

Title:

Resource Paradox Problem visualized by Total Material Requirement

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Abstract

Although green innovation is one of the important driving forces for building a sustainable society, it is apparent that many green innovations specifically focus on low-carbon technology. However, such innovation is often seen to induce additional resource demand. For instance, it is well-known that new generation vehicles with higher fuel economy require rare earth elements, lithium, cobalt, and nickel that were not used in such large quantities in conventional vehicles. This situation can be seen as a "resource paradox". Less attention has been paid to this resource paradox because of the lack of quantifiable indicators or insufficient databases on resource intensity. Total material requirement (TMR), is an indicator that quantifies the degree of mining activities required to supply direct material flows, in terms of hidden flows. The authors have been developing a database of TMR for various goods. The purpose of this study is to quantitatively reveal the resource paradox problem using TMR. In the presentation, we will introduce some of the more remarkable examples by comparing the TMR and lifecycle CO<sub>2</sub> emissions (LC-CO<sub>2</sub>) or direct material input at the economy-wide, product and metallic element levels.