents might be in a hurry and maybe they need to be well-dressed. It is also peer-pressure that make children want to go by car. And they might also have a lot of activities after school. It is a fact that more and more cars are sold here in Sweden. People want to have a car.

With respect to cost-considerations, participants in different groups noted

(FG1.08) Separate lanes for busses can make the ride faster, but for me that is not what matters most. For me it would be even better if they made public transport free, not if it is faster. Or even if they would just make it cheaper.

(FG3.03) If we say that public transport would be free of charge... one would maybe spend half an hour or 45 minutes per day extra for not using the car and travel for free instead. I would definitely have done that. It would save me about 2500 kronor (SEK) per month, in a year 25000 kronor.

In general it was obvious that participants thought economic incentives would be highly effective in changing their behavior. One participant in the commuter group noted that the introduction of congestion charges might be “the final push” to convince him to commute by train instead of car, while another participant defended her support for congestion charges on the basis that “it has to

pay off to make alternative choices” (FG1.05). Similar arguments were heard when the group discussed the potential for increased parking fees.

The commuter group felt that they did not receive enough information with respect to the air quality situation in Malmö, and that this impeded them from changing their behaviour. While this can be contrasted with the earlier findings that people mostly base their perceptions on sensory experiences, and not in public information campaigns, all participants agreed on this. This can be seen as an indication that the existing communication efforts by the city council are deemed insufficient or that they are simply not reaching those people that would benefit from them:

(FG3.02) I think there needs to be more information to the public about air pollution, that it is actually dangerous levels on certain streets and the health risks and so on. I didn't know about these levels before this meeting today, so we need to get more people to know that in order to initiate more action. (...) There is much campaigning that we all should bike because of the environment but that health aspect in terms of air pollution you really don't hear much about.

(FG3.01) There should maybe be a daily report in the local media about the pollution levels (...) Visual tools for this can be powerful. It can even be in your GPS, that the current air quality could be indicated.

(FG3.03) People need to know about the problem before they can focus on the solutions. Without that knowledge they will not understand why they need to change anything and will rather focus on how measures maybe limit their freedom. Air quality is not a common topic that people discuss.

Finally, it can be noted that a lot of participants implicitly expressed the belief that the city council's role in instigating behavioural change was a potentially significant one. One participant in the high-traffic group for example remarked on how measures to promote bicycling had an empowering effect on him and others, thereby helping people do the right thing:

(FG1.03) I think I feel stronger as a bicyclist. In Malmö there is this attitude that bicyclists are prioritized, I can take up a lot of space as a bicyclist, that is what I can do, that is what I SHOULD do. They have this message that you are really good if you chose to bike. That is the message you get: don't be afraid of the cars.

4.3.5. Knowledge about alternatives and visions. Where do we want to go?

Participants were then asked to imagine the kind of measures they would like to see, irrespective of whether or not these were realistic or not. Both groups were eager to discuss these alternatives, which brought out the kind of visions they had for the future of Malmö. Some of the measures most commonly mentioned pertained to economic incentives, including free or cheaper public transport and higher fuel costs. In both groups, participants were also in favour of a number of measures to facilitate car-pooling, including command-and-control-style interventions:

(FG3.01) In the US they have these car-pooling lanes and that is maybe something we should copy here. Then there will also be more effective as the cars are fewer, which maybe would encourage more people to choose that alternative.

In the high-traffic group, participants furthermore mentioned bans on studded tires, improved access to electric cars through car rental companies, and increased access to bikes for commuters:

(FG1.06) There is a project called 'The bike kitchen', it is not the City of Malmö, but I heard they will just now open up a bicycle library with a lot of different types of bikes that you can borrow. So people who commute to work or who drive a lot can borrow a bike for a few weeks and see if it becomes less expensive, if it convenient or not, to try if it works for them and their situation. That kind of thing would be very interesting to have on a larger scale.

This last aspect was also taken up in the commuter group, where the main focus was on improving the public transport commuting experience in order to attract more people currently driving cars. Participants thus mentioned the need to facilitate the combination of different modes of transport, for example by providing parking outside of the city center with direct bus connections into the city, and increased efforts to improve the reliability and punctuality of train services into the city:

(FG3.03) Improved parking in the outskirts with connecting public transport would be one of the best measures for commuters. It would also save time because it could counteract traffic flow from the outside that create these bottlenecks. So it would save time, reduce stress because you can sit and just relax, and it would be good for the environment. There are many benefits, so why not??

(FG3.03) I have this idea about having certain pooling stations at places where a lot of people enter the city, to avoid cars with just one person in. So there are cars waiting and they leave as soon as they are full and this service is there especially during the rush hours.

More structural changes to the working day or to the organization of society as a whole were also suggested. One participant mentioned the need for a 6 hour working day in order to make people less stressed and create room for more environmentally-friendly lifestyle choices. Another suggested that more flexibility in the organisation of work was needed:

(FG1.06) This thing that you have to be in time for work is something that messes things up if you use public transport. Like if a bus is late and you miss a connection... if the employer offers the employees those who travel to work by public transport something like 15 minutes flexibility, it would be an incentive to leave the car. [FG1]

Participants also highlighted how more careful urban planning could play a role in facilitating behavioral change:

(FG1.05) Day care and other services need to be closer, to make life easier for people.

This shows the belief by many participants that making sustainable choices is something for which the right conditions need to exist, in other words, that it is necessary to stress that people make individual choices under conditions that they do not always experience as free or fully changeable. To some extent, this suggests that the conditions that shape people's lives are to some extent experienced as restrictive, at least with respect to the adoption of behavioural changes. Under certain political, cultural or geographical conditions, certain behaviours are thus experienced as more logical than others. In order to counter this, we could say that a bold political vision and consistent efforts to match that vision, are needed. As one participant concluded at the end of the focus group,

(FG1.06) [The city of Malmö] needs to have clearer and more ambitious visions, and something like... a totally car free inner city. For Helsinki I think they have this vision for 2020. If the will is there one can do much and create alternatives to car use, with improved public transport.

4.4. Warsaw

4.4.1. What are the effects of air pollution?

Warsaw is one of the biggest Polish cities. As in any European agglomeration, the main air quality problem perceived by the people is related to traffic. Due to the significant contribution of burning fossil fuels (including coal and lignite) and biomass in energy production, the problem of air pollution in Poland is much higher than in most European countries. In the Mazovian region the gaseous and particulate pollutants emission is one of the highest in the country. The suburbs of Warsaw contain large clusters of settlements that are often heated individually. In addition, pollution that blows in from surrounding areas, e.g. small neighbouring towns, plays an important role in the air quality of Warsaw. Although Warsaw is fairly well-ventilated, the impact of high buildings in the city center, the lack of so-called "corridor aeration" in order to provide clean air from city borders and rapidly increasing numbers of vehicles are key determinants of air quality in the city. For this reason, limit exceedances of particulate matter and nitrogen oxides are commonly observed, particularly in winter.

These problems were also perceived among participants in all focus groups, despite the fact that the public debate on air quality in Poland has begun just a few years ago. General knowledge on air quality issues among the population therefore tends to be low. Some participants noted that the air quality in Warsaw was very poor,

(FG3) Air quality in Warsaw is tragic, especially in city center during winter.

