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Diversity in sub-national EU implementation: the application of the EU Ambient Air Quality directive in 13 municipalities in the Netherlands

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ABSTRACT

This paper offers an analysis of the implementation performance of the EU Ambient Air Quality directive in the Netherlands. It provides a systematic evaluation of the implementation of a procedural provision – the obligation to design air quality policy. It draws on original data on air quality policy measures that have been collected in 13 medium-sized Dutch municipalities. The analysis of differences in the implementation performance was performed using a novel three-dimensional conceptual framework. The findings illustrate great differences in the implementation performance between the municipalities. The focused comparison allowed establishing very precisely where the implementation performance is poor or even lacking, and which municipalities take their EU implementation task more seriously than others. Most puzzling, environmental problem pressure turned out not to act as a sufficient trigger for municipalities to take far-reaching air quality measures. In contrast to previous research, a more nuanced picture is painted when it comes to the concepts of 'compliance', 'non-compliance' and 'over-compliance'. A careful dissection of the implementation performance based on the aspects of the conceptual framework produces hands-on recommendations to municipalities seeking to improve their air quality policy.

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Air quality policy; EU Ambient Air Quality directive; procedural provisions; implementation performance; local implementation

1. Introduction

Air pollution is one of the major parameters of urban environmental quality. It has profound negative impact on human health (Gurjar et al., 2010). The European Ambient Air Quality (AAQ) Directive 2008/50/EC establishes air quality objectives to be met by the member states in order to prevent and combat air pollution. These objectives entail substantive provisions (Howlett, 2011), such as standards for the concentrations of specific pollutants in the air, as well as considerable procedural provisions, which are designed to indirectly affect the desired policy outcome through the manipulation of policy processes (Howlett, 2011). Thus, the directive calls for assessment, monitoring and sustainment of the air quality through rigorous air quality plans and obliges the member states to public communication on their air quality measures. This type of procedural provisions is increasingly used in EU environmental law (Héritier, 2002; Knill & Lenschow, 2004; Liefferink, Wiering, & Uitenboogaart, 2011).

In spite of their popularity, procedural provisions have received limited systematic attention from EU compliance scholars (Bondarouk & Mastenbroek, 2015; Knill & Lenschow, 2000). However, the examination of such provisions becomes especially relevant in light of a recent ruling of the Court of Justice of the European Union against the United Kingdom and a reasoned opinion from the Commission against Germany, both calling into question the 'appropriateness' of policy measures to combat air pollution (Article 23 of the AAQ

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directive). Thus, even though procedural provisions characteristically provide flexibility at the member state level as to *how* these obligations are to be implemented (Knill & Lenschow, 2004), EU institutions apparently pay very close attention to the practical implementation of such provisions.

Evaluating compliance with procedural provisions is important if one is to examine to what extent member states actually 'make EU policies work' (Haverland & Romeijn, 2007). The traditional view of compliance, where the conformity of the conduct of the regulated with legal obligations constitutes the central yardstick (Hartlapp & Falkner, 2009), seems less suitable here. According to this view, the mere fact that a member state or a local implementer lives up to the procedural obligation by producing reports or plans would already qualify the implementer as compliant. This dichotomous approach, by which compliance is juxtaposed to non-compliance, masks potentially great variance in responses between authorities and does not tell much about the extent of the domestic efforts to implement the policy (Bondarouk & Mastenbroek, 2015; Hupe & Hill, 2015).

To overcome the problem of shallow conclusions on the implementation of procedural provisions, the emphasis should be put on the differences in implementation performance between implementers of the same administrative layer, for example, between municipalities (Hupe, 2011; Hupe, Hill, & Nangia, 2014; Hupe & Hill, 2015). Such differences in the local implementation, which are still within the boundaries left by EU directives, deserve more scholarly attention (cf. Thomann, 2015; Treib, 2014) in order to understand how shared policy problems are jointly resolved in the EU (Bondarouk & Mastenbroek, 2015; Saetren, 2014).

This study addresses these gaps in literature. Moving beyond compliance, it elaborates on the implementation performance of medium-sized municipalities and depicts how the implementation of the AAQ directive results in tailor-made policy solutions on the ground within one member state. The objective of this paper is to evaluate the interaction between the policy leeway inherent in the AAQ directive's requirement to devise an air quality plan and its local implementation. The research question is therefore: what and how big are the differences between municipalities in using the room for discretion provided by the key procedural Article 23 of the EU Ambient Air Quality directive 2008/50/EC? A careful analysis will not only reveal differences between the municipalities but also shed light on how local air quality policy implementation compares to the obligations set out in the AAQ directive. The follow-up question of why these differences exist will, for space reasons, be shelved for another paper.

The article expands EU implementation research in four ways. First, it covers a relatively understudied practical implementation stage of EU compliance at the municipal level (Treib, 2014). Second, it covers a relatively understudied area of environmental policy – local air quality policy implementation (but see Beattie, Longhurst, & Elsom, 2004; Carmichael & Lambert, 2011; Dorfman, 2010; Newig & Fritsch, 2009; Woodfield, Longhurst, Beattie, & Laxen, 2003). Third, this article provides a systematic evaluation of the implementation of a procedural type of policy instruments, which has become a common ingredient of environmental policy. And fourth, this article provides a new way of evaluating implementation performance by using the innovative framework developed by Bondarouk and Mastenbroek (2015). The article draws on original data on air quality policy measures that have been collected in 13 medium-sized Dutch municipalities. Only the policy measures that have actually been carried out, that is, not just those planned, are included in this study. Such analysis reveals how actively the municipalities engage in the implementation of EU air quality policy.

2. Framework

The theoretically deduced framework introduced by Bondarouk and Mastenbroek (2015) was chosen as it enables a systematic analysis of differences in implementation performance on policies that leave a lot of leeway to local implementers. This is particularly useful when analysing procedural provisions such as air quality plans, that is, Article 23 of the AAQ directive. Viewing the implementation of the AAQ Directive from a traditional perspective, the mere fact that there is a plan would already be sufficient to claim that implementers are compliant. However, the variety between the implementers who are tasked with the same policy deserves a closer look. Following recent literature, it should not be a surprise that local implementers deviate from the policy set out by the national legislators, that is, that there are 'vertical' differences between the national policy and its local translation. What remains puzzling, however, is the existence of 'horizontal' differences between local implementers (Hupe, 2011; Hupe et al., 2014).

In order to systematically map such differences, Bondarouk and Mastenbroek (2015) proposed a three-dimensional conceptual framework of implementation performance. Implementation performance is the intensity of policy outputs undertaken by implementers in response to EU policy instruments – relative to the directive's benchmarks (vertical aspect) and to other implementers' outputs (horizontal comparison). The three dimensions are substance, scope and effort. These dimensions are further refined with the help of a number of aspects (Figure 1). Municipalities differ on these aspects of implementation performance.

Substance, the first dimension of implementation performance, relates to the central issue that is to be regulated. The first aspect entails the objectives of the substantive and procedural requirements posed by the EU, identifying the specific requirements on-the-ground (Howlett & Cashore, 2014). Municipalities may for instance impose stricter, less strict or additional air quality norms in their own policy measures. In case of procedural provisions such as an air quality plan, objectives refer to which type or types of measures were included in the plan. The second aspect relates to the operational definitions used during practical implementation. When implementing the AAQ Directive, municipalities for instance have to define what they mean by 'appropriate' or 'good' measures, or when exemptions to the measures are at place.

