Is Bulgaria at fault for falling behind? Or is it the EU?

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Title: Is Bulgaria at fault for falling behind? Or is it the EU?

Bachelor Project: Climate Politics

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22nd December 2021

7949 words

Universiteit Leiden

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1. Introduction

The countless studies and articles about climate and climate change make defining the key concepts difficult, due to the widely disputed terminology (Todorov, 1986). However, an understanding of climate is indispensable for studying climate change, which includes the harm caused by air pollution (Kumar et al., 2019). Whether it is due to natural causes or human creation, air pollution is the cause behind thousands of hospitalizations as well as premature deaths, as it is detrimental to both the environment and human health (Shandilya & Khar, 2012).

Climate change poses serious hazards to human existence on Earth, including the increased frequency of "intense droughts, floods, sea-level rise, air pollution, flora and animal differentiation, weather extremes, and natural catastrophes" (World Bank, 2012). An increasing amount of scientific data has warned the world about climate change over the last several decades. Scientists from the United Nations (UN) are concerned that if action is not taken immediately, the repercussions would be irreversible.

The European Union (EU) has been aiming to improve air quality since the issue became a significant political problem in the 1970s (European Commission, n.d.). The case of air quality and environmental policy are examples of the general phenomenon of Member States complying with EU regulations and directives (Börzel & Heidbreder, 2017; Börzel, 2002; Exadaktylos & Radaelli, 2009; Falker &Treib, 2008). According to OECD (2012) levels of air pollution are set to continue increasing in the next decades.

This topic is significant since the EU is frequently viewed as a homogeneous block, despite the fact that significant differences among member states exist. Furthermore, any regional divides that exist in accordance with EU regulations, as well as any heterogeneity depending on what the state's political background is, must be identified.

This study will be analysing Bulgaria, as it is the EU member state with the highest levels of air pollution. Therefore, this is the country where more knowledge can contribute the most towards air pollution reduction (IQAir, 2020). It is crucial to understand why a member state such as Bulgaria is still behind many EU standards, and struggling to implement air quality directives, even after over a decade of EU membership.

This thesis explores Bulgaria's two main political transitions in the last three decades, namely the fall of communism and the country's accession to the EU. Both were crucial for the economy, the government, and the environment, as well as the air pollution problem in the country. This project's discussion for air pollution will not cover all six identified main pollutants in the air - "Carbon Monoxide (CO), Lead (Pb), Nitrogen Oxides (NO2), Ground-level Ozone, Particle Pollution referring to particulate matter - (PM2.5 and PM10), and Sulfur Dioxide (SO2)'' (EPA, n.d.). For the purpose of this thesis, the most problematic pollutant in Bulgaria will be taken into account - Particulate Matter (PM). Despite the data existing from 2019, almost the whole of Europe has a problem with PM, which is demonstrated through the data of the European Environment Agency (EEA, 2021) and this surplus is significant at the international level as the EU yearly basis maximum corresponds to the World Health Organization's (WHO) guidance document on air pollution. For example for

PM10 - twenty-one countries from the European continent, sixteen of which are EU member states have levels above the EU yearly maximum. For PM2.5 seven European countries, four of which member states also registered levels above the maximum.

The aim of this project is to establish potential reasons explaining Bulgaria's continued failure of reducing its air pollution, even though it has been a member of the EU for over ten years. In this thesis, directives are chosen as the unit of analysis because they are a legislative act that establishes an objective that all EU member nations must meet. Nevertheless, it is up to every country to develop its own legislation to achieve these objectives (European Commission, 2018). Graphs will be presented to illustrate the time period of 03/06/2017 until 28/03/2019 while bringing together all relevant information and data. This time interval is chosen because there were more than 10 years of possibilities for Bulgaria to show progress.

1.1 Scope

The research question chosen for investigation is directly related to the above-mentioned topic, which is positioned within the theme of climate change. The precise question examined is:
To what extent are EU directives on air quality implemented in Bulgaria?

In order to gather answers, I devised the following sub-question:

What are the potential reasons for this lack of implementation?

The thesis is structured as follows, the first section contains the introduction above. The second section is the literature review which presents the other authors views on the topic. After that, the third section shows the relevant concepts such as the air quality and detectives followed by the methodology which is section four. In that part, the data and the method used for analysis are illustrated by explaining how the data is collected and analysed. The results will be presented in section five, followed by a discussion of the ramifications of the findings and answering the research question. As a final, the conclusion will include limitations, contributions as well as future recommendations in section six.

2. Literature Review

2.1 Negative Effects of Air Pollution

The negative effects of air pollution have been discussed in terms of its impact on climate change by a lot of authors over the decades. Akhtar & Palagiano (2018) argues that people have been concerned about air pollution for thousands of years (p. 3). Mosley (2014) also mentions ancient peoples but believes that air pollution began to deepen as a problem during the Industrial Revolution due to the extensive use of coal. A slew of unseen threats began to appear - acid rain, photochemical smog, and ozone depletion (pp. 1-3). These authors demonstrate that air pollution and climate change have always been topics of interest and debate. However, environmental pollution and deterioration have risen as a serious concern since the 90s as a result of the constantly growing industrialization and human development (Kim & Kim, 2018, p. 388;

Eguiluz-Grazia et al., 2020, p. 2171). The length of time that a pollutant has been in the atmosphere does not dictate the pollutant's contribution to climate change (Eguiluz-Grazia et al., 2020, p. 2176). In the second chapter of the book written by Al-Delaimy et al., (2020), Raven discusses the biggest drivers of biological extinction are climate change and air pollution. According to him, the problem is that people contribute to species extinction through air pollution which leads to climate change. As a result of this, the levels of extinctions per million species now reached at least 1000 times the historical extinction rate, signalling that extinction rates are now increasing rapidly (pp. 11-15).