(FG1) Heating and transportation are the most important causes of air pollution in Warsaw.

(FG2) When it comes to me, I heard that in Ursynów is not well. I know that there is a measuring station, where recently there were the exceedances. I was not interested in what indices, but I know that there is not good.

Others claimed that the situation is very different in different parts of Warsaw. Especially surroundings of main streets are exposed to high air pollution.

(FG2) Basically everything is good, because it is near the park – Pole Mokotowskie. But as I get out on the Wołoska or Woronicza street, I feel so little smell from the car. But in general it seems to me, that it is fine.

(FG1) It depends on the part of the city and on the traffic (...). There is a number of streets where the traffic is very high and the air quality is rather poor.

Some participants felt that the air quality situation was adequate.

(FG1) I do not feel that the air quality in Warsaw is bad. I haven't heard about person who suffer from poor air quality in Warsaw.

(FG1) It may be a sign of awareness of the inhabitants of Warsaw compared to inhabitants of small cities but the air pollution in Warsaw doesn't seem to be as high as in many other cities.

Most participants remarked that they base their knowledge on air quality in Warsaw (and in Poland) on public media information (web pages and press news). They noticed recent increased media interest in this subject.

(FG3) Recently in the media and local press there are a lot of information, how bad air quality is in Polish cities.

(FG2) I agree with the previous speaker. It seems to me that it is not good, especially since more and more talk about this in the media.

Some of the participants based their assessment on published reports and foreign publications that show poor air quality in Poland.

(FG2) In the near future, if not yet, the publication of the United Nations (I think... United Nations Compact) about how the bad air quality in Poland, will be published. [...] So, generally in Poland there is not good in this topic. [...] It seems to me that it is not good.

To others however, these issues were completely new. The most common reasons for this mentioned by participants was a lack of perception of air pollution as a problem, or simply a lack of interest in the subject.

(FG3) I have no such knowledge about pollutants like my colleagues (other participants). The first time I heard about pollution was from the SEFIRA project, but my family bought the flat, checking before air quality maps for choosing clean district.

(FG2) I was never interested in this problem. I have no knowledge of the environment protection, especially air. But I conclude that Bemowo District, especially the part in which I live, it is close to the old airport, near the park Kampinoski National Park generally is not bad. I mean, I have problems breathing, they began in Bemowo, but I think it is rather associated with pigeons, which feed on the roof, in the attic. And indeed it brought very serious consequences, almost

asthmatic. In contrast, about the air around where there is plenty of greenery - my feeling is that it is fine.

Increased media reporting and public access to air quality monitoring data and assessments prepared by local authorities meant that some of the Warsaw inhabitants noticed some changes in the city. Unfortunately, based on this information focus participants sometimes saw it as a change for the worse.

(FG3) A few years ago suburban districts were clean. Today, I notice that air quality in these areas is getting worse and it is similar like in the city centre. I live in that kind of district and I notice changes.

Participants often compared the situation in Warsaw with other parts of the country, also based on their own experiences (some of them lived in other cities before moving to Warsaw). Because of media information, Warsaw was compared with Crakow, which is perceived as the city with the largest air pollution levels in Poland. Warsaw participants mainly attributed the difference between the two cities to differences in the conditions and ventilation.

(FG3) Air quality in Warsaw is not so bad. I lived in Crakow and in Warsaw is definitely better.

(FG1) In comparison with Zakopane the air quality in Warsaw seems to be good. I have heard many information about air pollution in Zakopane or Cracow but not so many about Warsaw.

(FG2) But when it comes to Warsaw there is a wedge of the Vistula River which saves us. It is much worse in Cracow because it is the hearth, as in Zakopane. And if there is an inversion then these pollutants has just sit there and the smog is there.

(FG2) I come from Cracow, I lived there for most of my life. I moved to Warsaw 2.5 years ago [...] and it is a huge relief to move to Warsaw. I live in Ochota district, more than 100 meters from Grójecka street, because I knew that you should not live at the main communication routes. And I open the window almost anytime with a few exceptions. Revelation! In Cracow it is just so "Mordor", that ... And it is my feeling as a human being.

According to some citizens Warsaw compares unfavourably with smaller towns or rural areas, which they are sometimes visiting. This contrasts with monitoring results, which show that air quality in smaller towns is often worse due to the use of individual furnaces for heating.

(FG2) Compared especially from small towns when it comes to large cities or Cracow, where I visit, or Warsaw, the pollution is not comparable to such small towns. So this cannot be compared. It is greater in large cities: in Warsaw. There is a huge difference between Minsk Mazowiecki and Warsaw. In Minsk it is better. As I'm leaving Warsaw, and I reach Minsk, I can see the space, that the air is cleaner because there is even no such fog.

Quite often participants lamented the insufficiency of available information on the air quality in Warsaw and related threats and problems. They believed this to be related to an insufficient number of air quality monitoring stations, though it was noted that the number of it meets the criteria set out in the relevant EU Directives. An "insufficient" number of monitoring points and a general lack of activity by city authorities on this issue are seen as the main problem for the low level of public awareness. Participants based this on their own sensory experiences, although sometimes these were not compatible with the information communicated by the media, non-governmental organizations or local authorities.

(FG2) On my side of the river there is no measuring station so it is difficult for me to refer to the actual results, whereas some time to feel the smoke quite strongly with the windows open, so this is just one of the indicators. This is strange, because it is a high settlement blocks, and is close to residential houses and feel so, well, irritating smoke.

(FG2) It depends on the time of day, because sometimes it is very bad, and sometimes it is quite good. There is also a disharmony between my subjective feeling, and what is published on the website, through the media or through Warsaw Smog Alert. There are often such announcements, that it is very bad today, and actually it is not.

(FG2) In the place where you live there is not a monitoring station, and if you look at what is measured in al. Niepodleglosci, it has nothing ...

(FG2) What the Warsaw authorities are doing it is nothing. This means that they do not inform you well. There is not enough monitoring stations. When you live in Bemowo District, you can check the results at the station, which is a few kilometers away from you. And is a zero reliable.

4.4.2. What causes the air pollution?

All focus groups participants noted that sources of air pollution in Warsaw is numerous and depend on the area (district). In the city center and near main streets poor air quality is attributed mainly to private vehicles. For suburbs areas on the other hand, the air quality is perceived to be determined by energy production for heating, which is based on coal and biomass burning. According to government entities involved in the assessment of these activities (i.e. combustion in individual furnaces), the latter is the main cause of air pollution in Poland. The focus group discussions showed that the knowledge of participants about air quality is also based on their own personal experience, and not only on mass media or official reports.

(FG2) In my neighbourhood there is an average, because on the one hand, I live in the neighbourhood of detached houses and the smoke from the furnaces. On the other hand, in terms of transportation, there is not much traffic. I have 600 meters to the larger street, so when it comes to exhaust gases, it is the less. But even from the other side I'm close to the railway, so it can also be from the railway line.

(FG3) Air quality is poor in the city center and at all major streets and cruising routs. I notice it myself.