The second dimension of implementation performance concerns the *scope* of implementation: where, when and to whom does the policy task apply. The first aspect is the territory to which the policy task applies, for example, a whole region, an entire municipality or only specific areas in a city. The second aspect is the temporal scope, or duration of the policy task, that is, when did the air quality measures come into force and/or to which period do they apply. The final aspect of scope examines how broad or specific the group of addressees targeted by the policy measures is.

The final dimension focuses on the *effort* implementers put into accomplishing a policy's goals and consists of four aspects. First, the number of designated staff relates to how many people in the municipality are responsible for formulating and carrying out the relevant policy tasks. Second, the types of expertise involved in policy implementation address the type(s) of knowledge consulted during air quality policy task formulation. The third aspect of effort is the amount of financial resources, expressed for instance as the percentage of an implementer's budget, allocated to the implementation of air quality policy goals. The fourth aspect is the prioritization[1] of goals or measures within one policy, given the limited availability of resources. The final aspect refers to the monitoring for ensuring that the policy measures are complied with. It stipulates how a municipality will assess the quality of the delivered task and how it envisions controlling for policy adherence.

It should be noted that the framework by Bondarouk and Mastenbroek (2015) does not exclude interdependence between the aspects. For example, a municipal allocated budget to implement a policy might affect its ability to come up with monitoring. Such correlations are however not a concern for this paper, as it only aims to measure the implementation performance and not to explain it.

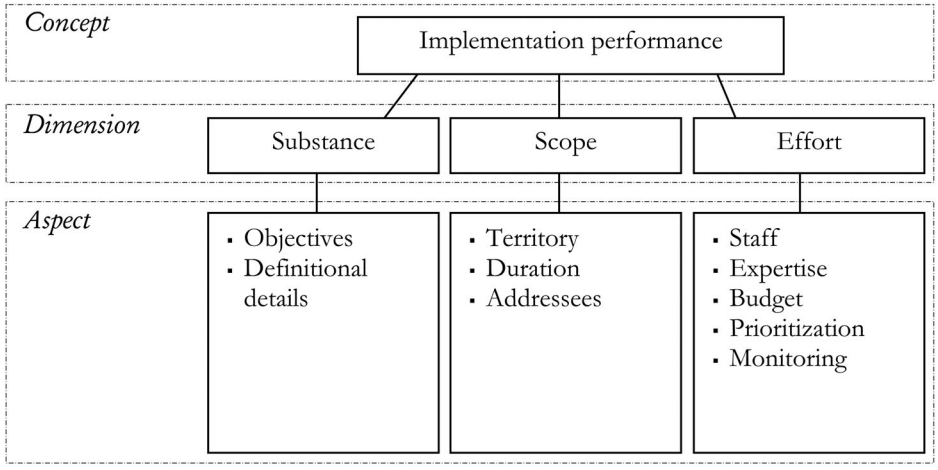

Figure 1. Conceptual framework. Source: Bondarouk & Mastenbroek, 2015.

3. Research design

3.1. Case selection

The Netherlands have been chosen for this study as the AAQ directive gave rise to implementation problems in a lot of Dutch municipalities (Busscher, Zuidema, Tillema, & Arts, 2014). The implementation problems were associated in particular with the close coupling of air quality requirements and spatial planning. All new spatial planning projects had to be assessed with a view to their contribution to air pollution, leading in several cases to serious delay or even termination of the project (Carmichael & Lambert, 2011). Hence, economic growth in the municipalities was threatened by air quality policy.

At the same time, the Netherlands present a typical case for the investigation of air quality policy. As almost all other EU municipalities, Dutch municipalities have a mandate in air policy and were faced with air pollution challenges (Busscher et al., 2014). In contrast to municipalities of big member states, however, Dutch municipalities are very comparable in terms of geography and sources of air pollution. Thus, Dutch municipalities were faced with largely similar conditions, and therefore could potentially take the same measures (Busch, Lenschow, & Mehl, 2012; Busscher et al., 2014).

This study focuses on medium-sized municipalities. First, these municipalities represent a large portion of society in the Netherlands as well as elsewhere. Second, these municipalities often face air quality problems that are very similar to those of the largest municipalities. While the latter received most scholarly attention (Gurjar et al., 2010; Mayer, 1999), medium-sized municipalities were largely neglected. And third, they form a large homogeneous group with similar air pollution sources, making them an almost ideal sample for horizontal comparison. All 13 municipalities in the Netherlands having between 150 thousand and 340 thousand inhabitants were selected for this study.

The analysis was based upon policy plans on air quality, mobility, parking policy, public transport and sensitive destination policies. The evaluations of these plans, annual financial reports and 18 interviews with municipal policy officers and local civil society organizations informed the analysis. In total 237 documents were covered. The time frame of policy implementation was kept rather wide – from 2000 to 2015, in order to fully account for the air quality measures on the ground. In some municipalities, a particular measure might have been taken already prior to 2008 AAQ directive, whereas other municipalities only started to implement at a much later moment.

The information was gathered on 8 out of the 10 aspects introduced above (see Figure 1). For two aspects – staff and budget – it turned out to be impossible to gather comparable and meaningful data because air quality policy measures usually transcend the departmental structures of municipalities. The financial department, the environment affairs department and the mobility and traffic department were usually involved in the design of policy measures. Some of those only invested a few hours per year on the matter, for example, the financial department employees who consulted the environmental department on the public procurement rules on the new public transport. Concerning budget, air quality policy measures could for instance be paid from the mobility department budget as many of the measures were directly related to mobility improvement measures. Trans-departmental made it impossible to isolate staff and budget allocated to air quality specifically. It must be noted that these problems relate to the strongly cross-sectoral nature of air quality policy. For many other EU policies, it is likely to be easier to trace data on staff and budget.

3.2. Scoring air quality plans and measures

In order to analyse air quality policy implementation performance, the data on the remaining 8 aspects were collected on 2 levels: the air quality *plan* as a whole and 25 individual air quality *measures*. In all instances, scores were assigned from 0 to 3. The scoring allowed for a focused comparison across the 13 municipalities. The division between the individual measures and the plan as a whole was necessary to prevent the scores on the 25 individual measures from overshadowing the scores on the overall plan. Weighing the scores would have been an option, but the weighing factors would inevitably have remained arbitrary for four reasons. First, the

importance of plans versus actual measures depends on a complex amalgam of political, institutional and cultural factors, which are very hard to disentangle. Second, there is no academic consensus on which measures prove to be in general the most effective (Knill, Schulze, & Tosun, 2012; Van Stigt, Driessen, & Spit, 2016). Third, the effectiveness of single measures is hard to determine as a combination of measures is usually employed to tackle environmental problems (Howlett, 2011). Finally, the applicability and effectiveness of any individual air quality measure is highly sensitive to the specific geographical context (Vlachokostas, Achillas, Moussiopoulos, & Banias, 2011). Therefore, refraining from weighing the scores seemed to be most proper solution.

On the plan level, data for the 'duration' aspect were collected but not elaborated upon, as we are interested in whether the policy measures have actually been taken at all (as opposed to when exactly they were planned). The effort aspects of 'expertise' and 'prioritization', in contrast, were only measured for the plan as a whole and not for the individual measures, as these effort aspects could be related to the plan level only.