Likewise, air pollution can also have natural causes these include volcanic eruptions and solar variations (El-Nemr, 2010, p. 5). In 2019 the United National Environmental Program (UNEP) defined the relationship between natural and human causes for air pollution as 'two sides of the same coin' (2011). Another important debate on the importance of air quality is related to human health. Health impacts are always calculated to indicate the later societal repercussions caused by air pollution (Jiang et al., 2015, p. 2). Air pollution's health impacts include effects on the respiratory, vascular, cardiac, and neurological systems, but also morbidity and mortality (Nowak et al., 2014, pp. 119-120). Due to the impact that air quality can have on health, many supranational bodies, such as the EU and WHO have created air pollution regulations and limits for countries to adhere to.

2.2 Air Quality Directives in the EU and Bulgaria

Understanding how member states implement and adapt to EU policies, legislation, and directives involves understanding Europeanisation studies. Bondarouk et al. (2019) argue that local authorities are in charge of putting many EU policies and directives into action. The Ambient Air Quality Directive (2008/50/EC) is an instance of EU policy that has an impact on local government. The EC does not have sole authority of implementing this type of legislation and thus must rely on the capability of member states and their level of constituents to implement the legislation (pp. 1-2). The government of member states can try to influence the outcome of European policies through a variety of elements which are both nation and policy-specific (Héritier et al., 1996; Andersen & Liefferink, 1997). The degree of concordance between European and national regulations; and; legislative and institutional traditions, impacts the execution of directives according to Europeanisation academics (Pircher, 2017, p. 2). Knill (2001) claims that if the level of mismatch is significant, it is most likely that the EU directives will be problematic or even unsuccessful. Pircher (2017) presents a few factors that influence the implementation of the policy concerned. The first factor that negatively impacts the implementation of EU directives, be it on air quality or in general, is transposition. This is the resultant effect of Bulgaria's lack of administrative capacity when it comes to directive implementation. The second negative impact can be a push towards federalism. As it was discussed in the 'Heterogeneity within EU' sub-section, there are studies that suggest that the degree of federalism of the EU is problematic for implementation of EU laws and directives (Linos 2007; Thomson 2010). There are also authors who argue that the federalist nature of the EU has little effect on implementation however the benefits of federalism on the implementation process have never been demonstrated (Pircher, 2017, p. 3).

The third reason that Pircher presents are the veto players (pp. 3-4). These three pieces of evidence demonstrate that there are barriers to the member states' favourable and simple execution of directives. Such barriers are also valid in the historical discussion of air quality directives.

2.3 EU Polices Against Air Pollution

At the time of the Intergovernmental Panel on Climate Change, tendencies to reduce air pollutants were associated with energy production as a result of autonomous technical advancement and purported pollution control strategies in accordance with Kuznets' environmental theory (Amann M et al., 2020, p. 3). Additionally, a better understanding of the necessity of targeted air quality policy interventions prompted a more diversified approach to air pollutant emission predictions, resulting in a broader variety of air pollutant paths than in prior worldwide models (Rao Set al., 2017, p. 350). Despite differing views on anti-pollution legislation, Sicard et al., (2021) and Escobedo et al. (2011) argue that there have been successful developments in the implementation of policies against air pollution, but policies targeting pollutants such as PM2.5 and PM10, are not close to success. Bagayev and Lochard (2017) underline that developing countries are known to have weaker regulations for air pollutants (p. 145).

Brunel and Levinson (2016) argue that generalizing EU policies is difficult because it is problematic to find suitable measures of regulatory rigidness. Another reason for this difficulty can be that economic activity and environmental regulations can be measured at the same time. This means that the location of the companies or factories may exert influence on regulators, allowing them to impose greater or less rigorous laws. On the other hand, Allegrini et al. (2006), argue that the EU air quality regulations make use of developments in air quality science to establish assessment methodologies and ideas that have never been utilized in law previously (p. 844).

2.4 Communist Background

Following the collapse of the East Block (EB) many former members of the Block embarked on fundamental changes in order to promote the establishment of well-operating democratic liberal governments (Baker & Jehlička, 1998). For more than 30 years, post-communist countries have struggled to deliver decent governance and enforce democratic norms (Gabal, 1995, p. 47). Scholars argue that ex-communist satellite states such as Bulgaria, Croatia, Romania, and eastern Czechoslovakia (nowadays Slovakia) are among the countries which failed to establish liberal democracy immediately after the demise of communism (McFaul, 2005, p. 5; Petrovic, 2013).In contrast, some scholars argue that meeting the requirements of becoming an EU member state is sufficient evidence to prove a state's level of democracy (Mrak & Rojec, 2013). Even so, through using the slogan of 'Return to Europe' Tarschys (1999) claims that the EU practiced soft diplomacy, choosing to admit new members based on their promises rather than their proof. Přibáň (2009) also argues that this was a deliberate plan in terms of strategically integrating former communist nations into at least one organization which embodies democratic Western European values (p. 341).

Most studies have been conducted on the implications of EU conditionality on Europe's transitional former communist countries, with much of this research concentrating on the efficiency of EU conditionality as a tool (Redžić & Everett, 2020, p. 233). The EU's accession standards compelled applicants to restructure their state and economy, limiting the state's role in the economy and enhancing the openness and effectiveness of state institutions (Vachudova, 2009, p. 43). According to Dauderstädt and Gerrits (2000) the historical contrast 'in economic, social, and political development' is frequently invoked to explain the disparities in the level of democracy when comparing Central and Southern/ Eastern Europe (p. 362). Pop-Eleches and Tucker (2011) indicate that the past foreshadows the future (p. 379). In conclusion, this is one of the reasons why a lot of authors support political history as an explanation of why post-communist countries, such as Bulgaria, are not able to implement EU directives to the same extent as countries that have not been part of the EB. The identified discrepancy between western/ northern European member states and eastern/ southern European member states begs the question of the extent of this heterogeneity when it comes to EU directives in general.