Some participants were able to point to specific air pollutants (particulates and nitrogen oxides) associated with specific sources of emissions.

(FG2) In Warsaw, it is certainly bad air quality. Mostly it is car exhaust, oxides of nitrogen, which are in the exhaust gases or fumes from chimneys, namely sulphur oxides. Especially for coal firing, which is sulphated. [...] There is also the problem of dust in Warsaw, especially those the smallest, less than 10 microns. [...] It comes, inter alia, from communication, from the abrasion of tires, for example. On highways or streets with more traffic.

(FG2) O: If the Polish energy sector will be continued based on coal it is unfortunately not going to be fine. You have to go into the renewable energy sources.

The use of "non-ecological" sources for heating, including poor quality of coal, are associated with economic and social problems. Sometimes these appear to be a mentality issue - related to the attitude of society and the public's lack of awareness.

(FG2) We have friends in Wawer, Radosc (districts of Warsaw). This area of detached houses is the second problem. This surface emission, coal, wood, garbage. Low-quality coal, silt coal burned in the furnaces. These problems are varied, and the city has forgotten about it. Nobody talked about this in Poland. [...] This resulting with these "smog alarms". Now the city has realized, that, "Oh God", the residents are indignant, something must be done. But it is such a huge mental and logistics problem, that will take years. And they are completely as the children in the fog, telling some tales and are not ready for real solutions.

(FG2) There are problems with low emissions (domestic heating) in Otwock, but also at the Warsaw side of the border. District heating is not brought to the borders of Warsaw.

(FG1) Maybe not in Warsaw but it is a big problem of waste combustion. PET-bottles (disposable bottles) are not collected but often burned at home.

Further 'root' causes of pollution often pointed out are the low quality of coal and the lack of legal regulations related to its distribution and use. Economic reasons were given as well, in that lower quality coal is much cheaper. Participants in this context also discussed the quality of coal imported from Russia, and problems with defining import quality requirements.

(FG1) To make coal heating into gas heating is rather expensive. Many households cannot afford it.

(FG2) And what is the difference in coal? Because it is the more expensive coal, for example, that which costs 900 PLN, our Polish. And there is a Russian coal... (FG2) No, no. These are myths. This the worst is our Polish. Our Polish coal mule, mine waste from our mines.

(FG2) I saw in the oven once that the cheaper coal is not burned completely. (FG2) Because it has more ash. Less energy in itself.

(FG2) There is coal, which costs 850 PLN and they say that it is better from Silesia. And there is one that costs 650 PLN. And they say that this is worse from Ukraine.

(FG2) It's not so that if there is Russian, it must be bad.

(FG2) This is the thing. They wanted to introduce standards for coal, so to beat import Russian coal. Because the Russians supposedly mixed sorts. And they realized, those Parliament Members and mining lobbyists that it cannot be done such standards based on physico-chemical parameters to beat Russian coal and not beat the Polish.

Another problem mentioned by participants (especially during the spring and autumn seasons) is the burning of green waste (leaves, branches, grass), which is a common practice in many allotment areas (small green spaces intended for private cultivation).

(FG2) There are some garden plots in different places in Warsaw. And the air there is sometimes, especially around the spring and autumn, terribly, terribly polluted.

(FG2) In the winter there ... homeless heat just anything ... you know what harmful chemical substances are produced by this combustion.

(FG2) I live next door, it's coming and it is a characteristic of a strange smell. [...] This is interesting, because this is like green spot in the city but

Unfortunately, one of the main problems in Poland is still household waste burning. This is observed mainly in villages and small towns, rather than in agglomerations like Warsaw.

(FG2) That's the mentality. There is a fee for garbage collection. And people still collect the plastic bottles, are such stupid, and burn it. On the field, they burn it.

(FG3) Another problem is the burning of coal and garbage in private houses. This is particularly visible in suburban districts of Warsaw. I am jogging for health and see that in an increasing number of housing estates air quality is rapidly getting worse.

At another level, participants also pointed out problems with spatial planning decisions and the destruction of aeration corridors by new housing estates.

(FG3) Problem of bad air quality in Warsaw comes from new high and density buildings and destructions of aeration corridors.

(FG3) The air quality is definitely better in the districts close to the forests.

4.4.3. What are the possible strategies, the possible actions? How can we change things?

Focus group participants were aware of some actions to improve air quality taken by the city authorities. Certain actions taken at the national level, including legislative measures, were also mentioned during the meetings.

(FG2) I know that the Ministry of Environment has taken, in cooperation with the Chief Sanitary Inspectorate, the action in the form of legislation aimed at improving the quality of the environment.

They believed that some actions are only temporary and are educational rather than intended to result in a systemic limitation of air pollution.

(FG2) There is something like "a day without a car", but it is only one day...

The participants of the FG1 think that the instruments of air policy are effective enough but the people don't realise how important it is to collect separate waste.

(FG1) I don't know whether the air quality policy is effective but I see the changes in the attitude of the inhabitants to the protection of environment and air quality. The people pay more and more attention to this problems.

Some activities, especially short-term actions are taken only during periods when air pollution is particularly bad (smog situations). Participants noted that there have recently been decisions about taking actions, which were not there before, eg. increasing the use of public transport - but they cited the examples of Crakow, not Warsaw.

(FG2) In Crakow there was also such an initiative. In one weekend, with a document certifying that you are a passenger or the owner of the car, you could travel without a ticket.

Quite often participants voiced the concern that insufficient information was available on the activities taken in Warsaw.

(FG2) The city does not inform about air quality and their measures taken in order to improve it. There is not simply and clear information that the city take any specific action in this issue.

(FG2) There is no information that eg. the buses are hybrid and emit less pollutants.

However, participants noted that an increase in the number of available sources of information about air quality is visible in recent times. VIEP's (Voivodeship Inspectorates for Environmental Protection) web pages were the most frequently mentioned sources of information. Also the CIEP (Chief Inspectorate) is publishing the results of air pollution measurements on the national air quality portal since the end of 2015, along with mobile application for the smartphones. Such activities are appreciated by participants.

(FG2) Now there is news that you can check the quality of air in your phone. It is probably an application on this subject. For the curiosity, I will install it myself, because I have respiratory problems and for my knowledge it would be good.

(FG3) I have noticed first time city authorities measures with boards of light informing about the level of pollutants in the city center. It was very good.

The majority of participants believed that city authorities do not recognize air quality as sufficiently important, though some of them have recently seen a beginning of some actions in this field.

(FG2) There is no adequate priority on the list of problems.

(FG2) After yesterday's meeting about the air quality in Warsaw I know that some action will be taken. But whether they are real or appropriate, I do not know. When now I look at this policy, there is no, firstly, discussion about the problem of air quality. Once it is presented mainly as problems with congestion. As for the topic of air, I do not feel, I do not see, that it is on the wallpaper.

(FG2) If one talks about bus politics, or associated with the trams, the air pollution.... there is no this topic at all.

The requirement of bringing the air quality situation in Poland in line with the requirements of European legislation was by some participants believed to be the main motivation behind city authorities' recent actions.

