

Proof of Concept for a U.S. Air Emissions Physical Flows Account

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Economic activity does not occur in a vacuum; the economy draws resources from and disposes of waste to the environment. Measuring these physical flows of material is a central component of environmental-economic accounting as outlined in the System of Environmental-Economic Accounting (SEEA), the United Nations (UN) standard for environmental accounting. SEEA aligns with the UN System of National Accounts (SNA) to allow for comparability between economic and environmental accounts.

This paper presents a proof of concept for the first SEEA-consistent air emissions physical flows account for the United States. Primary data on emissions come from the Greenhouse Gas Inventory (GHGI) and National Emissions Inventory (NEI), maintained by the U.S. Environmental Protection Agency (EPA). Included emissions are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, nitrogen trifluoride, and fine particulate matter. The prototype account covers the years 2012–2017. In addition to presenting tabulated emissions by industry, this paper will present examples of additional analytic indicators that can be calculated using the air emissions physical flows account, such as emissions per dollar value added, broken down by industry.

The main challenges in constructing this prototype account are (1) adjusting the emissions figures in the GHGI and NEI from a territory basis to the residency basis used in SEEA, and (2) attributing these emissions across industries and institutional sectors. These adjustments and attributions are made using secondary measures of activity, such as fuel purchases or output, with emissions being attributed proportionally to industries' levels of activity. A software tool called FLOWSA has been developed by researchers at EPA to aid this process. Secondary indicators are drawn from the Energy Information Administration Manufacturing Energy Consumption Survey, the Bureau of Economic Analysis Supply-Use tables, the Bureau of Transportation Statistics Transportation Satellite Account, and other national statistical sources.