2.5 Heterogeneity Within the EU

Despite the fact that differences exist among member nations, the EU is generally perceived as a homogeneous entity. Heterogeneity is covered in the so-called 'compliance' literature of EU studies, which is also part of the research on Europeanization. Air quality and environmental policy are just a case study of the general phenomenon of Member State compliance with EU directives.

The EU is the world's largest and most recognized multinational organization. It has over 34,000 legal provisions that take precedence over national law. Although EU legislation binds the Member States, the EU lacks the ability of unified enforcement to push states into conformity (Börzel & Heidbreder, 2017, p. 241). Nowadays, the field of Europeanization is known as 'the institutional, strategic and normative adjustments generated by European integration' (EPPIE, 2007, p. 39). Different surveys have been carried out on the public's opinion on this topic, focusing on issues such as domestic institutions and the impact of the EU on Member States (Olsen, 2002; Ladrech, 2005; Kassim, 2005). Although member states adhere to EU legislation, they should not be treated the same simply because they are all members of the Union. Newer members such as Bulgaria and Romania have not started implementing the required domestic changes, but even though their transition to democracy began at the end of 1989, it has been validated by their accession to the EU in 2007 (Falker al et., 2005, p. 235).

Although the development of the EU indicates the beginnings of a federal state, the EU lacks key criteria, namely centralized enforcement (Börzel & Heidbreder, 2017, p. 245). This preserves the sovereignty of each state, thus ensuring that states are still individual units which dictate their own progress. The EU only regulates certain aspects, for example leaving out taxation and citizenship requirements, in order to ensure that the sovereignty of each state remains intact. When it comes to EU directives or other regulations, which are mandatory for all member states, they still have a choice on how and if to do it (European Union, n.d.). While not following the recommendations of what the EU says may lead to consequences, it is still very

much doable, because of the double edged sword of sovereignty that allows the existence of the EU. This example shows that even though the EU does have unifying factors, uniformity, and laws within the member states, there are still differences based on the key mechanism of the institution.

3. Theoretical Expectations

Given that this study looks at the implementation of EU directives, with the focus on Bulgaria as a case study under the research question: *To what extent are EU directives on air quality implemented in Bulgaria?*, it is critical to consider the study's expectations in light of the theoretical views outlined above. While some authors consider that Bulgaria's entry into the EU is a success in itself, others argue that Bulgaria has made no progress in the appropriate application of air pollution legislation.

Additionally, this analysis also aims to establish whether the communist background is a likely reason for the inability of implementing the air quality directives after a decade as a member of the Union. Considering air pollution with PM 2.5 and PM10 as an instance, the starting date of the data used is ten years after Bulgaria's admission to the EU. This is in order to examine if the changes dictated by the directives have been enforced until the end of this period. As a result, the hypothesis in this study is:

H1: The implementation of air quality directives by the Bulgarian state has only been done to a limited extent.

4. Key Concepts

4.1 Defining Air Pollution

Air pollution is widely described as the release of chemicals, particulate matter, or biological elements into the atmosphere that cause harm or damage to people, living species, or harm to the natural or man-made environment (Hutton, 2011, p. 4). On the other hand, it is also claimed that pollution is an unavoidable result of human development, an unfortunate circumstance that must be accepted in some form or another (Barker, 1974, p. 358).

Six of the most prominent air pollutants have been standardize under the Environmental Protection Agency (EPA). They are classified as either primary or secondary. Primary pollutants are immediately discharged into the atmosphere, while secondary pollutants are formed from precursor gasses (EPA, 2021a). All precursor gasses are primary pollutants, but not all composed particles are secondary pollutants (Koolen & Rothenberg, 2018, p. 166). Particulate Matter (PM), Carbon Monoxide (CO), the Non-Methane Volatile Organic Compounds (NMVOCs), gaseous Ammonia (NH3), Nitrogen Oxides (NOx), Sulphur Oxides (SOx), and Black Carbon (BC) are the most frequent main pollutants (Maioneat. et., 2021). Particulate Matter (PM) will be the air pollutant discussed for this thesis.

"PM is a complex combination of ultrafine particles and liquid droplets composed of acids, organic compounds, metals, and soil or dust particles" (US EPA, 2011). PM sources can be both natural and manmade. Combustion in mechanical and industrial operations, automobile emissions, and cigarette smoke are all examples of man-made sources of PM. Volcanoes, fires, dust storms, and aerosolized sea salt are among natural sources (Anderson et al., 2012, p. 167). There are two types of PM: pm 2.5 AND pm 10. The primary

distinction between them is size. The number to the right of the 'PM' represents the particles' aerodynamic diameter. PM10 particles have an aerodynamic diameter of less than 10μm, whereas PM2.5 particles have an aerodynamic diameter of less than 2.5μm.

As already mentioned in the introduction, Bulgaria was chosen for the purpose of this thesis. Bulgaria's air quality is a major concern; measurements reveal that residents all around the nation breathe in air that is hazardous to their health. Although air quality has improved in recent decades, it continues to be behind European and global norms (Greenpeace, 2016).

Statistics on fine particulate matter levels in surrounding air collected by the National Environmental Monitoring System (NSEM) in recent years show that many areas in Bulgaria, including both industrial zones, the so-called "hot spots," and urban areas, have consistently exceeded the EU norms (НИС, 2011; НИС, 2015). As much as 60% of Bulgaria's urban population is exposed to levels of PM 2.5 and 10 above the established EU limits, making this exposure hazardous to the health of citizens (HEAL, 2014, p. 1). This makes PM2.5 and 10 the most important air pollutant for the country, as its levels are the most detrimental to citizens. Concentrations of PM2.5 and PM10, for example, are substantially higher than what the EU and the WHO have established to protect public health (HEAL, 2014, p. 1). With these figures in mind, it is clear to see why the proper implementation of EU air quality directives in the country is crucial and urgently required for the overall health of society.