(FG2) These actions that were taken [...] have been associated with European Union requirements to adaptation to the relevant directives.

The importance of educational and informational activities that increase awareness and motivate people to adapt more sustainable behavior was emphasized very often.

(FG2) You mentioned that informing. It's what when it comes to coal, coal heating, for example, in single-family homes, which are located in Warsaw, they can use coal, which has a lower sulfur content. People could be informed about it. But on the other hand, it is more expensive. Do people want to buy more expensive coal? Who would have known, for example, yet no one will check it...

Participants in all focus groups emphasized the important role of the activities related to the development of cycling, including the construction and maintenance of bicycle lanes. Development of public transport was also seen to be very important - mainly the metro and trams. With regard to bicycle lanes, some participants expressed opinions on their inappropriate design and construction in some places in the city. Proper maintenance of bicycle lanes was also stressed as an area where action needed to be taken.

(FG2) For example, I see that there is more and more bike lanes. Public transport in Warsaw, unfortunately, in my opinion, is getting worse. After the recent reforms of the city. Those are some contradictory two decisions, negating themselves. Whereas it seems to me that there are no such decisions on, for example, restrictions on cars.

(FG2) For me, the bike lanes could not exist. They are not cleared of snow... Once I almost broke my hand on that lane. Because I wanted to be in accordance with the rules and icy path was not cleared of snow. The city built the tracks, but later

they have no heart to it, to be shovel snow, or as you said, the path suddenly breaks pointless. Good path should be in a reasonable position when there aren't so much cars and not along a five-lane road...

(FG2) Most bike lanes are built in a stupid way, along major routes. If I'm moving that way, then I inhale the exhaust fumes ... For example, going the path along Jerozolimskie Avenue is simply unhealthy. So it is better to go one further parallel small alley, so I ride these side streets.

(FG2) In my case, if it was decent bike path ... because now access via Poniatowski bridge is a little bit dangerous. This is about 10 kilometers to work. So if it were a decent bike path, I'd commuted by bike to work. Because as it is now, I would have to drive to work a lot longer or to risk my life.

In addition to cycling, some participants drew attention to the positive aspects of walking over shorter distances.

(FG3) If I have to go short distance (e.g. 1,000 m) by car, I always go to walk. I know that using car will be associated with additional emissions into atmosphere. In this way I protect environment and take care of my lungs.

The activities related to the launch and development of the bike rental system in Warsaw (Veturilo) have been very well received. This system has been operational for four years, there are more than 200 stations and more than 3,000 bicycles. The system registered approx. 375,000 users who rented bikes over 6 million times. Renting a bike up to 20 minutes is free.

(FG3) Veturilo bike rents (no cost for first 20 min) is a good idea to improve the air quality in Warsaw.

Free public transport for city residents is, in the opinion of the participants, one of the possible measures that could be taken to increase the share of public transport journeys and thus reducing congestion and contributing to the reduction of emissions. Participants stressed the potential benefits of such actions, especially in situations of high pollution concentrations.

(FG3) Similar in Cracow, I would like in Warsaw implement a policy of transport costs dependent on air quality. If during given day will be big air pollution problem (e.g. smog), transport should be for free.

(FG3) The public society and decision makers from Warsaw city have blocked increase taxes for public transport. It's a very good idea to encourage people give up their private cars for daily transport within city.

(FG3) They were plan to build bus-lanes in one of the districts, but the car lobby have blocked it, arguing increase of traffic. It's stupid and encouraging use of cars instead of public transport.

Bus lanes and the construction of "Park & Ride" car parks were given as positive examples of transport planning and management in the city. They contribute to faster travel by public transport, and consequently increase the attractiveness of this type of transportation for residents.

(FG3) Construction of bus-pass is a good solution, because emissions from urban transport is lower.

(FG3) Similarly, establishing system of free parking "park and ride"

(FG3) I have changed my approach to urban transport, when city has established additional connection between my district and the city centre, increasing possibility of changes transfers. I have the ability to choose less congested routes (lines).

Warsaw recently introduced electric buses on one city line, which according to participants is a good example of an action to improve air quality.

(FG3) I notice the positive effects of the city in terms of improving air quality. It is electric buses in the city center.

(FG2) I can say that just in my line that I commute from home to the University they just introduced electric bus. It is quiet, clean and the whole line already Line number 222.

Discussion on the limited traffic zones in Warsaw and the possibility of their implementation was conducted during the meetings.

(FG2) Recently I heard about such a thing, that it was in Warsaw that they wanted to introduce, I do not know whether or not introduced, such restrictions that the cars with engines older than some years cannot enter to the city center. I do not know whether 10, 15 years old. That is, they wanted to do so that they cannot enter such cars. (FG2) But how would it be checked...? (FG2) The case is very simple, just a vehicle inspection stations at regular assessments can check whether...

(FG2) I'm afraid that Polish law does not allow at the moment such solutions. They flew in the Parliament during the amendment to the law on the environment protection. Only regulations on furnaces and boilers left in the act, because, the politicians did not want to expose motorist voters, before the elections.

(FG1) There is no infrastructure for limited traffic zones in Warsaw. We need more parking on railways stations, underground and bus stations.

(FG1) There is no possibility to close the city for private cars. We should develop public transportation to offer the people the possibility of the choice. They have to make a decision themselves. No prohibition. It wouldn't be successful.

People's habits and the desire to continue developing the street network were also seen as the causes of the current situation.

(FG2) Part of the guilt is on our side, that is, our behaviour. We come by car, do not choose eg. tram. And the city conducts such a policy: on the one hand

pretends to doing something that, for example, buy a bus [unintelligible] on the other hand intersects Warsaw with road network. A network of highways that will somewhere improve traffic flow but elsewhere will make it worse, but it will be only negative impact on air quality.

(FG3) Coming by tram or bus, I see only travels driver in cars. It is terrible. People still think of themselves, because it would be more convenient. They choose cars only for comfort.

(FG3) Today, as I drove to work by public transport and everyone can noticed that air is not the best, I saw on the public screens display information "Warsaw is clean and green city". It was two hours after article in local newspapers about cutting down all trees in one of the garden parks for building city route cruising. The city cut trees by building a route that will increase the number of cars in Warsaw.

Some issues associated with the spatial development of the city were pointed out by some of the participants as reasons for poor air quality: no enlargements of green areas, an increasing number of roads, etc. The establishment of new parks could, in the opinion of the participants, contribute to the improvement of air quality.

(FG3) There are many urban garden parks, but city not create a new. This is not good for improving air quality in whole agglomeration.

(FG1) Instead of building of parks and increasing of green areas in the city we have a policy of concentration of buildings in some parts of the city. It causes big problems with transportation, traffic jams and limited the green areas which influences the air quality.

As mentioned earlier, the main causes of air pollution in Warsaw, beside car communication, are emissions from individual buildings heating systems. Participants think that it is a big problem in some areas of the city (more peripheral), especially in the autumn and winter periods. Some participants pointed the need to take radical action to remove the main risks associated with the use of old stoves and poor quality coal. Current Polish law gives the possibility to introduce restrictions in this area by the provincial governments in certain areas of the region, eg. in selected cities. Such action has been taken in the case of Krakow and some participants would expect similar solutions in Warsaw.

