

Demand-driven GHG emissions of Swedish regions: 2008-2016

Topic: Multi Regional Input-Output (MRIO) Models Using Industrial Ecology Virtual Laboratory: Development of Regional IE Lab models and Applications

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Sweden is one of the most sustainable countries in the world and has become the best-performing country regarding reducing greenhouse gas (GHG) emissions. In 2016, Sweden's GHG emissions amounted to 5.6 tonnes per capita, the lowest among European Union (EU) countries, which averaged 8.7 tonnes per capita. However, looking at the emissions from the perspective of consumption, the figures look very different, with emissions amounting to 10.1 tonnes per capita in 2016. In this study, we go a step further in the analysis of Swedish consumption-based emissions by looking at the carbon flows between regions. That is, we look at which regions (through their consumption) are driving the emissions in other regions. We do this through multi-regional input-output (MRIO) analysis utilising a new virtual laboratory, the SwedenLab. This new database is able to generate a time-series of sub-national MRIO tables with up to 821 sectors across Sweden's 291 municipalities for the years 2008–2016.

Due to international and inter-regional trade, we found that the consumption of emissions goes beyond basic territorial boundaries. Using an MRIO modelling framework, we are able to identify the emission flows between counties in Sweden and the effect of international trade on regional consumption patterns. Our findings highlight the importance of inter-regional modelling for assessing consumer emissions at the sub-national level.