4.2 Defining Directives

From an EU perspective, various legislations relevant to air quality standards and emission reduction were established by the European Community in the 1970s and 1980s. In its efforts of combating air pollution, the EU provides Environment Action Programmes, horizontal strategies, and offers international environmental cooperation, environmental impact assessment, and public participation (Kurrer, 2021, pp. 2-4). Nevertheless, it is fair to state that these endeavours were not well-structured, methodical, or coordinated. The Commission's 5th Environmental Action Program, issued in 1992, established precise goals for a variety of environmental challenges, particularly air quality and the elimination of atmospheric pollutants (Enthoven, 1998, pp. 9-10). The principal policy instruments are a series of 'directives' that establish air quality guidelines to safeguard against high pollution levels, based on relevant research about the health consequences of air quality (European Commission, n.d.). They are also obligated, through information exchanges, discussion, research, and monitoring, to establish policies and plans to address air pollution dischargers, taking into consideration previous national and international efforts (Leyendecker, et. at., 1996, p. 1).

An EU directive "is a legislative act that sets out a goal that all EU countries must achieve" without mandating how they should do it (European Union, n.d.). In other words, it establishes standards that must be followed, but each member state determines how to enforce compliance through national legislation. Directives establish the precise date by which they must be incorporated (or transferred) into domestic legislation. This is usually two years following its publication in the Official Journal, although for some criminal law instruments, it can

be longer (EEA, 2020). Although the directives proposed for Bulgaria will be explored in-depth, it should be noted that they are not the only method the EU urges its members to act on improving air quality.

5. Research design

5.1 Case Selection

In the year leading up to the commencement of Bulgaria's membership in the EU, international organizations (IOs) and the European Commission (EC) paid close attention to the country. The interest is likely coming from the need for Bulgaria to meet the basic standards for membership. The implementation of the air quality directives at the time was one of the required standards. However, even with its progress since 2007, Bulgaria failed to achieve the EU norms and requirements for air quality. This failure has been verified by the EC's win in its lawsuit against the Bulgarian State. The case was filed to the European Court of Justice (ECJ), over the non-execution of a previous ECJ decisions establishing that the state did not fulfill its responsibilities dictated by the EU ambient air quality regulations. The reason for this was Bulgaria's failure to maintain air pollution within the limits set by the EU's Directive 2008/50, as well as to make the time period during which pollution levels exceeded prescribed criteria as short as feasible (European Union, 2019; InfoCuria, 2017).

Bulgaria is the selected case due to three main reasons. Firstly, Bulgaria is one of the post-communist member states which are part of the EU. Secondly, the air pollution of Bulgaria in the period chosen for this thesis, 2017-2019, is most problematic, especially for PM2.5 and PM10. Thirdly, the country is sent to court for the inability to implement the EU directives for air pollution after more than 10 years of membership. The case selection provides for a more in-depth understanding of the conditions under which the observed phenomenon manifests itself.

This study chooses to focus on PM emissions, namely PM10 and PM2.5 for two main reasons. Firstly, the EU Commission sued the Bulgarian state over its failure to adhere to the PM10 emissions limit every year from 2007 to 2013. The regulations in place for PM10 also apply and are meant to be in tune with PM2.5 regulations (InfoCuria, 2017). Secondly, the great potential negative health impacts of PM emissions justify this study's focus.

5.2 Methodology

While case studies are frequently thought to be a component of qualitative research and technique, they may also be quantitative or comprise a blend of qualitative and quantitative methodologies (Starman, 2013, p. 30; Cronin, 2014, p. 20). This thesis combines the two methods, thus it is expected to increase the clarity of the presented information. Yin (2009) argues that a case study is a bounded system that investigates a real-life case within a contemporary context. Because this thesis has a bounded system, case study analysis is applicable - the data analysed will cover a period of three years, which is a time-bound system in which the country has had ten years to develop since its accession to the Union in 2007.

Single case study designs enable in-depth research and, as a result, the drawing of conclusions indicating correlations that have a high chance of yielding a causative process (Beach & Pedersen, 2019; Halperin &

Heath, 2017, p. 214). which are extremely useful when an investigation has limited influence over occurrences. The case study has the distinct advantage of being able to manage and combine various data collecting methods - in order to utilize both secondary and primary sources (Krusenvik, n.d., pp. 5-6). There main relevant critique of this research method from Flybjerg (2006) is that single case cannot be generalized, which Jacobsen (2002) argues as well. This is not an issue for this project because this study looks specifically at the Bulgarian inability of implementing air quality directives, therefore there is no desire for a generalizing conclusion.

5.3 Data Collection

This project relies on secondary data from sources such as the EU, EC, EEA, and UNEP, due to a lack of access to reliable and transparent data directly from the Bulgarian government. Sources such as the World Bank (WB) and the НИС- National Research Center were also used. Third party sources were mostly used in order to enhance the internal validity of this study, therefore making its conclusions as reliable as possible. In addition, multiple sources of data and graphs showing similar information are utilized in this study as a form of verification in terms of accuracy. In other words, it can be concluded with more accuracy that Bulgarian PM pollution levels are above EU limits continuously, why this may be the case, and how the country compares to other EU member states if all three sources show the same trends and patterns.

6. Data Analysis

6.1 Qualitative Data

6.1.1 Problem Causes

The issue of contaminated air is not recent, nevertheless in recent years, people have begun to discuss it more actively, as well as to realize that such an issue exists. Even though this was a problem during Communism especially because of the factories where most of the people were working, nobody was open to discuss it. In the years after 1989, people started claiming that the causes of pollution slightly changed. In recent years cars started being a major source of air pollution, which has not been an issue before. The country's opening to globalization brought additional sources od air pollution such as cars, most of those imported being the ones that were too old to be sold in the west of the continent. According to the interview with prof. George Rachev (2019) climatology specialist at Sofia University, 230,000 used automobiles were imported into Bulgaria last year, with 85,000 of them being more than ten years old. Furthermore, Vision for Sofia claims that the average age of automobiles in Sofia is 19, despite the fact that official figures supplied to the EC reveal that the average age is 9 years (which presents that the average age of the cars in Bulgaria is unknown and also shows that the data which Bulgarian present to the EU is wrong or incorrect).