(FG3) I heard that Krakow introduce a coal burning in private houses ban when air quality is bad. Such activities should be conducted in all cities.

Some participants emphasized their own experience in this field.

(FG3) I have changed the type of fuel from coal and wood to gas for home heating.

(FG1) I have limited using of the car and use much often than earlier public transportation.

(FG1) I try to use ring roads in Warsaw. There are some parts of the city where I not use the car but only public transportation.

(FG1) I have to admit that – however I'm aware of the importance of the problem of air quality – I burn the mail at night. I cannot accept that the letters should be deliver to composting by municipal or private institutions.

In addition to potential prohibitions associated with home heating systems, participants also drew attention to the economic and social aspects of such choices. They pointed to the need for the implementation of economic incentives and support to maintain modern and cleaner heating systems.

(FG3) Without economic support from the state (subsidies) will be very difficult to change behaviour and reduce pollutants emissions. Such support is especially needed the poor people. They most often burn the worst quality coal for heating or drive 20 year old cars because they cannot afford a new one.

4.4.4. Knowledge about alternatives and visions. Where do we want to go?

Participants were then asked to imagine the kind of measures they would like to see, irrespective of whether or not these were realistic or not. They pointed to the issues of better public transport.

(FG1) We need in Warsaw more trams, new lines and more buses.

(FG1) Of course, it would be better when more people use bicycles but as a driver I must tell you that many bicyclist may cause traffic accidents. They don't pay attention to other users of the roads.

(FG2) This will be a very good solution when there will be more new trams or metro lines. But I have to say precisely, that I mean trams or electric buses not buses.

(FG2) Any limitations are less socially acceptable. And, for example, development of public transport is more accepted... They say "Okay, develop the transport ..."

Other actions to reduce pollutant levels were also indicated by the participants.

(FG3) Implementation of solutions to the city's policy measures taking into account emissions from vehicles (EURO standards). This may be bans for old cars or given emission standard.

It was emphasized that these measures must recognize the complexity of the problem, and that they should be consulted with the public.

(FG3) Systemic and comprehensive systematic changes with regard to the principles of sustainable development. Examples of this is improvement quality of public transport system, or development of bicycle paths.

(FG3) Before the implementation of measures the city should inform citizens why such action have to be taken and what effects are expected. For example when city established a entry cars ban into the city center, it is necessary to convince people that it makes sense environmentally and for health and wellbeing. Otherwise we can expect protests and disagreement.

The activities associated with a healthy lifestyle and the role of environmental awareness were also pointed out, particularly during the third focus group.

(FG3) The Warsaw city should implement a comprehensive action. For example, bicycle lanes should be connected to each other between the districts without brakes in some places.

(FG1) The people don't see the link between the quality of environment and health. We should increase this awareness and learn more about.

(FG3) Increasing public awareness, for example eco-driving. Awareness of consequences of some actions that could improve or getting worse a quality of air is important for people to change their behaviour.

Not all of instruments proposed during the discussions with the focus groups have been accepted by participants as effective or even acceptable and not all have been treated as effective from the point of view of air quality policy. This is probably connected to cultural differences between inhabitants of different backgrounds and their respective levels of awareness.

(FG1) I think that 80 per cent of driver would accept the limitations. More and more drivers are careful and don't drive too fast. The share of such drivers is increasing. The people would accept the changes in the traffic.

There is a problem with the implementation of air quality policy in regions and municipalities. The implementation of national and European policy comes up against local policy, which is influenced by the opinion of the inhabitants who often don't want any changes. This unwillingness to change their habits is connected with the poor financial situation of the inhabitants, especially of older people and inhabitants of small cities and in the country.

5. Discussion

5.1. What are the effects of air pollution?

General awareness of air quality problems appears to be high in most of the cases studied here, perhaps most so in Antwerp, where there has been an intense public debate on the issue of air pollution in recent years. This should be qualified with the clarification that some kind of selection bias is likely at work in all of our cases, in that people who are willing to participate in a voluntary discussion about air pollution can generally be expected to be interested in the topic, and therefore probably better informed about it as well. The two cases where people appeared least informed about the topic were Warsaw and Malmö. In Warsaw, the situation was somewhat mixed. Some

participants were relatively aware of the issue, despite the fact that public debate on air quality is fairly recent and overall public awareness or concern with air quality issues was deemed low. Others expressed the opinion that discussions on air quality were entirely new to them. In Malmö meanwhile, lack of awareness can be attributed to the fact that air pollution as a problem is much less pronounced than in the other cases. Participants here seemed fairly unaware or unconcerned about air quality, and a few people even mentioned that they had not given air pollution in Malmö any thought at all before being invited to the focus group discussion. Awareness about, or concern with air quality appears to be quite evenly spread across the different focus groups within each of the cases. In Antwerp, the low-traffic group was particularly engaged in environmental debates, while in Milan, awareness about the problem appeared to be highest amongst the commuter group. The reasons behind these differences are not entirely clear but are likely due to a combination of factors.

In reflecting on air pollution and its effects, participants in all cases often referred to their own physical or sensory experiences, which largely confirms earlier conclusions from the literature (Bickerstaff, 2004; Bickerstaff & Walker, 2001, 2003; Bonnet, Amalric, Chev e, & Travers, 2012; Wakefield, Elliott, Cole, & Eyles, 2001). Common sensory associations people make are between air pollution and particular smells, with the visual experience of soot on surface areas, as well as with the perceived effects on their health. In both Antwerp, Milan and Malmö, the occurrence of asthma and respiratory illnesses were related by people to air quality. In both Milan and Antwerp for example, people noted that their respiratory problems become much less pronounced when they are away from the city. People also frequently based their perceptions on experiences they had gathered from travelling to, or working in other cities, where they felt air quality was relatively better or worse than where they were currently living. For Malmö and Milan these sensory experiences with air pollution were the main source of knowledge about air pollution effects that people mentioned, while in Antwerp more formal methods of air quality communication, particularly campaigns by environmental groups and the mediatization of a public debate on air quality, appear to have played an important role in shaping public opinion in recent years. In Warsaw, sensory experiences were important but participants repeatedly highlighted the role of media coverage and officially-sanctioned information. Indeed, the apparent lack of awareness about air pollution in Warsaw, despite the fact that its pollution levels are amongst the highest in Europe, suggests that more organized forms of awareness-raising, public debates, and media reporting have an important role to play in the acquisition of environmental knowledge. Together this suggests that sensory experiences by themselves are unlikely to be sufficient to educate people on the different knowledge dimensions of air pollution.

