

# ***Comparing physical and monetary units in environmental analysis using Input-Output models***

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## ***Abstract***

Input-Output analysis, born as a tool for economic analyses, has seen increasingly widespread applications in other fields, such as Industrial Ecology and Life Cycle Assessment.

Environmental analysis can be performed using Input-Output Models with Environmental Extensions, both in monetary or physical units. Recently, physical versus monetary Input-Output Analysis has been a subject of discussion within the environmental input-output community. Here the impact of using physical versus monetary units for environmental analysis using IO models is assessed by focusing on the electricity sector. As different sectors (ex: industries, households) pay different prices for electricity, we suggest that environmental impacts are more appropriately allocated using a model with electricity transactions in physical units. We construct supply and use tables with electricity transactions represented in kWh for Norway, the Netherlands, and the U.S. Results of these tables are compared with those from monetary IO accounts to quantify the error associated with using monetary-based tables for environmental analyses. We also address issues related to production, transmission and distribution of electricity, as well as time issues (peak versus off peak electricity).

The monetary Input-Output tables used for this work are provided by the Statistical Office of the European Communities (Eurostat), and National Statistical Offices. The electricity data used for this work are based on statistics provided by national statistical offices. This work is performed as part of the European IP "A New Environmental Accounting Framework using Externality Data and Input-Output Tools for Policy Analysis -EXIOPOL" which aims at constructing IO tables for the EU27 and major trading partners.

**Keywords:** Physical Input-Output analysis; Hybrid Input-Output analysis; Environmental Analysis; Environmental impacts from the electricity sector.