

Group Project: Regional Resource Use Reduction

Introduction

Today, rising consumption of goods and materials is leading to rising environmental impacts worldwide. The European Union has a strong interest in reducing resource use and moving towards a circular economy¹. According to EU statistics, the EU uses 16 metric tons of material *per capita* per year (8 billion metric tons per year). Policy-makers are faced with the challenge of trying to reduce resource or material use, maintaining economic stability, and achieve sustainability goals. Resource use data linked to environmental indicators may be key to identifying target sectors or product types and evaluating potential for reduction.

Project Approach and Grading

This is a group project with 5 students. Grades will be 3, 4, 5 or fail. The project work is weighted 55% in relation to the other assignments.

Objective

In this project, students will select an EU region for which they will use the CircuMat/REAT tool to analyze material consumption within a region and to test different scenarios. The CircuMat/REAT tool present results in terms of product groups (e.g., petroleum, food) or sectors (e.g., mining, agriculture, manufacturing) and it will be your job to test different scenarios on how varying consumption levels could change the results. You can choose to analyze a sector or a specific product group, but keep in mind that the scenarios should be realistic. We will expect you to analyze the results, the reliability of the model, and if/how this type of tool could be useful for regional and municipality authorities or industries looking to affect material flows and the related impacts.

We would like you to compare results to potential or existing targets - are there any existing goals/targets set for the indicators provided? What strategies have been put in place or are possible? We will also want to see an analysis of the method – what are the calculations based on? Explain weaknesses/strengths etc.

Specific Tasks

1. Visit: <https://cml.liacs.nl/cmat/>
2. Select “Tool”
3. Use the user manual and the skills shown in the tutorial (13/11)
4. Select your location of choice and create a baseline dataset
5. Identify the top three sectors with respect to various indicators (consumption-based, production-based), also identify top three product groups. Look at multiple indicators (GHG, raw materials).
6. Investigate a realistic reduction in some kind of material/product (e.g., a policy) in the product groups that are high consumption. Provide concrete examples.

The CircuMat/REAT tool performs three types of analyses:

¹ https://ec.europa.eu/environment/resource_efficiency/about/roadmap/index_en.htm

- “Production view”: hot spot analysis to identify the key sectors where selected environmental or economic indicators mostly occur. This perspective calculates the economic and environmental indicators of specific manufacturing activity(s) in the region. For example, what is product or sector that creates high environmental impact or high material use in the production phase. This could be manufacturing of steel, for example.
- “Consumption view”: contribution analysis calculates the impacts generated along the entire supply chain for the final demand of specific manufacturing activity(ies) in the region; this analysis identifies the consumption items that contribute to the selected indicator. For example, what products are being consumed that have high impact/high material use based on their upstream options. This could be food processing, for example, in particular meat products.
- Scenario analysis that allows users simulate the effects of changing consumption on the selected indicators by modifying the final consumption values. The scenario analysis can identify the effects of changing consumption in the region on the environmental and economic indicators.

Content and material presented in the final report

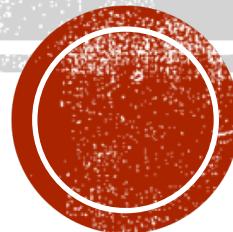
For the structure of the report, follow the instructions available in the course description. Apart from your findings regarding the tasks, the report should contain the following:

- General description of the issue
- Data sources (including a description and reasoning)
- Methodology used to analyze the problem
- Discussion
 - Suitability of the method and suggestions for improvement
 - Analysis of results
 - Assumptions, problems, and weaknesses
- References

