ECONOMIC QUESTIONS OF AIR ASSET VALUATION: A METHODOLOGICAL APPROACH

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—Abstract—

Nowadays we face severe problems to tackle the valuation and management of international public goods e.g. air, water etc. The debated question is that how much is the monetary value of these international public goods and who will pay for this for keeping their quality and quantity on the level, which provide good living condition for the future generation? The answer also demands for research on valuation of these assets. This paper gives a literature overview about the problem and methodological questions focusing on air asset valuation.

Key Words: *Air Quality1, Valuation2, Air asset3, Pollution4 etc.*
JEL Classification: Q51, Q53.

1. INTRODUCTION

Valuation and management of natural resources began informally with individuals like Charles Darwin, James Audubon, and other naturalists who began to document the functional value of species and habitats in ecosystems. At present time Europe is facing an unprecedented economic crisis, causing instability, unemployment and poverty. But the situation is aggravated even further by a development that seldom reaches the top stories in the news: the continuous depletion of natural resources and the pollution of our environment. This not only threatens our health and ecosystems, and changes our climate; it also undermines our future material wealth, and our future competitiveness.
So, the economic crisis is not only about interest rates, budget austerity and bank bail-outs. It is fundamentally about sustainability. We all know about the unemployment that unsustainable growth fuelled by financial excesses has brought. But we are only now beginning to understand that our infrastructure, financial system, business models and everyday behavior lock us in to a short-term socio-economic model which relies far too much on running down our stock of natural capital – the water, air and other ecosystems on which we ultimately depend. This is very clear that there will be no growth in the future if it is not green growth. And the only way to achieve green growth is a concerted shift to resource efficiency – to use our natural resources much more efficiently (Bell et al. 2004). The issue of clean air quality is a good case in point. There are number of important legislative and other EU initiatives taken in the last few decades, the air we breathe today is generally cleaner than it was 10 or 20 years ago. It is one of the few areas where we have seen an absolute decoupling between economic growth and emissions. In some cases, such as sulphur dioxide emissions, significant economic growth has been paired with an 80-90% decrease in the reported emissions in less than two decades (Bell et al. 2005). In 1970 as the US Economy has Grown, United States Environmental Protecting Agency (EPA) established The Clean Air Act (CAA), which is one of most important laws for protecting public health and the environment in the United States. For more than 40 years, it has protected the air that we breathe while the American economy has grown. The substantial public health benefits of the Clean Air Act overwhelmingly outweigh the costs associated with achieving them (EPA, 1999, 2010). Air is an international public good.

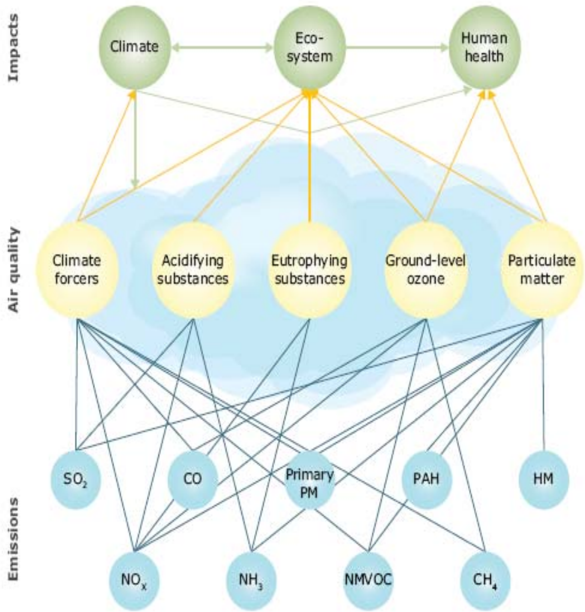
2. QUALITY OF AIR IN EUROPE

Air pollution in Europe is a local, regional and trans-boundary problem caused by the emission of specific pollutants, which either directly or through chemical reactions lead to negative impacts. Each pollutant produces a range of effects from mild to severe as concentration or exposure increases. The main effects of air pollution in Europe are:

- Damage to human health caused by exposure to air pollutants or intake of pollutants transported through the air, deposited and accumulated in the food chain;
- Acidification of ecosystems, both terrestrial and aquatic, which leads to loss of flora and fauna;
- Eutrophication in ecosystems on land and in water, which can lead to changes in species diversity;
- Damage and yield losses affecting agricultural crops, forests and other plants due to exposure to ground-level O_3;
- Impacts of heavy metals and persistent organic pollutants on ecosystems, due to their environmental toxicity and due to bioaccumulation;
- Contribution to climate forcing;
- Reduction of atmospheric visibility;
- Damage to materials and cultural heritage due to soiling and exposure to acidifying pollutants and O_3

Figure 1 shows the major air pollutants in Europe and their potential impact on human health, ecosystems and the climate. Air pollutants ignore national borders and can be carried over very long distances by the wind. This means that air pollution is not only a local or national issue but one that needs to be tackled through cooperation at European, international and even global level. Cooperation among EU Member States began with the adoption of the first EU standards for exhaust emissions from cars in 1970. Within the northern hemisphere cooperation has been driven by the Convention on Long- Range Tran boundary Air Pollution.