Appendix 1 elaborates on how the scores on the overall policy *plan* were assigned. A long-list of all possible policy practices was developed inductively and differentiated by aspect of the implementation performance framework (e.g. objectives, territory). A policy plan received a higher score per aspect of the framework if more descriptions from the long-list of policy practices could be 'ticked' for the city at stake. The scores were added up to form a score per municipality.

In order to analyse individual air quality policy *measures*, a long-list of all possible policy measures was developed inductively. Twenty-five possible measures were identified, which were subdivided into six categories of measures: (1) public transport, (2) prevention of cars in the city, (3) bicycle policy, (4) stimulating the demand for alternative transportation, (5) information to the public and (6) sensitive destination measures. Such aggregation was done to ease the comparison between the municipalities. The categories were cross-checked with other reports on the possible types of air quality measures (Fransen, 2012; Van Oort & Van Oort, 2012; Van Rij & Brink, 2013).

All 25 policy measures in all 13 cities were scored individually. Per individual policy measure, there was again a long-list of all possible policy practices developed inductively and differentiated by aspect of the implementation performance framework. As for the plan level, a policy measure received a higher score per aspect if more descriptions from the long-list of all possible policy practices could be 'ticked' for the city at stake. This eventually allowed for a comparison of the implementation performance on the ground between the 13 cities. To produce an aggregate score for one of the six categories of measures, the scores on the individual measures of the same category were added up. In a similar vein, an aggregate score per aspect of implementation performance was derived by adding up the scores for that particular aspect across all categories. The scores of municipalities could then be compared on the categories of air quality measures as well as on specific aspects of implementation performance. Also a total score on all six categories could be drawn up. Appendix 2 provides the extensive codebook that was developed for the measurement.

4. The Dutch policy context for municipal air quality policy

Before delving into specifics of the Dutch case and the responsibilities of municipalities and national government, a few details about the directive's Article 23 are at place. Article 23 stipulates that where limit values are exceeded, member states should make an air quality plan containing appropriate measures aimed at keeping the exceedance period as short as possible. The plans may additionally include specific measures aiming at the protection of sensitive population groups. The plans and the information on their implementation should be made publicly available.

In the Netherlands, the AAQ directive has been transposed into the Environmental Protection Act, which lays the basis for the National Air Quality Cooperation Programme (NAQCP). The NAQCP has been communicated to the Commission as the national policy plan to combat air pollution, and served as the ground for the Commission's decision to postpone the deadline for compliance for the Netherlands. This means that the limit values for particulate matter 10 had to be reached by mid-2011 (instead of 2005) and those for NO_2 by 2015 (instead of 2010). Apart from this derogation, the limit values are the same as in the EU directive. Although the

directive and the transposition focus on other pollutants as well, the NAQCP identifies these two as the only pollutants still being exceeded in the Netherlands.

Next to the standards, the NAQCP lists all national and municipal air quality measures. The national authorities are responsible for monitoring the air quality through a national sampling system, overseeing the progress of local air quality plans' implementation and communicating the air quality status to the public. Hence, according to the EU directive, municipalities are not obliged to monitor air quality and report the policy measures to the public, as the national government is already seeing to that. In addition, national authorities are responsible for managing the pollution at the national highways, while municipal roads are a responsibility of the local authorities. The national authorities have also committed to limit the growth of sensitive destinations, that is, schools, kindergartens, nursing and retirement homes, next to national and provincial roads. There is no binding regulation to undertake similar measures along municipal roads. The national authorities allocated 372 million Euros to local authorities for the air quality measures.

The municipal authorities submitted their local air quality action plans to the NAQCP. While some municipalities were very specific, others provided only a general outline of the measures to be taken. The municipalities are obliged to implement all the measures they have listed under the NAQCP; otherwise, they would have to pay back the funding granted by the national authority. At the same time, they are allowed to take extra policy measures besides those specified under the NAQCP. According to the NAQCP calculated forecast of 2008, four cities in our sample, that is, Utrecht, Eindhoven, Nijmegen and Arnhem, would still exceed air pollution limits by 2015. Strictly speaking, from the sample of 13 cities, these are the only 4 cities that were obliged to take air quality measures according to the AAQ directive.

Overall, this means that each municipality is bound to a different list of measures. Municipalities, moreover, basically drew up these lists themselves. It can therefore be concluded that they enjoy a large discretion in the implementation of the AAQ directive.

5. Findings and discussion

The objective of this paper is to evaluate the interaction between the policy leeway inherent in the AAQ directive's procedural requirement to devise an air quality plan and its local implementation, and by doing so to demonstrate what differences exist in the local implementation of AAQ directive. This ultimately contributes to our understanding of how member states actually 'make EU policies work'. This section starts out by comparing local air quality policy implementation to the obligations set out in the AAQ directive. Afterwards the question of differences between the municipal implementation performances is dealt with. As a few municipalities were predicted to face continued exceedance of the limit values, we specifically pay attention to their implementation performance. In addition, we zoom in on the performance of relatively bigger versus relatively smaller cities in our sample. Finally, this section reflects on the use of the implementation performance framework, which is first employed in this paper.

5.1. Local air quality policy implementation versus the AAQ directive and the Dutch transposition

When it comes to formal compliance with the AAQ directive, all 13 municipalities comply with the requirement of having a plan. Also when it comes to meeting the air quality standards, the municipalities have almost entirely managed to achieve the deadlines for the specific pollutants.[2] Recalling the Dutch air pollution problems prior to the AAQ directive, this achievement is remarkable as such. One possible explanation for this could be the way the Netherlands have organized the practical implementation. Both 'carrots' and 'sticks' were provided in the NAQCP: the municipalities had to take action and were not allowed to engage in spatial development projects if exceedances were expected, but at the same time the municipalities received financial assistance to implement their AAQ measures. The fact that the municipalities were involved in the NAQCP design from the beginning could be conducive to this compliant behaviour (Howlett, 2011).

More interestingly, however, the data show various situations where municipalities seem to do more than necessary. We can distinguish over-compliance relative to the EU directive and over-compliance relative to

its national transposition. In addition to that, there are many differences on a horizontal level, suggesting that some municipalities take the implementation task of air quality policy more seriously than others without being over-compliant in a strict sense of the word. We will discuss these situations in more detail now.

First, over-compliance relative to the AAQ directive occurs with regard to a substantive provision: six municipalities (Nijmegen, Tilburg, Almere, Groningen, Breda and Haarlem) aimed for stricter standards on particulate matter 10 and nitrogen dioxide than those stipulated by the directive as well as its national transposition. This must be taken as a clear form of over-compliance in local practice. Furthermore, two municipalities (Nijmegen and Groningen) took an extra pollutant into account – soot, which is neither mentioned in the EU directive nor in the national transposition. As soot is in fact a sub-particle of particulate matter 10 and as such covered by the directive, this can hardly be considered as a substantive local 'topping' of national or EU rules. It however demonstrates that some municipalities have taken air quality concerns a step further by doing their own specific research on the important ingredients of particulate matter 10 and addressing it in their policy measures.