Content and material presented in the Appendices to the final report

- Copies of literature used
- Excel spreadsheets with calculations

REGIONAL RESOURCE USE REDUCTION

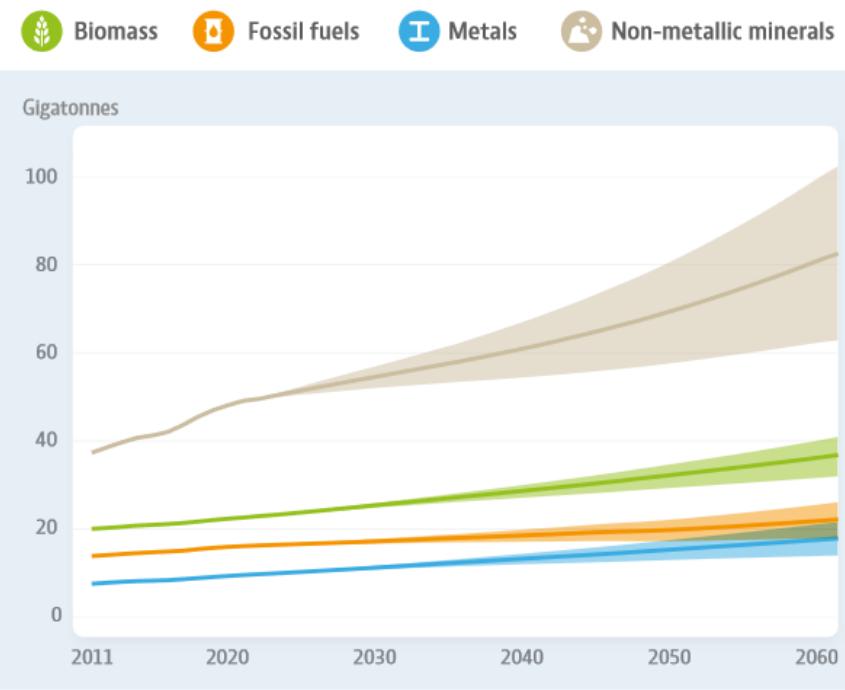


Supervisors: Alexandra Lavers Westin &
Leonardo Rosado

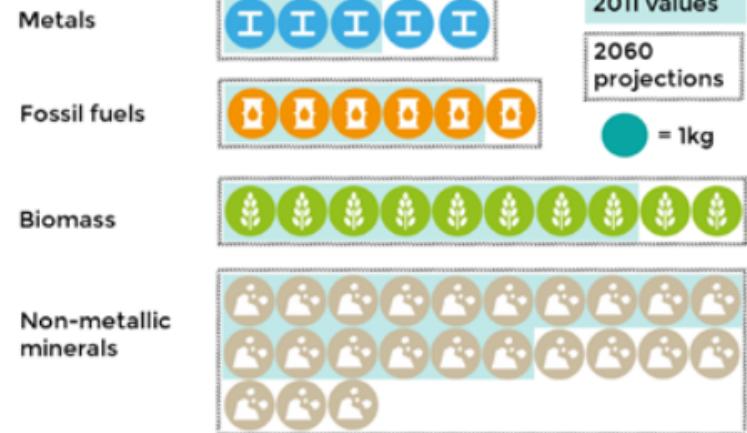
Group Project – ACE155

BACKGROUND

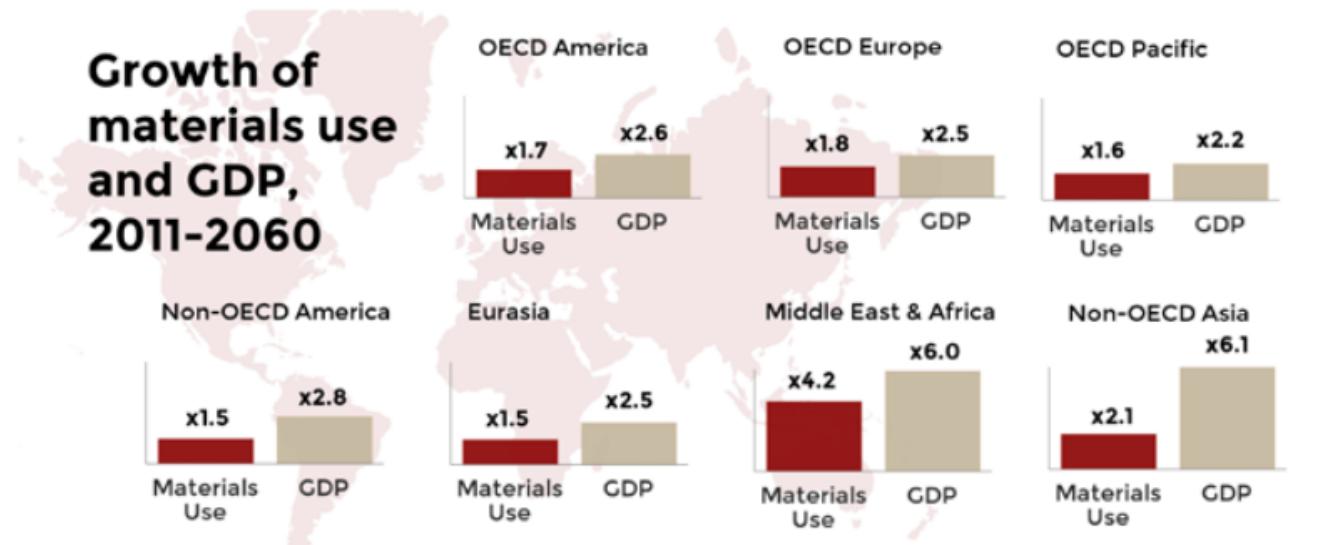
Figure 6. Growth in materials use depends on population and economic growth assumptions



Materials use per capita per day



Growth of materials use and GDP, 2011-2060



<https://www.oecd.org/environment/waste/highlights-global-material-resources-outlook-to-2060.pdf>



EUROPEAN REGIONS

- Example: Västra Götaland
- Population of 1.719.000
- Increasing consumption
- Increasing population



<https://stadsutveckling.goteborg.se/en/>



PROJECT OUTLINE:

- Select a European region
- Identify the top three sectors with respect to various indicators (consumption-based, production-based), also identify top three product groups.
- Investigate a realistic reduction in some kind of material/product (e.g., a policy) in the product groups that are high consumption. Provide concrete examples.
- Analyze results and assess the strengths/weaknesses of the model, if the reductions are likely and/or possible, etc.