Apart from car pollution, which is constant, the biggest source of pollution in Bulgaria is due to households that are heated with coal or wood, which is peak pollution, and still, a high percentage of households are heated in this way, according to Kronve (2020) and Nikolaev et al., (2020) the trend is not decreasing. As a result, the major two sources of PM air pollution in Bulgaria are traffic and home burning of wood, coal, or

fuel. One of the primary reasons Bulgaria still utilizes communist heating systems is that they are the most cost-effective, according to Kronev (2020). The difficulty of residents to utilize gas or other renewable energy sources stems from Bulgaria's status as one of Europe's poorest countries and the high corruption levels (Transparency, 2020; Gotev, 2021). There are other factors that influence the pollution in the country such as the rare street washing and the dust, which pollutes, especially during the summer, as well as the perpetual construction of buildings in the city. Air pollution affects the entire country as a result of all residents' actions, endangering their health once again (Chuturkova, 2014).

Even before Bulgaria's accession to the Union, the EU already had its own measures and laws to tackle the problem of air pollution. As already mentioned, the air pollution problem began to be an important topic in Europe when the European Council declaration issued in Paris in October 1972 effectively established EU environmental policy (EEAa, 2020). Since then numerous directives and projects to combat air pollution have been applied for the countries which were already members of the EU. The earliest legislation was Council Directive 80/779/EEC from 15th of July 1980 on sulphur dioxide and suspended particle regulatory limits and recommended values for air quality with an effective deadline 2005. The directive was amended by another directive following its creation. The second Council Directive 85/203/EEC from 7th of March 1985 about nitrogen dioxide air quality criteria and also a few years later was ameliorated by another directive. It is important to emphasize that the first two EU directives on air pollution have been changed and adapted over time, this applies to all directives.

The purpose of listing the first two directives for air pollution at the EU is to demonstrate how Bulgaria had to execute a large number of air quality directives that were part of the EU even before Bulgarian application for EU membership to its admission (ClientEarth, 2021). On the other hand, the six founding countries of the Union had more time to incorporate the directives into their own legislation and successfully execute them, which drastically reduces the chances of these countries failing to comply with air protection requirements. Directive 2008/50/ EC on ambient air quality and cleaner air for Europe is the main air quality directive, and hence the most important, as it completed and replaced all other air quality directives to that date. Part of the main requirements that Bulgaria did not fulfill is first to ensure that in its zones and agglomerations the levels of PM10 in ambient air do not exceed the limit values which were mentioned earlier in the text. Even though a member state exceeds the limit values for PM2.5 and PM10 concentrations does not imply that that Member State has failed to meet its commitments. However, Bulgaria was sued for the non-fulfillment of its obligations regarding the quality of the atmospheric air. Bulgaria had until June 11, 2010 to implement the laws dictated by Directive 2008/50/EC. However, in 2014, the values were surpassed in all six Bulgarian zones and agglomerations, i.e. more than three years after the Directive's deadline for integration, implying that the specified permissible values continue to be systematically and consistently exceeded. The European Court of Justice had to intervene twice over Bulgaria’s failure to implement air quality directives. The EC brought this to the court’s attention in 2015 over its unfulfilled obligations under Article 13 (2) TFEU. Additionally, the EP brought this to the attention of the ECJ a second time in 2019, after the state’s failure to execute the court’s

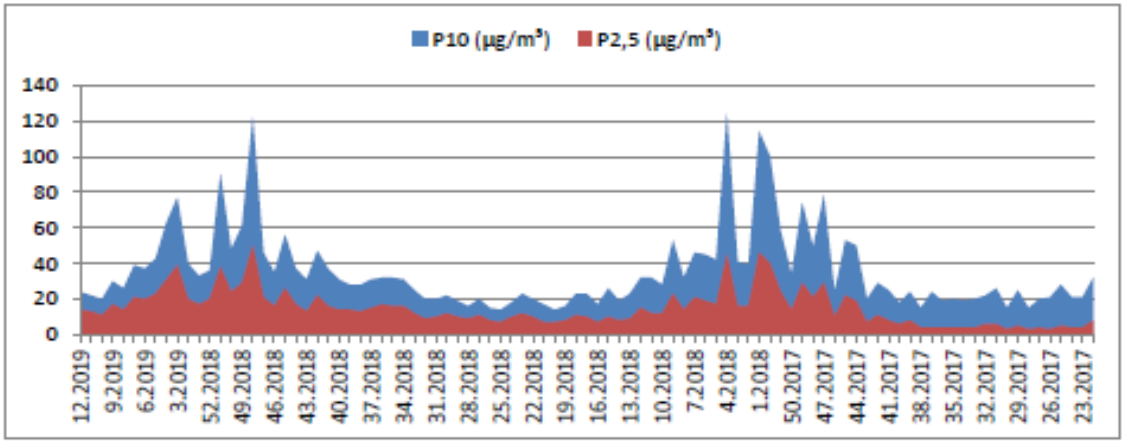
first ruling in 2017 and another area of non-compliance with EU air quality directives concerning coal leaks (Gotev, 2018; Greenpeace, 2021).

