**The Economic Burdens of Air Pollution: A Cross-city Assessment of Research Methods, Models, and Governance.**

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**Abstract**

The aim of this project is to create an extensive research framework to assist in calculating the economic burden of air pollution within a variety of cities throughout the world. This is an extension of a previous *Asthma Files* project on the economic burdens of asthma in the United States which used similar methods and models to draw conclusions including the total expenditure as a percentage of GDP. The initial stage of research will examine the economic burdens of air pollution studies conducted in the following six cities: Albany, Bangalore, Beijing, Houston, and New York City. These six cities are the current focus of the *Asthma Files* project. I will also analyze the city specific variables used in each study. While the primary focus will be towards productivity loss due to morbidity and mortality, it is important to note the city specific variables that contribute to the economic burden. With these variables identified I will produce a framework for assessing the economic burden of air pollution in a variety of urban conditions.

**Societal Significance**

Over the last 50 years air pollution has been a growing concern throughout the world. From the United States Clean Air Act of 1970 to the EPA’s recently passed Clean Power Plan (Aug. 2015), air pollution has become a part of the political agenda. Even though air pollution and air quality are growing in importance, significant sustainable plans have yet to be put into place. Organizations ranging from the EPA to NGOs such as The Sierra Club, all aim to force political action and improve air quality. A significant economic loss due to air pollution has potential to drive for such plans. By focusing on urban areas I hope to assess the loss of productivity of those effected most by air pollution in an effort to improve their living conditions.

**Project Design and Feasibility**

The project will begin with an initial literature review of studies that evaluate the economic burden of air pollution in the six cities studied within the *Asthma Files* research group. Based on the methods pulled from those sources I will branch out into other urban air pollution economic burden studies (outside of the six cities). Once a significant amount of studies are pulled together, the next step is to look into methods and variables. I aim to identify which studies used similar models and methods, as well as studies that differ from the other literature when calculating the total economic burden. From these methods I will construct a framework for assessing other potential cities looking to calculate the total economic burden due to air pollution.

There are two potential issues of feasibility at the start of this research. (1) If the variables used to calculate total expenditure vary drastically, the conclusions could result in a broad framework that requires further research before assessing a specific city. (2) The integration of air quality systems and models is outside of my current field of study. I may need to spend time learning these systems to accurately integrate them into the total expenditure equation used to express the economic burden of air pollution.

**Background**

I am currently a dual major in Economics and Sustainability Studies. I have research experience from both the Economics department and through Sustainability Studies. Within economics I have worked on data collection, organization, and analysis of anthracite coal mining data and railroad mapping. My sustainability work includes early undergraduate research on the economic burdens of asthma, various environmental course work, and a senior project thesis on the growth of sustainability education. I have participated in three undergraduate research symposiums thus far.

Outside of Rensselaer Polytechnic Institute I have held three internships relevant to my current research focus: Blackwater National Wildlife Refuge (2012), The Sierra Club Beyond Coal Campaign Intern (2014), National Geographic Multiplatform Programming Intern (2015). While working for the Beyond Coal Campaign I gained exposure to environmental governance, legislation, and policy first hand. I also gained my first environmental economics research experience to help drive energy efficiency legislation in Pennsylvania. Each of these experiences have helped me effectively break down complex systems, assess problems, and ultimately construct efficient sustainable solutions.

**Presentation and Evaluation**

I will provide weekly updates to my research online through the *Asthma Files* Wiki. My project will be delivered in the form of a final paper and presentation highlighting the framework for assessing the economic burden of air pollution.

**Dissemination of Knowledge**

I will present the results of my research during the STS Undergraduate Research Symposium in December 2015.