Second, over-compliance relative to the national transposition of the directive can be seen as some municipalities have established their own air quality monitoring system and provide information to the broader public on their policy measures, despite the fact that the national authorities already take care of this. The Netherlands, in other words, already complied with the AAQ directive on these points on the national level. Five municipalities have their own air quality assessment system in place. Except Almere all cities engaged in information provision. Nijmegen, Amersfoort and Utrecht even scored quite high within this category (see Table 1). Moreover, without being formally obliged to do so, four cities have taken extra local measures to prevent the growth of sensitive population destinations next to busy municipal roads (see Table 1). This finding again shows that municipalities may be willing and capable of going a step further than necessary, indicating that national expectations are not always dashed locally (cf. Pressman & Wildavsky, 1973). Third, there are several cases where neither the EU directive nor the national transposition of the directive specify exactly which measures are to be taken. Also in those cases, data show that municipalities differ in their implementation performance. This for instance entails endeavours in the area of bicycle policy, which considerably diverge across cities (see Table 1). This grey area of discretion is exactly the room the municipalities can use to fit the measures to their local circumstances and to do more than an average municipality. This cannot be regarded as over-compliance because the point of reference for deciding whether compliance or over-compliance is at stake at all is missing. The only conclusion to be drawn here is that some municipalities take their implementation task more seriously than others.

In this context, it should be noted that the Netherlands is a unique case as municipalities were invited to develop their own air quality measures, which were then included in the NAQCP and subsequently became binding upon the municipality concerned. Nevertheless, the comparison of the local measures laid down in

Table 1. Categories of ambient air quality measures.

Municipality	Plan as a whole	Total AAQ measures	1. Public transport	2. Prevention of cars in the city	3. Bicycle policy	4. Demand for alternative transportation	5. Information to the public	6. Sensitive destination measures
Utrecht	14	141	31	38	42	17	13	0
Eindhoven	14	151	36	31	35	32	9	8
Tilburg	15	151	28	34	38	31	12	8
Almere	11	123	31	29	33	30	0	0
Groningen	14	143	39	33	45	16	10	0
Breda	14	130	20	34	27	33	8	8
Nijmegen	16	158	33	34	34	36	21	0
Enschede	12	138	37	24	39	26	12	0
Apeldoorn	13	97	20	15	32	24	6	0
Haarlem	14	141	31	32	35	33	10	0
Arnhem	12	126	32	34	24	29	7	0
Amersfoort	12	119	15	15	33	29	18	9
Zaanstad	13	104	27	25	21	18	13	0

Note: the municipalities are listed according to their population size, Utrecht being the largest and Zaanstad being the smallest in the sample.

the NAQCP and actual local implementation is not a good starting point to determine over-compliance, as there is an obvious strategic interest of the municipalities not to promise too much in the NAQCP or to use rather vague terminology. At the end of the day, the measures taken in practice at the local level have to be decisive for determining implementation performance.

5.2. Differences between cities: municipal policy plans and individual policy measures

The analysis reveals that there are more differences between the municipalities with regard to the implementation performance of individual air quality measures than with regard to the air quality plan as a whole.

The aspects of 'territory' and 'addressees' of the air quality plan turned out, not totally unexpectedly, to be the same for all municipalities in the sample. Without exception, the plans were applicable to the whole municipal area and addressed the whole municipal population. As all municipalities identified 'road traffic' as the source of pollution, there were no horizontal differences on the 'definitional details' aspect either.[3] All cities prioritized circulation measures, nitrogen dioxide and particulate matter 10, and local bottlenecks where air quality standards were threatened to be exceeded. Moreover, apart from four cities which have taken additional sensitive destination measures, all identified the same categories of policy measures to combat air pollution (see Table 1). This finding suggests that there might be a lot of communication and knowledge exchange between the municipalities. Even though the Netherlands have a national air quality plan, all municipalities were free to take their own measures. It remains to be seen what role the national government and the NAQCP played in stimulating such uniform approach.

When it comes to individual air quality measures, a high variation between municipalities can be observed regarding both different aspects of implementation performance (see Table 2), and different categories of policy measures (see Table 1). The 'addressees' aspect accounts for the largest inter-municipal difference, with Eindhoven scoring 17 and Apeldoorn only 6 points, implying that the measures taken in Eindhoven apply to a considerably wider group of addressees than measures taken in Apeldoorn. When comparing municipalities on the six categories of AAQ measures, Nijmegen took a lot of effort to ensure that the public was informed on the air quality measures that were taken and the air quality status in the city (21 points), while Almere did not do anything in this category of measures (0 points). Although, as discussed above, municipalities exhibit considerable similarities regarding the categories of measures they take, this finding implies that within these categories municipalities may opt for tailor-made strategies to combat air pollution. Even though all are compliant, some municipalities took a step further in reducing air pollution than their local peers. In this context, it should be remembered that World Health Organization recommendations for air quality are twice as strict as EU limit values. To what extent this municipal activism could be attributed to, for instance, more ambitious environmental policy traditions (cf Lee & Koski, 2012; Wood, Hultquist, & Romsdahl, 2014), active interest groups (cf Lee & Koski, 2012; Treib, 2014) or policy entrepreneurs (cf Kingdon, 2014; Meijerink & Huitema, 2010) will be examined in future research.

Table 2. Aspects of implementation performance.

Municipality	Plan as a whole	Total AAQ measures	Objectives	Definitional details	Territory	Addressees	Duration	Monitoring
Utrecht	14	141	12	51	33	14	36	5
Eindhoven	14	151	15	49	30	17	36	4
Tilburg	15	151	16	49	31	15	36	4
Almere	11	123	10	41	31	12	26	3
Groningen	14	143	12	48	30	12	39	2
Breda	14	130	15	43	25	14	29	4
Nijmegen	16	158	12	58	34	12	39	3
Enschede	12	138	12	42	31	11	39	3
Apeldoorn	13	97	8	32	20	6	28	3
Haarlem	14	141	13	46	29	12	38	3
Arnhem	12	126	12	42	25	13	31	3
Amersfoort	12	119	14	39	20	11	32	3
Zaanstad	13	104	10	35	24	8	24	3

Note: The municipalities are listed according to their population size, Utrecht being the largest and Zaanstad being the smallest in the sample.

5.3. Four municipalities with predicted bigger air pollution

Four cities in our sample had to take extra measures, that is, Utrecht, Eindhoven, Nijmegen and Arnhem, as they were expected to face particularly persistent air quality problems. It seems logical to assume that they would do more than other municipalities in the sample that were not predicted to have a similar problem pressure. However, this is not exactly what the data show (see Table 1). Nijmegen and Eindhoven have indeed higher scores on the measures, indicating that they have done more than other cities. However, there are three cities – Tilburg, Groningen and Haarlem – which scored higher than Utrecht (141 points) or the same without having the same environmental pressure to do so. Groningen, where limit values had never been exceeded, was not even a member of the NAQCP, which means that there was neither an obligation to take any measures at all nor any financial support from the NAQCP. At the same time Arnhem, having a predicted environmental pressure, ranks no higher than fifth from the bottom. This is very surprising as a presence of problem pressure is apparently not enough for the municipalities to undertake vigorous air quality measures. Specific local factors must be held responsible for this and will be addressed in further research.