Focus group participants made noticeable associations between air pollution and symbolic places. In Antwerp the proximity of an industrial harbor invoked discussions about its polluting role, while in Milan the connection was made between the presence of waste incinerators and pollution. In Malmö, the visual presence of dense traffic or busy streets invoked the same connotations, while city centers or more 'natural' environments such as parks were in all cases usually believed to be areas with relatively less pollution, even if this connotation was explicitly disputed by some of the participants (see the Antwerp analysis). While in some of the groups people associated the place where they lived as relatively clean, this was clearly not the case everywhere. In Antwerp, some participants underestimated the level of pollution in their own neighbourhoods, while in Malmö's high-traffic group, people rather tended to mark their own streets as polluted on the map. Contrary

to Bickerstaff & Walker's (2003) finding, also, that city centers are generally perceived to be the worst polluted areas, the picture emerging from the focus group analysis is much more mixed. For Warsaw, participants clearly linked pollution to central areas in the city. In Malmö however, the old city center was not marked as a polluted area, though some of its main surrounding streets where, while in Milan the Area C region in the center was seen as relatively clean. This can probably be seen as an indication of the close association people make between traffic and pollution: When the city center is made largely car-free (as in the case of Malmö) or subject to a low emission zone that restricts access (in the case of Milan), the association people have between these central areas and air pollution seems to be positive rather than negative.

The importance of symbolic associations comes back when analysing the knowledge people have of the distribution of air pollution. In Antwerp, associations with the visibility of the industry in the harbour mean that people attribute a significant part of the pollution to this area, in addition to high-traffic areas such as highways and ring roads. The same goes for Milan, where all groups highlighted the main entry roads and highways, in addition to industrial areas in the north of the city, as particularly polluted areas in the city. Also in Malmö people spontaneously indicated the city's ring roads and the entry roads into the city, as well as some of the main traffic arteries in the city, as main sites of pollution. If anything, people in Malmö actually overestimated the air pollution problem somewhat and indicated more roads as polluted than what emerges from official data. In Warsaw, people were acutely aware of the distribution of air pollution based on emission sources, such as heating, waste incineration, or traffic, and attributed meaning to this through connotations with smells and visual perceptions. In all cases also, people seemed conscious that a number of factors affect the distribution of air pollution and therefore complicate the picture. The importance of topography and wind direction, for example, were mentioned in the Warsaw and Antwerp focus groups, while people in Milan and Warsaw noted that pollution seemed differentiated in time as well as in space, and that they for example felt that pollution was particularly bad in winter compared to other seasons, in weekdays compared to weekends, or at certain moments of the day. In Malmö, Warsaw and Antwerp, some participants reflected on the role of city planning and architecture (street canyons created by trees or by high buildings) as a factor affecting air pollution distribution. In general then, the knowledge that participants held about the distribution of pollution compared quite well with the 'official' air quality information as reflected in cities' air pollution maps.

5.2. What causes the air pollution?

In all of the cases, focus group participants indicated traffic as one of the most important sources of pollution in the city. For Malmö, different traffic sources were the only source mentioned by participants, with one person remarking that this could perhaps be seen as a unique situation because of the city's post-industrial character. In Milan, Warsaw and Antwerp, traffic was highlighted as a major source but clearly not the only one. Other factors deemed important to participants included industry in the harbour in Antwerp, coal and biomass-based heating in Warsaw and Milan, and specifically for Milan the concentration of waste incineration in the north of the city.

In attributing importance to traffic as a main source of air pollution, people commonly differentiated between various kinds of traffic. In the case of Antwerp for example, participants distinguished between different vehicles based on the fuel that was being used, with diesel cars clearly seen as the

most polluting source. They also felt that increases in freight transport, as a consequence of economic expansion in Antwerp and Flanders, was responsible for increasing emissions. In Malmö, participants talked about the respective responsibility of private transport vs public transport, and some people estimated that the role of public busses was significant because these tend to be highly concentrated in some streets. Similarly, participants in the Warsaw focus groups distinguished between different quality grades of coal used in household heating, and attributed pollution effects to the cheapest, and lowest-quality forms of coal. Other underlying, root causes that were discussed include the legacy of a particular, car-friendly form of city planning; insufficient historical investments in alternative modes of transport; government policies that promote car usage (e.g. company cars in Belgium) or that fail to restrict polluting forms of household heating (Warsaw); the failure of authorities to recognize air pollution as a priority; the prevailing socio-economic structure of a society, necessitating long commutes in order to conform with the geographies of working and living; the rigid organization of the working day, implying inflexible working hours that make the use of public transport impracticable, etc. Some participants hinted at the general mentality of the public as an underlying cause of pollution, with some of the commuters in Antwerp for example acknowledging that their choices to opt for the use of polluting yet economically interesting company cars was based exclusively on selfish concerns, that is, on associations they made between their car and their individual freedom, which they argued they would be unwilling to give up even if the use of alternative forms of transportation would be more economically attractive or save them considerable time in commuting.

Commuting patterns and people's decisions to live in the countryside while working in the city were highlighted by participants in three of the cases as a particular cause of concern. In this context it was obvious that some people indeed tended to put the responsibility for air pollution with someone else, rather than problematizing the negative contribution of their own behaviour. In the case of Malmö for example, participants in the commuter group tended to question the need for city inhabitants to use their cars, whereas the group with local inhabitants put more focus on commuting as an important underlying source of pollution. This pattern is repeated in Milan, where the support for or against the Low Emission Zone appears to be differentiated according to who benefited from the measure and who did not, a pattern that is also reflected in who people attribute responsibility to for the air pollution problem in the first place. Also in Milan, it was mostly people living in areas with a high traffic burden that attributed the most importance to traffic as a source of pollution.

In Antwerp, finally, people were acutely aware of the problem of transboundary pollution, whereby emissions from neighbouring industrial areas, most importantly the Ruhr area in Germany, were believed to affect the air quality situation in Antwerp. This contrasts with the situation in Malmö, where similar concerns are usually raised in political circles, that is, Swedish policy makers often put the responsibility for pollution with international shipping in the Baltic sea, or with emissions blown over from further south, but where focus group participants did not point this out as a significant pollution source.

5.3. What are the possible strategies, the possible actions? How can we change things?

People adopt strategies related to air quality on a number of levels. We can roughly divide these strategies in adaptive actions, which are meant to minimize the individual's exposure to air pollution, and actions that are meant to contribute to the mitigation of air pollution which occur in response to government policy. The clearest evidence for adaptive action comes from Antwerp, where some people noted that they consciously tried to reduce their exposure, for example by not biking when there was a smog alarm, or by seeking out places they believed to be less polluted, e.g. parks or waterside areas. Concerns over the impact of pollution levels on the health of children was highlighted as a particularly important factor. Others however didn't seem to worry about this at all. In Malmö, it seems few people had thought about the need for adaptation, which can be a reflection of the lack of awareness of air quality as a problem in the first place. The discussions on the Milan case, meanwhile, highlighted how adaptation is a socio-economically differentiated capacity. Participants noted how some social groups in the city are less capable of adapting than others, hence that poorer people often have little choice but to live in highly polluted areas and therefore have more limited adaptive capacities. It is unclear to what extent participants for the Warsaw case had adapted to air pollution.