6.1.2 Political History

Bulgaria's main political transitions in the 1990s may be viewed as crucial preconditions for various implications in all facets of the country's development as well as the air pollution issue. The 1989 transition is regarded as one of the most noteworthy events in the country's history (Atanasov, 2009). At the time, two major aims emerged: financial stability and institutional transformation (where air protection laws also appear) (Аврамов & Антонов, 1994). Now, 32 years later, the transition seems different in the eyes of citizens, as does the perspective of Bulgaria's former communist rule - not so quite the same as an aspect of political conflict, but as part of independence, consciousness, and self-identification (Баева & Калинова, 2011). However, after almost 30 years of democracy, part of which is already one decade of being a Member of the EU, the EC concluded that there are still fundamental flaws in the implementation process in Bulgaria of EU laws and directives (OECD & EBRD, 2002).

6.2 Quantitative Data

6.2.1 National PM Emissions

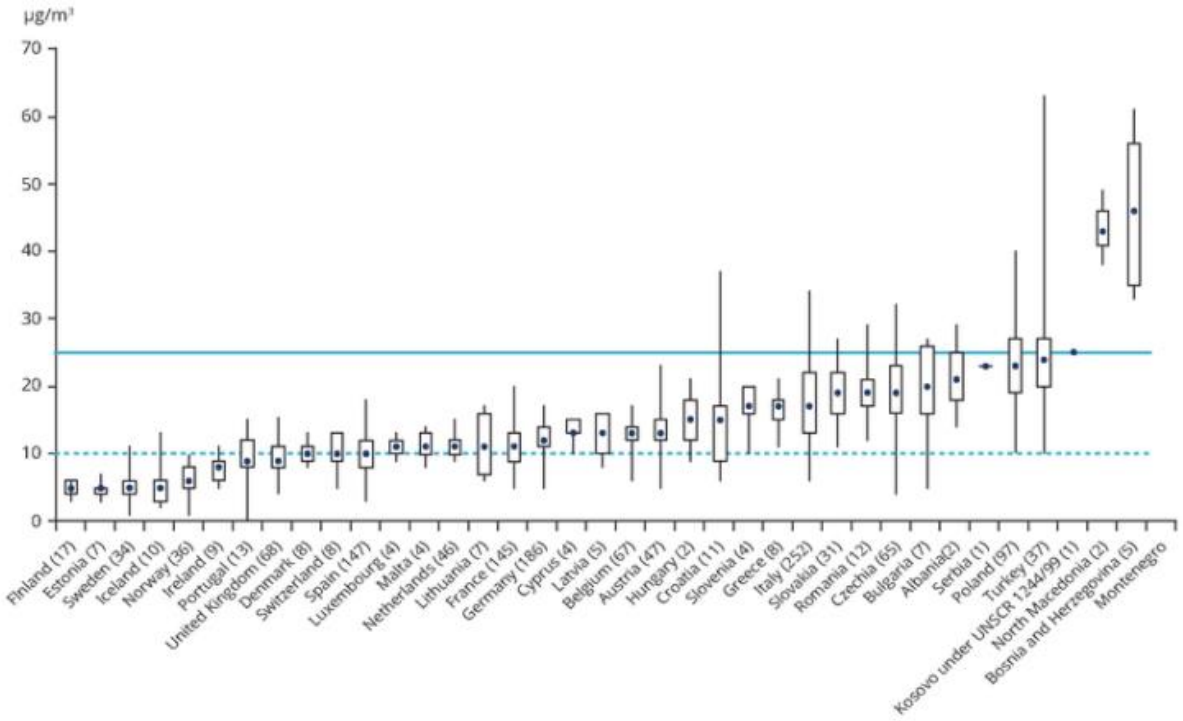


Graph 1: PM2.5 and PM10 concentrations in Bulgaria for the period 3.06.2017 - 28.03.2019 (source of data: AirTube, n.d.; author`s analysis)

Graph 1 illustrates information about the air quality in Bulgaria for PM2.5 and PM10 as a pollutant from the twenty-third week of 2017 till the twelfth week of 2019. The data is divided into weeks, more specifically every three weeks. According to the graph, there is a precise time of year when the air in the country is most polluted. This is the winter season. It can be seen that in the 23rd week of 2017 and the last reported week for the same year, the values increased by almost 40 times. According to Council Directive 2008/50 / EC-1, two limit values for PM10 and a health-based target for PM2.5 have been published. In this way, boundaries were set and guidelines were drawn up to control the levels of PM2.5 and PM10 in the ambient air. "Specifically, a 24 h mean concentration of 50 µg m−3 not to be exceeded more than 35 times per calendar year and an annual mean concentration of 40 µg m−3 have been imposed for PM10, while an annual limit value of 25 µg

m−3 has been set for PM2.5 (to be met by 1/1/2015)" (Kassomenos, 2014). According to the graph for 2017, in just six weeks (44-50), Bulgaria has managed to exceed the allowed 35 times above the limit for both PM2.5 and PM10. Weeks 44 to 50 correspond to the beginning of winter season 2017, the limits continue to be exceeded until the end of the winter season corresponding to week 10 of 2018. The same pattern can be seen for weeks 43.2018 to 06.2019, also corresponding to the winter season. This pattern shows a clear coloration between PM emissions exceeding the limit established by EU quality directives and the season of the year i.e. winter when a large portion of the people in Bulgaria consume coal and wood to heat their homes.