5.4. Larger versus smaller municipalities

A pattern emerging from this sample that is less surprising is the notion that smaller municipalities tend to score lower on both the individual measures and the air quality plan as a whole. This suggests a relationship between the capacity of an implementing actor and its implementation performance (Treib, 2014). However, this relation does not seem to be fully symmetrical as being a bigger municipality does not suffice to score higher on the air quality policy implementation performance (see Tables 1 and 2). There are two deviant cases: Haarlem is the fourth-smallest municipality in our sample but has the same score as Utrecht (141 points), which is the biggest among our 13 cities. Almere is the fourth-largest municipality but has the fourth-lowest score in the sample. These cases are in line with EU compliance research, suggesting that capacity does not automatically lead to better compliance or performance as the willingness to implement also plays a role (Knill & Lenschow, 1998; Treib, 2014).

5.5. Reflection on the implementation performance framework

As this paper first employs the framework for assessing implementation performance developed by Bondarouk and Mastenbroek (2015), we reflect on its merits. First, with the help of this framework, the analysis paints a more diverse picture of implementation reality than a dichotomous notion of compliance could have done. According to the latter, all municipalities would have been classified as compliant, without doing justice to the empirical diversity which is crucial to understanding how member states make EU policies work.

Second, this framework allows a more precise identification of the best performing implementer. If one were to look only at the number and types of measures taken against air pollution (i.e. in terms of this paper, total objectives of individual measures), which has been the predominant way of studying implementation (Bondarouk & Mastenbroek, 2015), Tilburg would be the best performing municipality with a score of 16 on objectives (see Table 2). When considering the entire range of aspects of implementation performance covered by the conceptual framework, Nijmegen appears as the best implementer with a total score of 158 points, while its objectives score of 12 points remains behind that of Tilburg. Nijmegen has put a lot of effort in substantiating the measures, implementing them on a wider scope and being one of the frontrunners to carry out the measures. Nijmegen also scores highest on the total air quality policy plan (see Tables 1 and 2), due to the stricter norms and by being one of the five municipalities having their own assessment system to monitor air quality.

Third, a dissection of policy implementation into aspects and categories of measures allowed establishing where the implementation performance was lacking vis-à-vis other municipalities and gave insights into what potential improvements could look like. For example, a municipality that has the highest score on total individual air quality measures does not necessarily lead in each distinct category of AAQ measures.

Nijmegen being the best overall scorer only leads in two out of six categories of air quality policy measures (see Table 1). In this way, the framework assists in isolating weaker links in the implementation performance.

And finally, this framework allowed moving beyond commitments on paper to systematically digging into the implementation practices of municipalities. When comparing the scores on the air quality policy plan with the scores on the total individual measures, it becomes evident that having a well-scoring policy plan does not always predetermine a high score on total individual measures (see Table 1). Utrecht, Eindhoven, Groningen, Breda and Haarlem have equal scores on the plan as a whole, but have very different scores on the individual air quality measures. Almere performed poorer than Apeldoorn on the plan as a whole, but much better on individual air quality measures. Enschede is yet another example where the municipality scored poorly on the policy plan as a whole but rather well on the individual measures. This suggests that considerable differences may exist between plans on paper and measures carried out in reality. This framework facilitates looking deeper into practical implementation and assessing which local implementers really make EU policy work.

6. Conclusion

The analysis of municipal implementation of the EU AAQ directive revealed differences even within one member state. Although the 13 medium-sized Dutch municipalities in our sample were all technically compliant with the directive, they differed on various aspects of implementation performance. The focused comparison allowed establishing the overall top and bottom scorers of air quality policy implementation. Dissecting air quality policy into different categories of measures, however, another top three emerged for each category of measures. Such differentiated approach to implementation performance produces hands-on recommendations to the municipalities seeking to improve their air quality or to catch up with the other municipalities. It becomes relatively easy to demonstrate where the implementation performance is poor or even lacking.

This study demonstrates that there are different forms of over-compliance: over-compliance relative to the EU directive and over-compliance relative to its national transposition. In addition, the sample shows that some municipalities take their implementation task more seriously than others. The latter should however not be confused with over-compliance as in these cases, there were no specific measurable obligations neither in the EU directive nor in the national transposition. What is at stake here is essentially a matter of filling in the available room for policy discretion. It is highly likely that such notions of over-compliance and discretion are present in the implementation of other directives as well. This may constitute a puzzle for future research.

Surprisingly, the municipalities scored equally on ‘definitional details’ and ‘prioritization’ at the level of air quality policy plans as a whole. Another remarkable similarity between the municipalities is that, despite of high discretion in the implementation, most undertook the same categories of policy measures to combat air pollution. This suggests a basically similar coping behaviour by local implementers and trans-municipal information exchange. Such convergence could be hypothesized to be present in the implementation of other procedural policy instruments as well, as faced with uncertainty about the effect of their measures implementers could be expected to bundle their efforts and exchange information to effectively combat environmental problems, leading to similar solutions on the ground (Joergens, Lenschow, & Liefferink, 2014; Veenman & Liefferink, 2014). Future research should address how differences in discretion may affect policy convergence at the ground level.

At the same time, a more in-depth evaluation shows a lot of differences. Some particularly interesting patterns emerged from the data. First, and most puzzling, environmental problem pressure did not act as a sufficient trigger for a municipality to take far-reaching air quality measures. Further research could help to understand the conditions for this phenomenon. Second, smaller municipalities tend to have a lower score on implementation performance than bigger municipalities. This is less surprising, as other research has also shown that resources play an important role in implementation performance (Treib, 2014). At the same time, there were two outliers that deserve further investigation. And third, balancing the more general finding that the categories of measures taken by municipalities tend to be largely similar, more fine-grained differences in implementation performance imply that some municipalities took a step further in reducing air pollution than their local peers.

This research did not aim at establishing a link between scores on the implementation performance and actual air quality improvement, thus relating policy output to policy outcome (see Knill et al., 2012). Which policy measures work best to improve air quality is an entirely different question, which should be analysed differently. It remains a highly pertinent question though, especially since research has shown that EU air quality standards are in fact too low to adequately protect human health (Brunekreef et al., 2012). This is also reflected in the fact that WHO recommendations regarding air quality are twice as strict as the current EU standards. Therefore, even in Nijmegen, which adopted more ambitious air quality policies than comparable cities in the Netherlands, air quality might, after all, be insufficient.

This paper was the first to empirically apply the framework to measure implementation performance developed by Bondarouk and Mastenbroek (2015). A traditional conceptualization of implementation would have only focused on the objectives aspect of implementation performance and would have yielded very different results, for example, regarding the best performer. Instead of branding one implementer as the best performer based merely on the fact that it took most measures, the present framework took into account how the measures were defined as well as where, to whom and since when they applied. This resulted in a considerably more nuanced picture of implementation. Employing the framework also enabled studying the policy measures that were actually taken in contrast to those committed only on paper. As this paper revealed remarkable differences between policies on paper and policies in action, we encourage further research into this topic in order to see to what extent member states really make EU policies work.

In the particular case of air quality, not all aspects of implementation performance turned out to be equally fit for analysis. For two aspects, staff and budget, it proved problematic to gather meaningful data. This had to do with the departmental structures of municipalities in combination with the strongly cross-sectoral nature of air quality policy. This interconnectedness enables municipalities to pool resources from different departments to implement more policies with the same budget. How this impacts the goals of each related policy needs to be addressed in more detail. This paper has painted a more complex, richer and more nuanced picture of implementation of EU environmental directive at the lowest administrative layer of government. It has offered a considerable number of puzzles for future research. Further research, moreover, is needed to examine how Dutch municipal implementation performance compares to local implementation in other EU member states. Air quality has been a very salient topic in the Netherlands. Municipalities cooperated on the design of NAQCP from the beginning and have received funding from the national government. These factors might have contributed to municipal mobilization on this policy issue. How the interrelation between the requirements contained in the AAQ directive, national transposition and local implementation impacts the implementation performance regarding air quality would be most interesting to see.