Figure-1: Major air pollutants in Europe, clustered according to impacts on human health, ecosystems and the climate



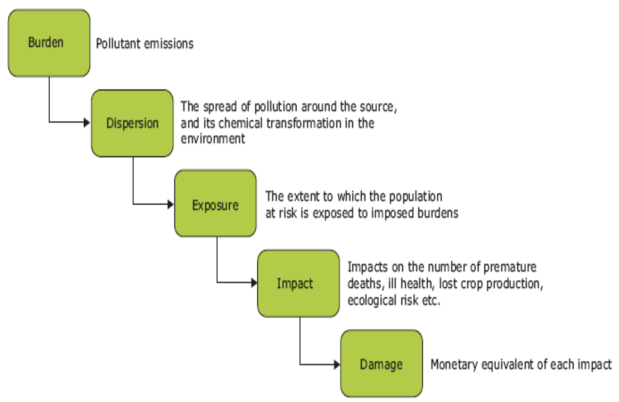
Source: EEA, 2010

3. ASSESSING THE COST OF AIR POLLUTION IN EUROPE

The European Pollutant Release and Transfer Register (E-PRTR), established by the E-PRTR Regulation (EU, 2006), provides information on releases of 91 different pollutants to air, water and land from around 28 000 industrial facilities in the 27 EU Member States, Iceland, Liechtenstein, Norway and, from 2010, Serbia and Switzerland (E-PRTR, 2011). The E-PRTR register thus provides environmental regulators, researchers and the public across Europe with information about pollution released from industrial farms, factories and power plants, and demonstrates that national regulators are aware of the size of emissions from specific facilities within their jurisdictions. By focusing on releases to the environment, the E-PRTR addresses potential burdens on health and the environment in a way that can be measured directly using well-established methods (EU, 2006, 2008). Significant research has been undertaken in recent years to develop scientific modelling frameworks and economic methods that allow the impacts and damage costs associated with air pollution to be estimated (Barrett and Holland, 2008). Such methods have been developed through research funded by the European Commission and Member States since the early 1990s, for example, under the under the European Commission's Clean Air For Europe (CAFE) programme. In 2005, the CAFE programme, for example, estimated that the annual cost to human health and the environment from emissions of regional air pollutants across all sectors of the then EU-25 economy was EUR 280–794 billion for the year 2000 (EU, 2006).

The analysis presented here for all pollutants except CO2 is based on the Impact Pathway Approach (IPA). It follows a logical, stepwise progression from pollutant emissions to determination of impacts and subsequently a quantification of economic damage in monetary terms (Figure 2).

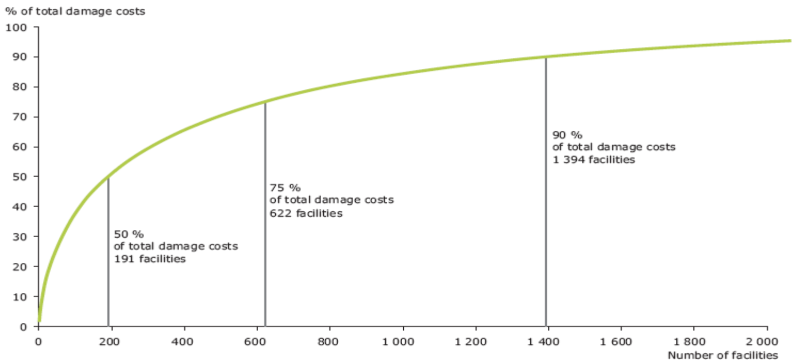
Figure 2. The impact pathway approach



Source: DECC, 2011

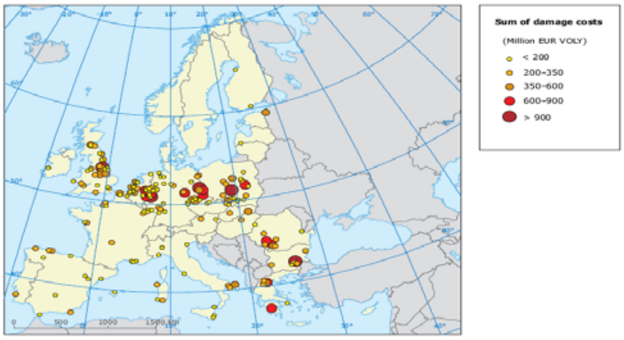
The cost of damage caused by emissions from the E-PRTR industrial facilities in 2009 is estimated as being at least EUR 102–169 billion. A small number of industrial facilities cause the majority of the damage costs to health and the environment (Figure 3 and Map 1). Fifty per cent of the total damage cost occurs as a result of emissions from just 191 (or 2 %) of the approximately 10 000 facilities that reported at least some data for releases to air in 2009. Three quarters of the total damage costs are caused by the emissions of 622 facilities, which comprise 6 % of the total number (EU, 2008).