6.2.2 EU PM 2.5 Emissions



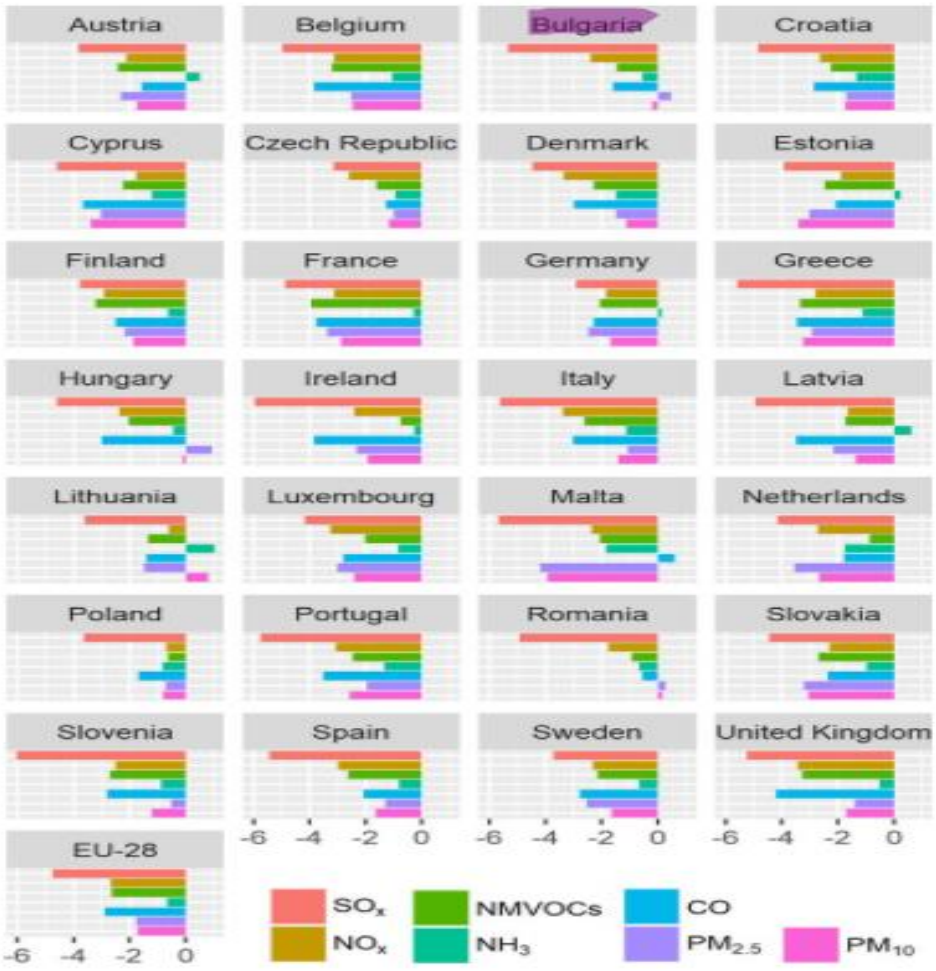
Graph 2: Annual mean concentration PM2.5 values, for Europe in 2017
(Source of data: EEA, 2019)

Graph 2 illustrates the general trend of PM2.5 emissions for the European continent. On the x-axis, the names of the countries corresponding to the above data are represented. On the y-axis, there is a rate of PM2.5 which is represented in µg m−3 with values from 0 to 70, in increments of 10. The line corresponding to a value of 25 on the y-axis represents the maximum values of PM2.5 emissions that the EU countries can reach according to the air quality directives. The graph shows that Bulgaria's results are right at the border or even above the borderline. This means that the country breaks the rule by exceeding the values more than 35 times a year. The country is breaching the levels of PM2.5 even 10 years after its accession to the EU.

The heterogeneity within the EU is shown by the inability of comparing Ireland and Bulgaria, for example, due to their different values. The highest values of Ireland and not even overlap with the lowest values of Bulgaria. On the other hand, countries seem to be comparable by geographical areas, as their averages are not further apart than 5 units like Finland and Ireland, but beyond this variation, the disparity clearly

indicates heterogeneity within the EU. This heterogeneity can also be seen when looking at different pairs of countries such as Finland and Croatia, or Portugal and Romania. The pairs indicate a correlation between the year of accession to the EU and a countries performance in terms of PM2.5 emissions given that Ireland, Finland, and Portugal all joined the EU before 2000 and Bulgaria, Croatia and Romania joined in 2007 or later.

6.2.3 EU PM Emissions



Graph 3: Annual trends of national emissions (% year^{-1}) in the 28 European Union countries (EU-28) for PM2.5 and PM10 over the time period 2000–2017 (Sicard et al., 2021)

Graph 3 indicates PM 2.5 data in pink and PM 10 data in purple. The figure shows the annual trends of air pollutant emissions for the 28 member states of the EU at the time for 2000-2017. Substantial decreases in the emissions of those two pollutants were made − 1.7% year−1 for PM2.5 and PM10 in all 28 EU countries, for the period of 17 years, even though Bulgaria was part of the EU only for 10 years. The information shows that except Bulgaria (+ 0.5% year−1), Hungary (+ 0.9 % year−1), and Romania (+ 0.3% year−1), all other EU-28 countries saw a drop in PM2.5 emissions. It can be noted that the three countries that have not lowered their levels are post-communist countries. Even though this graph does not represent an increase in the values for PM10 in Bulgaria, it can be seen that in comparison with Western countries, there was no

progress made by Bulgaria (Sicard et al., 2021). Because in Eastern Europe including Bulgaria the daily limit value for PM10 was commonly surpassed (Guerreiro, 2014). The history of the communist background can be seen as a potential reason for this as the only three countries that added to their PM emissions have this background. While other post-communist states such as Check Republic, Slovakia, and Slovenia are not part of this pattern this does not mean that the history of communism cannot be a reason for it.

6.3 Result of Data Analysis

This research project has been centred on the research question:
To what extent are EU directives on air quality implemented in Bulgaria?

and the sub-question: *What are the potential reasons for this lack of implementation?*

The hypothesis for this study is: The implementation of air quality directives by the Bulgarian state is not done to the standards set by the EU.

In order to answer the research question and sub-question, this project has explored Bulgaria's historical background as a state, the content and aim of the EU air quality directives in chronological order, and data showing PM emissions for the period of 2017-2019. This research project found that the EU directives on air pollution failed to be implemented by the Bulgarian state. This conclusion also proves this project's hypothesis to be true. The data illustrated by the graphs above have shown that Bulgaria's PM emissions do not align with the aims and limits set by the directives. This adds to the fact that within 2 years the country has been sent to court twice by the EC, even though Bulgaria has been a member state for a decade. There main potential reasons for this is that Bulgaria's past as a communist state created a need to catch up with the long-time members of the EU. In other words Bulgaria has been challenged to implement the laws that older member states have had up to 30 years to implement, in 10 years.