Notes

1. Prioritization refers to the priority assigned to specific policy goals *within one policy*. This is not to be confused with the concept of 'saliency', which reflects the priority dynamics *between different policies*.
2. According to 2015 measurements, there are single sample points in Utrecht, Eindhoven, Tilburg and Arnhem where limit values are exceeded. In each case, this concerns one section of a street where concentrations of nitrogen dioxide exceed the annual limit of 40 $\mu g/m^3$. In 2008, forecast calculations indicated that Utrecht, Eindhoven, Arnhem and Nijmegen would face pollution exceedance. While Nijmegen managed to completely eradicate exceedance of the standards, Arnhem, Utrecht and Eindhoven were not entirely successful in doing so, but it should be stressed that this exceedance concerns fractions of a single street.
3. Only Nijmegen identified water transport as an important source of pollution. However, most of the cities in the sample do not have a water body with a busy traffic. Therefore, such comparison becomes problematic in view of geographical differences.
4. Only Nijmegen has identified water transport also as an important source of pollution. However, most of the cities in the sample do not have a water body with a busy traffic. Therefore, such comparison becomes problematic because of the differences in geographical conditions.
5. Municipalities can have an air quality plan in cooperation with other municipalities.

6. A more detailed operationalization of different degrees of size of population was not necessary as all municipal plans referred to the whole population of the municipality.
7. Not to be confused with sources of pollution. Those were coded as definitional details.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix 1

Operationalization and scoring of the local air quality plans

The data on the air quality plans were elaborated according to the seven aspects of the conceptual framework.

Objectives

First, the aspect of 'objectives' was operationalized in terms of the strictness of the pollutant standards that were set in the plan, as well as possible additional air quality pollutants specified in the plan. The plan would score a maximum of 3 points for calibrating stricter norms than national norms *and* adding at least one extra pollutant chemical to the list. The plan would score 2 points if only the norms were higher than the national norms, and 1 point was given to a plan in which air quality standards were similar to the national norms.

Definitional details

The second aspect, 'definitional details', was operationalized in terms of what source of pollution, for example, car traffic, were specified in the policy. The more sources of pollution were specified the more points were given. As all municipalities in the sample of 13 medium-sized Dutch cities identified 'road traffic' as the source of pollution, there were no horizontal differences on this aspect.[4] Therefore all municipalities received 1 point.

Territory

The fourth aspect, 'territory', was operationalized in terms of the territory to which the air quality plan applied. A plan was assigned 3 points for a regional territorial scope,[5] 2 points for a municipal territorial coverage, and 1 point if a policy plan only applied to a small territorial section in the municipality. As all municipal plans in our sample concerned the territory of the municipality, there were no horizontal differences on this aspect. All municipalities received 2 points.

Addressees
The fifth aspect, 'addressees' was operationalized in terms of the size and composition of the group the plan was applicable to. 'Addressees' were scored 3 points if a measure was relevant to all citizens, 2 points for a smaller group, 1 point for the smallest[6] group. As all municipal plans concerned the whole population, there were no horizontal differences on this aspect. All municipalities received 3 points.

Expertise
The sixth aspect, 'expertise', was interpreted in terms of practical rather than scientific knowledge and operationalized in terms of stakeholders involved in the development of the air quality plan. 'Expertise' was scored on the basis of a thematic long-list of all possible types of stakeholders (for example business organizations, environmental groups, civil society organizations or municipal health organizations), which was created inductively. If 6 (maximum) or 5 types of stakeholders were involved in the plan development, then the plan would be scored the maximum 3 points, if only 3 or 4 types then the plan would be scored 2 points, and if 1 or 2 types of stakeholders then the plan would score 1 point.

Prioritization
The seventh aspect, 'prioritization', was operationalized in terms of measures[7] that were prioritized within the plan. The more measures were identified as the focus of the policy, the more points were given. As all municipalities identified the same type of measure, which was the circulation of traffic in the city, which is a measure under 'prevention of cars in the city' category, as their 'priority', there were no horizontal differences on this aspect. Therefore all municipalities received 1 point.

Monitoring
The third aspect, 'monitoring', denoted monitoring of the air quality policy. The plan would score the maximum 3 points for annual reports on air quality and having its own municipal air pollution measurement system, 2 points for only annual reports, 1 point for applying the national monitoring tool that is available on the national air quality website and 0 points for not specifying any enforcement mechanism at all.

The scores for all aspects were added up to form a score per municipality. The maximum score for a municipal air quality plan was 16 points.

Appendix 2

Operationalization and scoring of the individual air quality policy measures

The codebook

The legend:

Bold letters & numbers = category of air quality measures (There are 6 categories)
Roman numbers (I,II, etc.)= measures within the category
Arabic numbers (1,2, etc.) = definitional details
Italic letters = instructions for scoring
pt = points

1. Public transport:
On objectives score Public Transport category: 0 pt if 0 measures are taken; score 1 pt if 1–3 measures are taken; score 2 pt if 4–5 measures are taken, score 3 pt if all 6 measures are taken.

I. High quality public transport: (a separate 'highway' for busses where they always enjoy priority)

1. connection between economic hubs

On definitional details score High quality public transport: 0 pt if no definition is given, or 3 pt if this definition is given.

II. Public transport comfort:

1. accessibility of the bus stops and busses
2. dynamic travel information;
3. public order observers in the bus;
4. frequent travel opportunities;
5. many bus stops (a bus stop within 500 m)

On definitional details score Public transport comfort: 0 pt → no comfort, 1 pt → 1definition, 2 pt → 2–3 definitions, 3 pt → 4–5definitions.

III. Sustainable public transport:

1. Green / natural gas
2. Electric busses
3. Diesel with filters (Euro V and higher)

On definitional details score Sustainable public transport: 1 pt → diesel, 2 pt → Green/natural gas, 3 pt → *electric*.

IV. Sustainable taxi:

1. subsidy for maintenance costs of 'green cars'
2. a local subsidy on top of national subsidy for the purchase of the cars.
3. Municipality initiates the talks with taxi companies to explain the advantages of greener cars.

On definitional details score Sustainable taxi: 0 pt → no sustainable taxi, and 1 pt → 'initiate the talks … ', 2 pt for 'subsidy for the maintenance costs', 3 pt for 'a local subsidy on top of the national subsidy'

V. Stimulate public transport usage:

1. Only non-financial stimulation
2. discounts
3. totally free

On definitional details score Stimulate public transport usage: 0 pt → no mentioning, and 1 pt → Only non-financial stimulation, 2 pt → discounts, 3 pt → totally free.

VI. Priority public transport at intersection:

1. priority to the public transport

On definitional details score Priority public transport at intersection: 0 pt → no definition is given, or 3 pt → this definition is given.

Territory: *score 1 pt → a single measure is relevant for a particular district/sections of the city, 2 pt → within the municipality, 3 pt → the whole region*.

Addressees (only applicable to 'Stimulate public transport usage'): *score 1 pt → a single measure is only relevant for elderly or youngsters, 2 pt → it concerns several districts, 3 pt → the whole municipality*.