Figure 3. Cumulative distribution of the 2000 E-PRTR facilities with the highest damage costs



Source: ETC/ACC, 2010

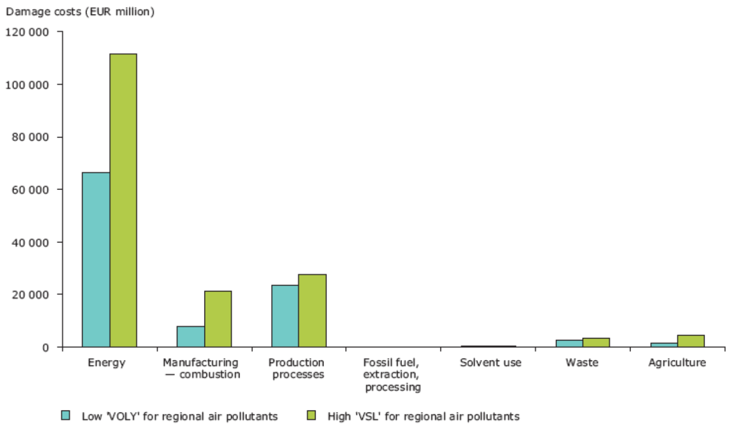
Map 1. Location of the 191 E-PRTR facilities that contributed 50 % of the total damage costs estimated for 2009



Source: ETC/ACC, 2010

Of the industrial sectors included in the E-PRTR pollutant register, emissions from the power generating sector contribute the largest share of the damage costs (estimated at EUR 66–112 billion), (Figure 4). Excluding CO2, the estimated damage costs from this sector are EUR 26–71 billion. Sectors involving production processes and combustion used in manufacturing are responsible for most of the remaining estimated damage costs (EU, 1999, EU, 2008).

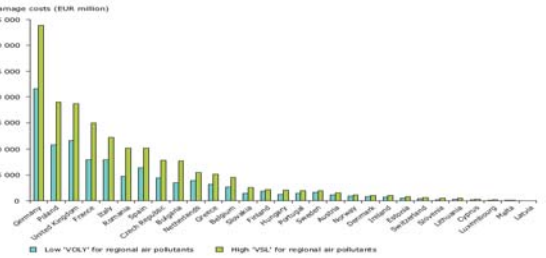
Figure 4. Aggregated damage costs by sector (2005 prices)



Source: EU, 2008

Results aggregated by country are shown in Figure 5. Countries such as Germany, Poland, the United Kingdom, France and Italy, which have a high number of large facilities, contribute the most to total estimated damage costs (WHO, 2004, 2006).

Figure 5. Aggregated damage costs by country, including CO2



Source: EU, 2008

Till today, there is, no single method available to estimate the damage costs for the pollutant groups addressed in the study (i.e. the regional air pollutants, heavy metals, organic micro-pollutants and carbon dioxide). Aggregating results from the different approaches therefore poses challenges, given differences in levels of uncertainty and questions about methodological consistency. For greenhouse gases in particular, a wider debate is required on how best to estimate the economic impacts of emissions on environment and health. The report at various places addresses the uncertainty by providing damage cost estimates that have been aggregated both with and without the estimated greenhouse gas damage costs. That is why; we need to develop a new methodological tool for estimation of air asset valuation.

4. CONCLUSION

Does clean air have a cost where it makes sense versus where it doesn't? What about human life in general? There are good reasons to think environmental regulations might increase production costs, but we didn't know how large the effect might be? We are not saying that the regulations are a bad idea, but we wanted to know the cost. We have outlined some key priorities which will guide our future work. We aim to set out a clear plan for how to ensure that our air can become even cleaner in the coming decades, so that we may live longer, and healthier, as well as protecting our most fragile ecosystems better. In this paper, we tried to give brief outlines of the valuation cost of air asset, case study, european stratigy to handle the air quality issues and possible methodology to calculate the cost and benefit of the air asset. But still several question need to answer soon.

5. ACKNOWLEDGEMENT

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