7. Discussion

This research is a contribution to the literature on climate politics, more specifically on air pollution politics and the implementation of directives. It strengthens the argument that the inability of implementing air policies is based on a wide variety of factors. This project shows that the historical background of Bulgaria, the multitude of directives that the country had to implement simultaneously, and the heterogeneity within the EU can be seen as potential reasons for the lack of implementation of EU air quality directives in Bulgaria.
Moreover, this thesis contributes to the current academic literature in two ways. Firstly, it identifies, thus verifying, the heterogeneity within the EU by clearly pointing out large disparities between the air pollution levels (as represented by PM emissions) of different member states, therefore identifying this as a problem. This is important as labelling heterogeneity within the EU as problematic, and a potential cause of maintained disparities between countries is still an academically debated issue. Secondly, this thesis points at a possible link between the political history of a member state, as well as when they joined the EU, and the implementation rate of air quality directives, i.e. the state's capacity of implementing the required directives.

This is significant as identifying such a link could lead to researching and creating more appropriate and hence effective implementation mechanisms and requirements for such member states, Bulgaria being a prime example.

The clear disparity between Bulgaria and other EU member states shows the inability of the EU to be seen as a heterogeneous structure. This is problematic because the same laws and directives are set up for countries that are on different development levels and with different historical backgrounds. That being said, it is key to acknowledge these differences as it would allow for countries to potentially be given smaller goals to achieve, instead of a benchmark too high to even be looked at. The notion of heterogeneity within the EU is almost taken for granted in all fields, due to the uniformity of legal rights of EU citizens in EU countries, which makes individuals outside of the field of governance and politics assume that this is the case in all aspects.

This study highlights the existence of these differences, also implying that a new course of action should be considered, for newer member states, if deemed necessary, in order to actually achieve the aims of directives on air quality and not exacerbate the current heterogeneity. The underlying causes of these disparities can come from multiple areas. The three possible sources of the disparities identified in the data analysis section are the corrupt political history and culture of Bulgaria; the lack of economic funds of the ordinary citizen to switch to more air quality friendly heating alternatives; and a lack of awareness about the issue of air quality in the general population.

All of these three potential reasons for this lack of implementation can be linked to Bulgaria's communist past. Firstly, the still existing corruption can be seen to be caused by a lack of change in the country's political class, therefore the current influential politicians still come from a communist background even though Bulgaria is now considered a democracy (Стандарт, 1998). Secondly, the lower average income, and hence lack of funds to invest in modern and more air quality friendly heating, is a common trend in post-communist Eastern European states when compared with member states from other regions of the continent (Eurofound, n.d.). Thirdly, given the history of isolation from the west due to the country's communist past, as well as the language barrier, it is possible to hypothesize that the issue of air quality is not one that has gained much awareness in the eyes of the average citizen. Therefore, it is hard to expect people to choose more environmentally friendly options (heating systems in this case) when they are most likely not aware and educated about the importance of PM emissions and their detrimental effect on health.

8. Ending Remarks

8.1 Limitations

When looking at the case of Bulgaria, there are some limitations. Firstly, the time constraints bound the study's outputs. Even though the association between Bulgaria and PM emissions above the allowed limit is clear from the data analysed, the investigation would have been more thorough if it would have been possible to conduct this study using data covering a longer time period.

Secondly, the accuracy of the data sample utilized to demonstrate the PM2.5 and PM10 levels can be questioned. Bulgaria is a country known for its corruption and inaccurate information, which leads to questions over the reliability of the data. Using third-party sources, which do not rely on the Bulgarian data, helped improve the reliability of this research. As the analysis above shows, all graphs analyzed are in agreement with each other in terms of the trend of PM emissions in Bulgaria, indicating that the conclusion drawn from their analysis is reliable and accurate relative to the true situation.

Thirdly, although I revealed the problem of heterogeneity and touched upon its possible causes such as communism, and lower economic well-being, it is highly possible that additional factors are also important in understanding the mechanism behind the incapacity to implement air quality directives. Lastly, it is also important to note that this research is mainly focused on a specific type of air pollutants. This is relevant as the pattern of PM emissions may not be in harmony with the pattern of the emissions of other air pollutants. Therefore, one should be conservative in generalizing the conclusions of this study onto the general trend of air pollutants emissions.

Even though the single case study research design used to construct this research project does have some limitations in terms of external validity, i.e. the ability to be generalized to other cases, it does indicate the need for further similar and more detailed research looking at other member states. Such research would help identify whether this heterogeneity issue is also manifested in the case of air pollution by other EU member states and if so be used as motivation for the assessment of the current implementation requirements, goals, and methodology of air quality directives in the EU.

8.2 Conclusion

This study investigated to what extent EU air quality directives are implemented in Bulgaria, from the perspective of PM 2.5 and PM 10 emissions. In order to conclude that EU air quality directives are implemented to a limited extent, this research project analysed three different graphs, based on different sources of data, showing the pattern of PM emissions not only in Bulgaria but in the EU in general.

When looking at potential reasons for this limited implementation two key aspects were identified. Firstly, Bulgaria's communist history can be seen as a reason. This is not only because of the political culture but mostly due to the socio-economic status of most people. Showed by the probable theory that the above-limit levels of PM emissions during winter months are due to people burning wood and coal to heat their home, this can indicate a lack of education/ awareness about better heating systems for air quality, as well as the average person's lack of financial resources to transition to the superior heating system. Secondly, the heterogeneity within the EU, identified in the data analysis above, indicates that giving member states who are at vastly different starting points the same goals to achieve, in the same time period, may not be the way to go in order to realistically achieve implementation.

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