TRANSPORT EMISSION FOOTPRINT IN THE SLOVAK ECONOMY

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Our study introduces an enhanced methodology for the allocation of emissions from road transport into NACE rev.2 categories and households. This methodology, grounded in thorough data analysis, represents a significant improvement over the previous approach. In compliance with Regulation 691/2011 on European Environmental Economic Accounts, we have chosen to enhance the methodology for allocating emissions arising from road transport. Through this allocation process, it becomes feasible to systematically trace the emission footprint associated with products originating from each economic activity. This improvement holds significant implications for the accuracy and reliability of air emissions accounting, as stipulated by the European Parliament and Council (2022). The allocation of transport emissions into NACE rev.2 categories enables thorough analysis and identification of the major contributors to air emissions across various economic activities and data sources.

GATHERING ACTIVITY DATA → COPERT MODEL → SOFTWARE TOOL → AEA QUESTIONNAIRE

METHODOLOGY

Based on the original methodology, we developed a new one that allows for a more precise allocation of emissions thorough a detailed analysis of input data. Our methodology consists of several phases, including data gathering and processing from various sources and their integration into an overall framework. The allocation of emissions is a key step in our analysis. We created a matrix within the software tool that elaborately describes how emissions are allocated to various economic activities.

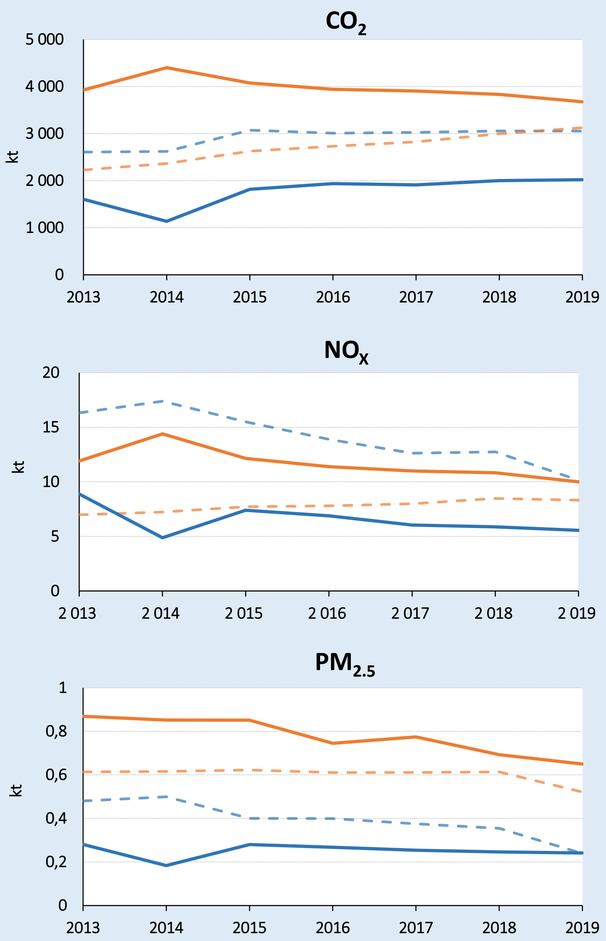
OUTCOMES AND RESULTS

Household (HH) Emissions Surge

The allocation of emissions to households has witnessed a remarkable surge, registering a 76% increaseof CO_2 in 2013 when compared to the previous allocation method. This substantial rise is primarily attributed to the refined allocation approach, which now relies solely on precise data regarding the number of vehicles used and registered for various eco-nomic activities within NACE rev.2.

Category H - Transport Dynamics

Notably, emissions from Category H - Transport, which encompasses Transportation and Storage, experienced sig-nificant changes in allocation patterns. This category saw a substantial decrease in emissions since the adoption of our methodology.