Most participants in the Antwerp focus groups, as well as some of the Warsaw participants, have changed their behaviour in one way or the other in order to limit their own impact on air quality, however, very few did this (consciously) as a response to government interventions. For Antwerp the exception seems to be when a policy measure was introduced that connected financial consequences to continued pollution (i.e. by violating a smog alarm). This seems to support the assertion, put forward by participants in all of the cases analysed here, that people are only likely to adapt to government policies if there were economic grounds for doing so. At the same time however, it was clear that participants in the Antwerp focus groups did change their behaviour to a certain extent as an answer to the communication of action groups concerning the negative consequences of air pollution. Furthermore, several participants were making environmentally conscious choices in more general terms, for example by becoming vegetarian. In Malmö and Milan as well, respondents seemed to have a fairly high degree of environmental concern and made efforts to reduce their impact for other reasons than improvements in air quality. In general terms, this would suggest that incentivizing behavioural change is more complex than a mere focus on economic incentives would suggest, even if economic incentives obviously do seem effective in some cases (see below). This conclusion is furthermore supported by the importance that some of the Antwerp focus group participants attributed to more indirect strategies or actions to reduce air pollution, for example by helping to raise awareness about the problem, or by participating in collective forms of action in order to bring about policy change, without there being any economic motives connected to this. In the Warsaw case as well, two of the participants had joined an environmental group with the explicit purpose of helping to raise awareness about air pollution and attempting to bring about national and local policy changes.

In contrast to the Antwerp case, people in Malmö do appear to have changed their behaviour somewhat in response to the measures introduced through the city's air quality plan, even if the difference between the two cases likely has to do with the nature of the measures introduced in Malmö, which are generally much broader than a focus on air quality alone. People for example reflected on an increased willingness to bike in the city as a consequence of recent investments in bicycling lanes throughout the city and bicycle parkings at the city's train stations, and generally thought this was an effective and acceptable measure. It is interesting in this respect that what some

of the participants in Malmö believed had helped them to change their behaviour, namely investments in public transport and bicycling infrastructure, is exactly what participants in Warsaw, Milan and Antwerp highlight as missing factors hence underlying causes of air pollution in their cities. This confirms the idea that the active pursuit of infrastructural investments in alternative modes of transport by governments is perhaps one of the most effective strategies for governments seeking to bring about a change in people's behavioural patterns.

The Milan case perhaps shows the clearest example of behavioural change as a response to a 'pure' air quality measure. Here, focus group participants noted that the introduction of the LEZ in the city center had led to the displacement of traffic to the outskirts, which can be interpreted as a form of adaptation by city inhabitants and commuters. A number of participants also directly noted how they had changed their behaviour in response to air quality measures over the past year, and, interestingly, that even though they were originally hostile to these measures, they had come to appreciate them over time. Particularly in the commuter group, people remarked how in response to the LEZ, they had started using public transport instead of the car, or were limiting their travel into the city center altogether. In this case, the economic incentives attached to the LEZ do appear to be the main reason for people to change their behaviour, even though this immediately also raised a number of concerns. Participants in the Milan focus groups repeatedly reflected on the unequal distribution of LEZ costs, benefits and impacts, and the subsequent social justice implications of this measure.

Where people fail to change their behaviour, this was in Milan, Warsaw and Antwerp very often seen to be because of lacking infrastructural investments (e.g. in bicycling lanes and parking, park and ride opportunities, etc.), and the absence or insufficient development of public transport alternatives. In Antwerp in particular, it was clear that shortcomings in public transport and the infrastructure to facilitate it, led to the absence of people 'making the right choices', e.g. that people felt that public transport was often not convenient enough to warrant them to leave the car at home, because it was too slow, the connections were inconvenient, or the service did not allow them to return home late in the evening. In the Warsaw case, participants complained about the bad maintenance of bicycling lanes and the inconsistent public transport policy of the city authorities. The Milan case, finally, puts focus on how the acceptance of certain measures is likely to be influenced by the degree to which people are directly affected by it. Those groups in Milan (citizens in the city center) who received most of the positive benefits of the LEZ appeared to be most in favour of it, which suggests that people's perceptions and ideas about the possibility or desirability of certain environmental strategies or actions is at least partly influenced by selfish motivations, that is, it is generally easier to agree with proposed solutions if they do not affect you negatively.

5.4. Knowledge about alternatives and visions. Where do we want to go?

With respect to the alternatives and visions that focus group participants put forward, there was a high level of consistency between the cases. In Malmö and Antwerp for example, there was a general agreement on the desirability of less car-oriented lifestyles, which has to be made possible by less car-oriented mobility infrastructure. Remarkably, this was the case even for those groups in the Antwerp case that were outspoken and convinced car users and beneficiaries of car-oriented financial incentives (company cars). But although these company car users agreed that less cars

would ameliorate air quality, they totally opposed the idea of abolishing company cars (in their own words because of selfish reasons). In Milan, it was mostly the participants from the city center (where the LEZ was in place) that were most in favour of car-reducing policy measures. In all cases though, participants expressed the opinion that measures to reduce car usage should be accompanied by simultaneous investments in public transport and bicycling, that is, that alternatives need to be offered if it becomes more difficult or more expensive to drive a car in cities. Other accompanying measures mentioned by participants included the development of park and ride options, which people had heard or read about from other cities, or which were already in place but could be improved upon and/or expanded. Infrastructural changes, to facilitate public transport and bicycling were seen as particularly important in Antwerp, Warsaw and Milan, while participants in Malmö were generally very satisfied with the efforts that the city had undertaken in recent years on exactly these fronts.

While the need for alternative forms of energy were mentioned in all cases, technological measures were generally not a major part of the visions that people put forward. The exception here is perhaps Warsaw, where people put significant emphasis on the need for alternative household fuels to substitute coal. In general, more focus was put on broader, structural and societal changes. These larger visions focused on the need for different commuting patterns, on living closer to work, on the development of decentralized cities that bring services closer to residential areas, on flexible working hours, etc. In indirect terms, participants in the Antwerp and Warsaw cases expressed the need for more citizen involvement in decision making, and for more communication from the government about air quality issues, for example in the form of awareness campaigns. In Malmö as well, participants thought more could be done to increase awareness about air quality issues in the city. It's interesting here that a lot of the visions expressed by participants were, again, broader than just air quality policy, hence would have implications far beyond this single environmental problem.

In all of the cases moreover, people seemed acutely aware of the potentially negative social justice implications of various policy alternatives. This was seen as ground for concern and in many cases was flagged as the reason why participants rejected certain proposed policies. In Malmö for example, some participants thought that a congestion charge, one of the possible policies that has been debated in the media and that was introduced in other Swedish cities, would mostly hurt the poor. The introduction of a Low Emissions Zone in Milan provoked similar feelings. In Antwerp, measures to reduce car ownership or to make it more difficult for cars to enter the city center were seen to disadvantage the poor as well, as was the proposed introduction of a LEZ and the specific financial incentives for purchasing green cars. In Warsaw meanwhile, some participants noted that it was mostly the poorest that used highly polluting forms of household heating, hence that some form of government support would be needed if these were to be phased-out. While these measures were sometimes opposed on the basis of their perceived lack of effectiveness as well, that is, the belief that people would simply adapt rather than change their behaviour, the consistent focus on questions of social justice is interesting. It suggests that the kind of visions people tend to have for the future, hence the kind of policies that they want to see enacted, is influenced not merely by environmental concerns, but to a large extent also by the broader socio-economic implications of policy alternatives. This is a concern that seems irreducible to the fairly selfish motivations described above, even if such selfish motivations are in some cases undoubtedly part of the reason why concerns over social justice are raised.

