

MCC Press Release

Will the climate transition be a battle of materials? Study forecasts the increase – and shows solutions

Heavy additional demand for commodities like cobalt, lithium, copper, aluminium and iron. Countermeasures include behavioural changes in mobility, housing and nutrition.

Berlin, 04/06/2024. As things stand today, global demand for cobalt and lithium for e-car batteries will increase almost twenty-fold by 2050. By then, the development of a fossil-free power supply will require a lot of copper, aluminium and iron, and the respective demand is likely to roughly double. Rare earth elements – essential for wind turbines, for example – will also be needed a great deal more. A study now sheds light on the foreseeable increases in material consumption associated with the climate transition, and describes how these can be mitigated. It was led by the Berlin-based climate research institute MCC (Mercator Research Institute on Global Commons and Climate Change) and published in the renowned journal *Nature Climate Change*.

“It is true that decarbonisation will make the global economy, as a whole, less resource-intensive than it is today by phasing out coal, oil and gas,” says [Felix Creutzig](#), head of the MCC working group Land Use, Infrastructure and Transport and lead author of the study. “However, the additional material requirements resulting from the climate transition, the associated raw materials extraction and the waste flows pose considerable ecological and social risks at the regional and local level. For the first time, we systematically show that various demand-side climate solutions can be used to counteract this, including behavioural changes in mobility, housing and nutrition, and the improvement of material circularity in the economy.”

So far, demand-side climate protection (as a supplement to the creation of a fossil-free energy supply) has received increasing attention primarily because of its potential for rapid greenhouse gas reduction, and because it usually goes hand in hand with [increased quality of life](#). The latest Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) includes a [separate chapter](#) on this topic for the first time, overseen by Creutzig as a Coordinating Lead Author. The new study presented now – a joint effort by experts from ten countries – is the first to systematically analyse the associated potential for reduced material consumption in the climate transition.

Based on an extensive evaluation of the scientific literature, the research team first drew up a detailed risk profile for each raw material. This includes the land consumption associated with extraction, threats to biodiversity and the sometimes-enormous water requirements, health hazards caused by toxic substances or poor working conditions, as well as knock-on effects such as corruption, political instability and geopolitical dependencies. For example, the extremely politically unstable country of Guinea is responsible

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for almost a quarter of the global production of the aluminium precursor bauxite. Half of the world's cobalt deposits are located in the civil-war-torn country of Congo. And 90 percent of semiconductor wafers for solar cells are produced in China.

Building on this risk analysis, the study then describes how demand-side climate protection can make decarbonisation more material-friendly. In the transport sector, this includes more [pooled mobility](#). In the building sector, it is about natural construction materials, modernisation of old buildings and more intensive use of living space. And in the food sector, less meat consumption means better health as well as lower material demand, for example in the reduced production of animal feed. Overall, this is not about coercion, but about investments in infrastructure that enable people to adopt climate-friendly behaviours, as well as positive incentives to do so.

According to the study, quantifying and categorising the potential savings in materials is now an urgent topic for further interdisciplinary research. "The Integrated Assessment Models that describe the relationships between climate policy and climate development, and ultimately form the basis for decision-making by governments via the IPCC reports, need updating," says Creutzig. "Such models should also depict the material dimension of a low-carbon – and ultimately carbon-free – global economy. After all, the general substance of our study is that demand solutions have a doubly beneficial effect: against the climate crisis and against the plundering of the planet."

Reference of the cited article:

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MCC explores and provides solution-oriented policy portfolios for climate mitigation, for governing the global commons in general, and for enhancing the many aspects of human wellbeing. Our six working groups are active in fields like economic growth and development, resources and international trade, cities and infrastructure, governance, and scientific policy advice. Co-founded by the Mercator Foundation and the Potsdam Institute for Climate Impact Research. | www.mcc-berlin.net/en | https://twitter.com/MCC_Berlin

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