Transformative mechanisms in decarbonization policies: a structured approach

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Overview
The urgency to accelerate sustainability transition calls for a broad economic and social transformation. Policies aiming at decarbonization are crucial to promote such transformation but there is still limited knowledge on how this can be achieved. This research addresses this gap by proposing theory derived factors that introduce transformative effects in policies, and investigating their presence in decarbonization policies, in different world regions. The goal is to understand whether transformative mechanisms are being introduced in current policies, which mechanisms or combinations of mechanisms prevail/are missing, and which sectors emerge as preferential targets, thus contributing to the debate on the formulation and implementation of transformative sustainable policies.

Method
A literature review revealed five factors that are proposed to introduce transformative effects in a policy: engage a diversity of actors; encompass activities of a variety of sectors; encourage experimentation; enable reflexivity; use a mix of instruments (Haddad et al., 2022; Mazzucato, 2018; Rogge et al, 2020; Weber & Rohracher, 2012; Schot & Steinmuller, 2018). These factors lay the basis for the definition of "transformative mechanisms", which support an empirical assessment of the transformative capacity of decarbonization policies. A database of policies from Europe, Japan, China, and USA compiled data obtained from IEA e EEA policy databases, totaling over 3000 policies. These policies were examined to uncover the presence of transformative mechanisms. The incidence and distribution by region and sector (energy, transport, buildings, industry, etc.) of policies displaying individual mechanisms and/or their combinations was assessed. A qualitative analysis studied more deeply the policies displaying extensive combinations of mechanisms to better understand their goals and mode of organization.

Results
Transformative mechanisms were found in only a minority of decarbonization policies and combinations of mechanisms that may configure effective transformative policies were even less frequent. Reflexivity and diversity of actors were the most common transformative mechanisms, while variety of sectors was less frequent. However, experimentation & reflexivity and diversity of actors & variety of sectors were often seen in combination. Regional and sectoral differences in the presence of transformative mechanisms and their relative relevance were also observed. The energy sector, either alone or in association with other sectors, was the most likely to display transformative policies. Transversal policies, which often incorporated a wider set of mechanisms, were seen as potentially more transformative.

Conclusions
Policies displaying transformative mechanisms are promising to accelerate decarbonization but still have a limited incidence. Yet, it was possible to discern some patterns in terms of policy contents and sectoral prevalence. The definition of these mechanisms and their analysis is a first step towards assessing decarbonization policies' ability to produce co-benefits for the economy, but further research is needed.

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