6. Conclusion

The purpose of this focus group exercise has been to acquire a better understanding of the perceptions and behaviour of individuals in relation to air quality policies. As the discussion shows, focus group participants appeared to possess a fairly high level of knowledge of air quality issues, as understood in terms of the four categories put forward by Jensen (2002), and seemed environmentally aware more generally as well (though there were some exceptions, particularly for the Warsaw case). Many participants held nuanced and sophisticated ideas in all four of the categories that Jensen (2002) puts forward, namely on the distribution of air pollution in their cities, about its proximate as well as underlying causes, about the kind of actions that were available to them, and about the alternatives they could envisage for the future. The least developed form of knowledge, perhaps, was on the kind of concrete policies that governments had already implemented in order to reduce air pollution. In Warsaw for example, many of the participants pointed out that they had insufficient information about the policies that were being implemented, which they attributed to a lack of information campaigns on the part of the city authorities. Similar concerns were expressed by focus group participants in Malmö.

The way these different levels of knowledge are acquired holds interesting insights for policy makers seeking to instigate behavioural change. In line with the existing literature, it is quite clear that direct sensory experiences play an important role in shaping or confirming opinions of air pollution. These affective associations with air pollution therefore emerge as a potentially powerful avenue through which people could be stirred to action. In fact, from the Antwerp case it is clear that this is exactly the kind of thinking that lies behind the strategies of various action groups. In Ghent for example, the action group “Gents Milieufrent” (the Environmental Front of Ghent) launched the ‘operation white sheets’, asking inhabitants to hang white sheets out of their windows. In this way the group managed to construct a visual, affective connection between PM concentrations in the city – which otherwise are rather abstract - and the pollution of the everyday living environment. The blackening sheets are seen as an effective campaigning tool because they constitute a sensorial and physical proxy for what is supposedly happening to people’s lungs. Other reportedly successful campaigns, such as a project that analysed pollution concentrations on homegrown strawberries, are based on the same principle, while also mobilizing a large number of people around the topic more directly. Given the awareness-rising power of these affective experiences with air pollution, governments would perhaps do well to play closer attention to these campaigns when developing their own communication strategies, which currently all too often rely on abstract indications of air pollution, such as Antwerp’s initiative to place several large displays in the city center, indicating current pollution levels, or Malmö’s air quality website that lists the direct results of air pollution measurements in different locations around the city. Other ways in which information campaigns could appeal to people include concentrating on the link between air pollution and children’s health, since this appears to be one of the most common causes for concern and one of the more frequently mentioned reasons why people undertake adaptive actions.

At the same time however, sensory and physical associations with air pollution would seem to be most (though not exclusively) applicable to Jensen’s (2002) first knowledge category, and less so to knowledge of causes, actions, or alternatives. Since all four categories are deemed necessary for people to undertake pro-environmental action, other strategies appear necessary as well, including more formal forms of communication or education. In addition to exposure in the media, the work of

environmental organisations and action groups seems potentially significant in providing the educational role put forward by Jensen. In the Antwerp case in particular, a lot of the knowledge participants had gained about policy alternatives (e.g. 'Ringland'), about the pros and cons of different actions, and about pollution causes, appears to have come as a direct consequence of civil society initiatives. The general importance that participants in all cases attributed to awareness-raising campaigns underlines the importance of this kind of work.

Participants' reactions to existing policies differed considerably, though some commonalities could be discerned. In all of the focus groups, economic incentives came up as potentially the most effective way to decrease car use and therewith reduce pollution, even though in nearly all cases people also flagged these incentives as problematic because of the socio-economically uneven impacts they would likely entail. At the same time, participants generally immediately added that (economic) measures to reduce traffic would also need to be accompanied by investments in alternative options that are easy, affordable, and widely available. As one of the participants in Malmö put it, governments need to make it easy for people to make the right choices. The respective absence or presence of adequately developed public transport and bicycling infrastructure therefore emerges from our focus groups as a significant factor underpinning people's willingness and/or ability to change their behaviour. This confirms the idea that the active pursuit of infrastructural investments in alternative modes of transport is perhaps one of the most effective strategies that governments can pursue if they want to bring about a change in behavioural patterns, alongside punitive economic measures that discourage car use. This strategy could also help to overcome, to some extent, the obvious political problems with economic and punitive measures, that is, that the people most likely to be affected by them are unlikely to be very supportive of their introduction. Another benefit of this approach, as one participant in Antwerp noted, is that investing in public transport simultaneously also has advantages in other fields, for example for social cohesion, since people from widely different backgrounds get to meet each other on the tram, bus or train.

The concrete actions that participants put forward largely corresponded to the broader alternative visions they formulated: car-free cities, more sustainable forms of city planning, changing commuter patterns, an infrastructural overhaul of the public transport system, and more public involvement in decision-making, to name but a few. These broader visions put the finger on another perhaps significant finding of this analysis, namely, that people do not tend to think in terms of individual environmental problems. The focus groups clearly show that people reason in more holistic environmental terms and don't necessarily differentiate between actions for air pollution, and, say, actions for mitigating climate change. People tend to change their behaviour in order to reduce their environmental footprint in general, and then assume this has all kinds of ancillary benefits. They generally do not change their behaviour specifically to reduce, say, their NO_x emissions. Indeed, in the context of the broader environmental challenges that societies are facing, the question of air pollution can seem quite insignificant to the public of less-polluted countries (e.g. in Sweden). In this context it perhaps makes little sense for authorities to single out air quality as a concrete focus for behavioural change. Instead we suggest the pursuit of strategies that seek to create more synergies between air quality policy and related environmental policy, perhaps particularly so for the mitigation of climate change. The advantages of this approach have already been noted in the literature (Sergi et al 2016). This approach could aim to tag air quality gains onto general improvements in environmental quality, in the expectation, for example, that it would be easier to mobilize behavioural change for reasons other than air pollution reduction. De facto, if somewhat

unwittingly, it appears a lot of governments are already pursuing this. Malmö's air quality plan largely reads as a strategy to bring about a modal shift, and is acknowledged by politicians to have been developed for reasons quite separate from the reduction of air pollution. In Antwerp as well, participants noted that a lot of the supposed air quality measures were actually introduced for very different reasons.

Finally, our focus group exercise clearly shows that environmental knowledge is a necessary but not a sufficient condition for bringing about environmentally beneficial behaviour. While knowledge of the problem, of its causes, and of the alternatives were commonly present, a number of participants hinted at the fact that they would in any case be unwilling to give up their cars. The reasons for this was framed in terms of purely selfish reasons (Antwerp), in terms of contradicting government incentives (the promotion of company cars in Belgium), or in terms of the connection people felt between the use of their cars and the satisfaction of their basic needs (Milan). The importance that people attribute to the need for infrastructural changes and investments in alternative modes of transport thus highlights the imperative for visionary politics, that is, for government policies that is radical in its sustainability aims.

7. References

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