Duration: *score 0 pt → a single measure only relevant since 2014, 1 pt → a single measure is only relevant since 2010, 2 pt → since 2005, 3 pt → already in place earlier than 2005*.

Monitoring: *not applicable for this category of measures (ie. Not applicable for Public transport)*.

Table 1. Maximum scores on public transport.

Category of policy measures	Individual policy measure	Objectives	Definitional details	Territory	Addressees	Duration	Monitoring	Total
1. Public transport	High quality public transport		3	3	–	3	–	9
	Public transport comfort		3	3	–	3	–	9
	Sustainable public transport		3	3	–	3	–	9
	Stimulate public transport usage		3	3	3	3	–	12
	Sustainable taxi		3	3	–	3	–	3
	Priority public transport at intersection		3	3	–	3	–	9
	Total	3	18	18	3	18	–	60

–, not applicable.

2. Prevention of cars in the city (center):
On objectives*: score Prevention of cars category (if there are established AQ bottle necks by NAQCP): 1 pt → 1–2 measures is taken; 2 pt → 3–4 measures are taken, 3 pt → 5 measures are taken.*

On objectives*: score Prevention of cars category (if there are no established AQ bottle necks by NAQCP): score 1 pt → 1 measure is taken; 2 pt → 2–3 measures are taken, score 3 pt → 4 measures are taken.*

I. City center distribution

1. Few exemptions
2. Many exemptions
3. Subsidy available
4. Special arrangement for the waste collection
5. Only facilitating role for the companies to initiate something

On definitional details score City center distribution: 0 pt → there are only certain periods of time without any distribution plan and/or many exemptions are possible; 1 pt → municipality fulfills only a facilitating role; score 2 pt → there is a distribution system at place but there are a lot of exceptions, score 3 pt → only few exceptions are at place and/or there is a underground waste-system/subsidy available.

II. Transferia/P&R

1. P&R connected to public transport facilities
2. P&R connected to bicycle facilities
3. P&R signs are well visible coming from the highways
4. Extra busses on holidays

On definitional details score Transferia/P&R: 0 pt → no P&R is available, 1 pt → for having a bicycle facilities, 2 pt → for P&R to be connected to other sorts of transport, 3 pt → if the signs are there (the visitors are well aware of the P&R possibilities) and/or there are extra busses coming during holiday

III. Environmental Zone*

1. Dynamic traffic management boards that regulate when the zone is functional
2. Traffic signs indicating that you have entered the zone
3. Few/many exemptions possible

On definitional details score environmental zone: score 1 pt → many exceptions, 2 pt → traffic signs + few exceptions, 3 pt → dynamic traffic management boards

*(*One can only have an environmental zone in the city if there are established AQ bottle necks following the national guidelines. So if a city already complies with AQ according to national standards, it is not allowed to have an environmental zone)*

IV. Parking policy

1. Dynamic parking information systems show where to park
2. Increase the parking fee
3. Decrease the number of parking lots
4. Parking spot fee gets exponentially larger if to have a second car

On definitional details score parking policy: 1 pt → 1 definition, 2 pt → 2–3 definitions, 3 pt → all 4 definitions.

V. Circulation measures

1. Dynamic route installation
2. Green waves
3. Depending on the type of road and whether there are bottlenecks a priority at traffic lights is given to the trucks/cars/public transport/or bicycles

4. Physical alteration of infrastructure (eg 'pockets' for busses, bridge to divert the flow of traffic from the city center, physical alteration of the roads to slow down the traffic , widening of the road at the intersections, adoption of one-way traffic)

On definitional details score Circulation measures: *1 pt → 1 definition, 2 pt → 2–3 definitions, 3 pt → all 4 definitions.*

Territory (not applicable to City center distribution): *1 pt → a single measure is relevant for a particular district/sections of the city, 2 pt → if within the municipality.*

Addressees (only applicable to environmental zone & parking policy): *1 pt → a single measure is only relevant for a few businesses (eg. trucks) if applicable, 2 pt → if it also concerns a smaller pick-up trucks/visitors, 3 pt → the whole municipality (so also the citizens).*

Duration: *score 0 pt → a single measure only relevant since 2014, 1 pt → a single measure is only relevant since 2010, 2 pt → since 2005, 3 pt → already in place earlier than 2005.*

Monitoring: *only applicable to environment zones + circulation: 1 pt → having the fines at place or just mentioning that there is monitoring, 2 pt → irregular controls/monitoring, 3 pt → camera control/or other form of regular/systematic control/monitoring.*

Note (if environmental zone is not allowed): on Prevention of cars in the city category the max number of points are: 3 (for objectives) + 12 (for definitional details on 4 measures) + 3 (for enforcem. Mechanism on 1 measure) + 6 (for Territory on 3 measures) + 3 (for Addressees) + 12 (for Duration on 4 measures) = 39 points.

Note (if environmental zone is allowed): on Prevention of cars in the city category the max number of points are: 3 (for objectives) + 15 (for definitional details on 5 measures) + 6 (for enforcem. Mechanism on 2 measures) +8 (for Territory on 4 measures) + 6 (for Addressees on 2 measures) + 15 (for Duration on 5 measures) = 53 points.

Table 2. Maximum scores on Prevention of cars in the city (centre).

Category of policy measures	Individual policy measure	Objectives	Definitional details	Territory	Addresses	Duration	Monitoring	Total
2. Prevention of cars in the city (centre)	City center distribution		3	–	–	3	–	6
	Transferia/P&R		3	2	–	3	–	8
	Environmental zone		3	2	3	3	3	14
	Parking policy		3	2	3	3	–	11
	Circulation measures		3	2	–	3	3	11
	Total	3	15	8	6	15	6	53

–, not applicable.

3. Bicycle policy:

On objectives score Bicycle Policy category: 0 pt → 0 measures are taken; 1 pt → 1 measure is taken; 2 pt → 2–3 measures are taken, 3 pt → 4–5 measures are taken.

I. Bicycle parking

1. Free
2. Indoor
3. New buildings (business and leisure) all have enough room reserved for the bicycle parking lots
4. Bicycle parking facilities at public transport hubs (bus stops, train stations)
5. Road sign to indicate the next big parking lot for bicycles

On definitional details score Parking lots for bicycles: 1 pt → 1 definitions, 2 pt → 2–3 definitions, 3 pt → 4–5 definitions

II. Comfort bicycle roads

1. Separation bicycle road from the main roads
2. Waiting time system on busy intersections
3. Mopeds are prohibited at the bicycle roads
4. Asphalt bicycle roads

On definitional details score Bicycle comfort: 1 pt → 1 definition, 2 pt → 2–3 definitions, 3 pt → 4 definitions

III. Bicycle highways

1. There are Bicycle highways (wide bicycle-highways)

On definitional details score Bicycle highways: 0 pt → no definition is given, or 3 pt → this definition is given

IV. Priority bicycle at intersections

1. priority to the bicycle at intersections

On definitional details score Priority bicycle at intersections: 0 pt → no definition is given, or 3 pt → this definition is given.

V. Stimulation bicycle usage

1. There is a campaign

On definitional details score Stimulation bicycle usage: 0 pt → no definition is given, or 3 pt → this definition is given

Territory: *score 1 pt → a single measure is relevant for a particular district/sections of the city, 2 pt → if within the municipality, [3 pt → the whole region – only applicable for II, III, V*].

