

The Total Cost of Climate Change: A State-Level Analysis

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Background/Objectives. The cost of climate change to individual states is gaining priority as the increasing occurrences of extreme heat, wildfire, extreme precipitation, and flooding is causing extensive damage throughout the country. Such trends have rapidly become the new normal, with the damage likely to continue, and in some cases increase, in the future due to climate change. Subsequently, it is imperative for states to have a clear understanding of the potential costs associated with climate change.

In a study led by Resilient Analytics, Inc in collaboration with the Center for Climate Integrity, a new approach to understanding the cost of climate change to municipalities is being implemented. The current study focuses on the estimated adaptation costs that will be incurred by public jurisdictions in the state of Pennsylvania based on projected climate change impacts across multiple infrastructure and public health categories. The study emphasizes the protection of infrastructure such as roads, buildings of multiple types, flood control structures, and coastal infrastructure. Additionally, the study focuses on minimizing the impact of increasing temperatures on urban areas as well as public facilities.

Approach/Activities. The climate change impact study is based on a combination of current climate change projections made available through the LOCA Daily Downscaled Projections^[1], national available datasets such as census data, and the Infrastructure Planning Support System (IPSS) system by Resilient Analytics that provides the analytical capability to quantify impacts to infrastructure and building assets. This data is combined with GIS-based geospatial reasoning to localize the projections and impacts. Using an engineering-based approach, the study follows the overall approach implemented by Resilient Analytics for similar studies conducted by the Environmental Protection Agency. Using the least required cost approach, the study utilizes standard engineering adaptations as a common basis for protecting infrastructure assets in the study. The ten areas of analysis and costing can be divided into three general climate impact categories: temperature, precipitation/flooding, and sea level rise. Each analysis area focuses on the costs associated with the adaptations necessary to counteract changes in climate trends.

Results/Lessons Learned. The initial results of the Pennsylvania study indicate more extensive costs of climate change than previously considered. The underlying reason for this difference is the previous lack of focus on a full breadth of climate impacts. Rather, the current study examines both an extensive profile of climate-induced damages across 10 categories and the cost of adaptation to mitigate such damage. For example, the cost for public buildings must consider the prevalence and sizing of existing air conditioning, the cooling capacity necessary to maintain design conditions under the stress of projected temperature trends, and the cost to adapt or install systems to meet these demands. This session will highlight preliminary results in multiple categories from the study and discuss how a similar approach is needed to obtain the true cost of climate change across multiple jurisdictions.