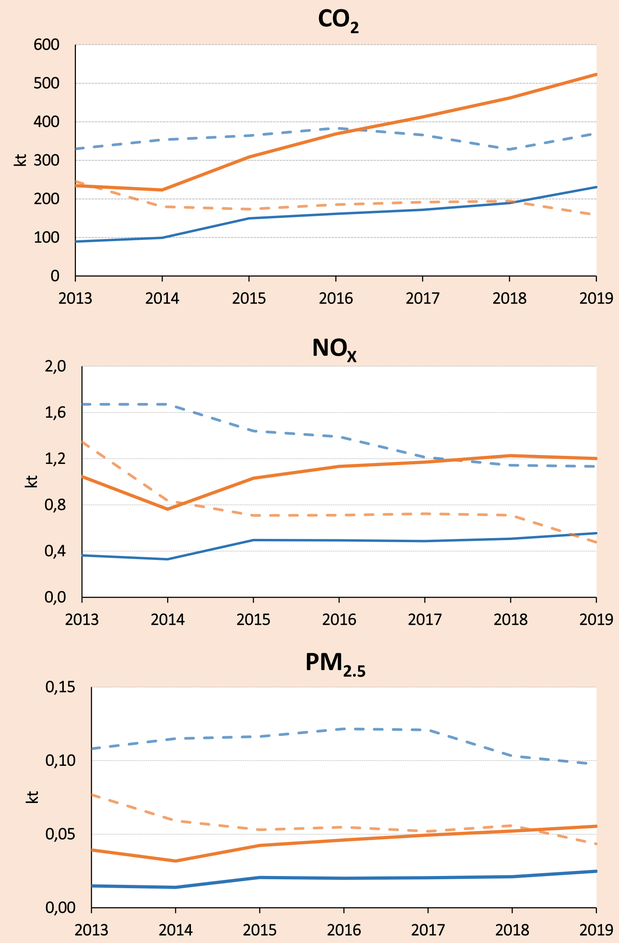


Category C – Manufacturing

The implementation of the new methodology has led to significant changes in emissions allocation within category C. Emissions from industrial production within this category have decreased by up to fourfold since the adoption of the new methodology. This decline can be attributed to the separation of emissions from gross value added, resulting in emissions relocating to other parts of the national eco-nomy or households.

Category G - Wholesale and Retail Trade Emissions Spike

Along with the Repair of Motor Vehicles (category G), has experienced a substantial increase in CO_2 emissions, rising by 230% in 2019 as indicated by the new allocation method. This shift in emissions allocation underscores the methodology's effectiveness in providing a more accu-rate reflection of emissions sources within this category.



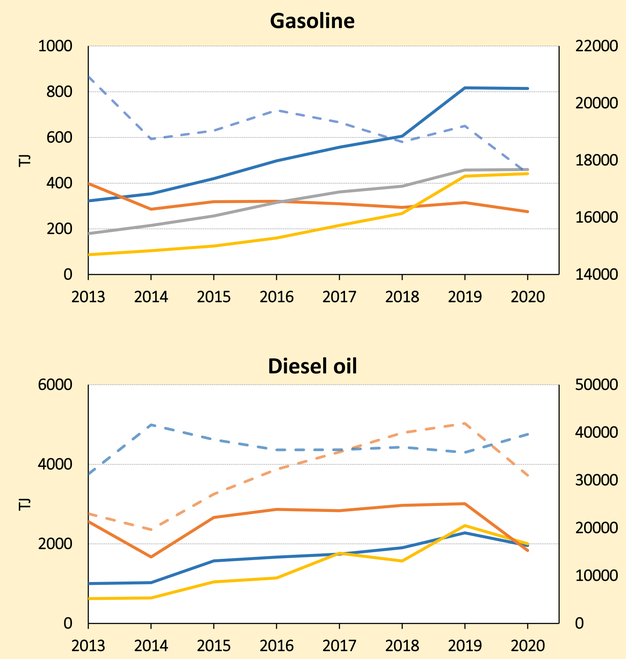
Gasoline Consumption Dynamics

The new allocation matrix for the distribution of physical energy flows in PEFA not only provides a new distribution of gasoline usage in economic activities but also offers insights into likely changes within the economy itself. For instance, in 2013, the largest consumers of gasoline were categories G, H, and M, with critical insights into emissions sources accounting for 54% of total gasoline consumption in the national economy. However, by 2019, category N (Administrative and Support Services) had replaced category H, showcasing shifts in economic sectors' gasoline consumption patterns.

Evolution of Diesel Consumption

Similar shifts are observed in diesel consumption, with categories C, G, and H emerging as the largest consumers in 2013, accounting for up to 87% of diesel consumption in road transport. However, by 2019, category N surpassed category C in diesel consumption among the top three consumers. This shift indicates diversification in diesel usage patterns among different economic categories.

These findings emphasize the significant impact of our new allocation methodology on emissions reporting, providing policymakers cross economic sectors and fuel types.



CONCLUSIONS

Enhanced Allocation Methodology: Our methodology now represents a significant advancement over the previous approach, addressing limitations such as heavy reliance on gross value added and expert estimates, which often resulted in imprecise environmental impact assessments.

Impact on Emissions Reporting: The adoption of our new methodology results in substantial changes in emissions allocation, with notable increases in emissions allocated to households and specific economic categories. This shift is attributed to our method's ability to rely solely on precise data, including the number of vehicles used and registered for economic activities within NACE rev.2.

Policy Implications: The reallocation of emissions, especially the notable increases in household emissions, has far-reaching implications for environmental policy. Policymakers now have access to more accurate data that can inform targeted interventions and incentives. This empowers them to formulate strategies aimed at reducing emissions and enhancing energy efficiency across different economic sectors.

Importance of Integration: Our integrated framework, which combines data from both AEA and PEFA accounts, underlines the importance of considering environmental, energy, and economic dimensions simultaneously. This holistic approach enables comprehensive analyses, revealing potential areas for improving resource management within the economy and facilitating a transition toward a greener and more environmentally responsible economic landscape.

Future Directions: Building upon the foundations laid by this research, future work should focus on the continued refinement of emissions allocation methodologies. Additionally, exploring the evolving dynamics of economic sectors and fuel consumption patterns is essential to staying responsive to changing environmental and economic landscapes.