Duration: *score 0 pt → a single measure only relevant since 2014, 1 pt → a single measure is only relevant since 2010, 2 pt → since 2005, 3 pt → already in place earlier than 2005.*

Addressees & Monitoring: *not applicable to Bicycle policy*

Table 3. Maximum scores bicycle policy.

Category of policy measures	Individual policy measure	Objectives	Definitional details	Territory	Addresses	Duration	Monitoring	Total
3. Bicycle policy	Bicycle parking		3	2	–	3	–	8
	Comfort bicycle roads		3	3	–	3	–	9
	Bicycle highways		3	3	–	3	–	12
	Priority bicycle at intersection		3	2	–	3	–	8
	Stimulation bicycle usage		3	3	–	3	–	9
	Total	3	15	13	–	15	–	46

–, not applicable.

4. Stimulating the demand for alternative transportation

On objectives score 'Stimulating..' category: 0 pt → 0 measures are taken; 1 pt → 1 measure is taken; 2 pt → 2–3 measures are taken, 3 pt → 4 measures are taken.

I. Stimulation of alternative fuels consumption

1. Subsidies for the greengas fuel stations

On definitional details score alternative fuel stations: 3 pt for having these fuel stations at place

II. Electronic transport

1. Subsidies for the recharging stations
2. Subsidies for the e-cars
3. Subsidies for the e-bicycle/e-scooters
4. Free parking during the recharge

On definitional details score electronic transport: 0 pt → only facilitating non-financially, 1 pt → only up to 1 definition, 2 pt → up to 2–3 definitions, 3 pt → 4 definitions.

III. Organization of car usage at third parties

1. Subsidy for the companies for the calculation of whether switching over to sustainable forms of fuel will be efficient (role of municipality – sponsor and executor)
2. Mobility management for the company (role of municipality – thinking along)
3. Financial benefits for the main employers of the municipality if their employees choose bicycle over car as means of transportation.
4. Special procurement conditions for construction work (the companies that win the procurement should have clean cars at their disposal)
5. Facilitate parking place for Green Wheels or other car sharing services

On definitional details score Organization of car usage at third parties: 1 pt → only up to 1 definition, 2 pt → up to 2–3 definitions, 3 pt → 4–5 definitions.

IV. Municipality's stock of cars

1. Filters on diesel cars
2. e-cars/greengas-cars
3. stimulate bicycle usage/discourage car usage
4. procurement rules for new cars

On definitional details score special attention to employers: 1 pt → only up to 1 definition, 2 pt → up to 2–3 definitions, 3 pt → 4 definitions.

Territory (except of 'municipality's stock of cars'): *score 1 pt → a single measure is relevant for a particular district/sections of the city, 2 pt → if within the municipality.*

Addressees (except of 'Alternative fuel'): *1 pt → a single measure is only relevant for a few businesses, trucks if applicable, 2 pt → if it also concerns a wide variety of businesses, 3 pt → the whole municipality (so also the citizens).*

Addressees ('municipality's stock of cars): *1 pt → a single measure is only relevant for a higher politicians, 2 pt → if it also concerns civil servants, 3 pt → also concerns waste collecting companies and/or street cleaners*

Duration: *0 pt → if a single measure only relevant since 2014, 1 pt → a single measure is only relevant since 2010, 2 pt → since 2005, 3 pt → already in place earlier than 2005.*

Monitoring: *not applicable to this category.*

Table 4. Maximum scores on Stimulating the demand for alternative transportation.

Category of policy measures	Individual policy measure	Objectives	Definitional details	Territory	Addresses	Duration	Monitoring	Total
4. Stimulating the demand for alternative transportation	Stimulation of alternative fuels consumption		3	2	–	3	–	8
	E-transport		3	2	3	3	–	11
	Organization of car usage at third parties		3	2	3	3	–	11
	Municipality's stock of cars		3	–	3	3	–	9
	Total	3	12	6	9	12	–	42

–, not applicable.

5. Information to the public

On objectives score 'Information to the public' category: 0 pt → 0 measures are taken; 1 pt → 1 measure is taken; 2 pt → 2–3 measures are taken, 3 pt → 4 measures are taken.

I. School material

Definitional details: *3 pt → there are definitional details (if there is such a policy, there are common standards)*

II. Air quality policy information

1. Tips on environment friendly behavior
2. Desk of complaint
3. AQ policy
4. AQ monitoring (links to national reporting/information)
5. AQ monitoring (local if applicable/could also be reports)
6. Information on car sharing
7. Information on the subsidies

On definitional details score information on the website: 0 pt → there is only description of environmental zone and recharging stations for electric cars, 1 pt → only up to 1–3 definitions, 2 pt → 4–6 definitions, 3 pt → more definitions.

III. Active engagement of stakeholders

1. Workshops for the public
2. Support to the interest groups that organize activities
3. Yearly awards for the cleanest company

On definitional details score 1 pt per definition.

IV. Information on wood burning policy:

1. Environmental tips
2. What you should do in case of annoyance
3. Where you can go to if you need assistance
4. Environmental issues explained
5. Health issues explained
6. Size specifications of wood

On definitional details score information provision: 1 pt → only up to 1–2 definitions, 2 pt → 3–4 definitions, 3 pt → more definitions.

Territory & Addressees: *not applicable as all are affected.*

Duration: *score 0 pt → a single measure only relevant since 2014, 1 pt → a single measure is only relevant since 2010, 2 pt → since 2005, 3 pt → already in place earlier than 2005. (If there is information on the website about earlier reports/monitoring results/etc)*

Monitoring: *not applicable.*

Table 5. Maximum scores on Information to the public.

Category of policy measures	Individual policy measure	Objectives	Definitional details	Territory	Addresses	Duration	Monitoring	Total
5. Information to the public	School material		3	–	–	3	–	6
	Air quality policy information		3	–	–	3	–	6
	Active engagement		3	–	–	3	–	6
	Wood burning information		3	–	–	3	–	6
	Total	3	12	–	–	12	–	27

–, not applicable.

6. Sensitive destination measures

Objectives score: *3 pt → there is such a policy*

Definitional details: *3 pt → there are definitional details (if there is such a policy, there are common standards)*

Addressees: *1 pt → this policy is only relevant for new buildings, 2 pt → new and old buildings which are mentioned in the national guidelines, 3 pt → if extra destinations are mentioned that are not in the national guidelines.*

Duration: *1 pt → a single measure is only relevant since 2012, 2 pt → since 2005, 3 pt → already in place earlier than 2005.*
Territory & Monitoring: not applicable.

Table 6. Maximum scores on Sensitive destination measures.

Individual policy measure	Objectives	Definitional details	Territory	Addresses	Duration	Monitoring	Total
6. Sensitive destination measures	3	3	–	3	3	–	12

–, not applicable.

Table 7. Maximum scores on all categories.

Categories of air quality policy measures	Objectives	Definitional details	Territory	Addresses	Duration	Monitoring	Total
1. Public transport	3	18	18	3	18	–	60
2. Prevention of cars in the city (centre)	3	15	8	6	15	6	53
3. Bicycle policy	3	15	13	–	15	–	46
4. Stimulating the demand for alternative transportation	3	12	6	9	12	–	42
5. Information to the public	3	12	–	–	12	–	27
6. Sensitive destination measures	3	3	–	3	3	–	12
Total	18	75	45	21	75	6	240

–, not applicable.