

Product-oriented climate policy: learning from the past to shape the future



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ABSTRACT

Product-oriented climate policies such as labels, financial incentives, and emission standards for vehicles and buildings have achieved considerable reductions in emissions and triggered innovations that offer very low emissions during the use phase. In contrast to other climate-policy instruments, these policies are successfully applied in an increasing number of regions. However, a major proportion of global emissions—namely, those from industry—remain outside the scope of most current forms of product-oriented climate policies. All economic activities could be included by extending product-oriented policies to embodied emissions (i.e. emissions resulting from manufacturing products). To guide such a development, we need a better understanding of the current state and potential future development of this policy approach. Therefore, in this paper, we review and evaluate policy evolution over the past decade in terms of both measures implemented and emissions addressed. On this basis, we synthesize a framework for developing policy towards greater stringency and broader scope. The framework describes a step-wise process to achieve increasingly stringent standards. Once established, standards can extend their scope to include additional, similar products, and related embodied emissions. Our framework and policy review informs the reinforcement and extensions of current product-oriented climate policies. A relevant implication for international climate policy is that the regional adoption of such policies incentivizes the global diffusion of low-GHG products. International climate policy can foster this development by supporting the harmonization of carbon-footprint norms for products in order to enhance conformity with international trade, and facilitate the extension of product-oriented climate policy to embodied emissions.

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1. Introduction

In the absence of an ambitious and binding international agreement to mitigate climate change, national (or regional) action takes center stage in policy contribution to reduce greenhouse gas (GHG) emissions. However, unilateral climate-policy raises the risk of GHG-intensive production being shifted to less regulated markets (Helm et al., 2012). This would result in carbon leakage: emissions in the region implementing strict climate policy are reduced, but emissions caused by the production of imported goods (embodied emissions) increase. To avoid such carbon leakage and address related concerns over economic competitiveness, it has been suggested that emissions embodied in imported goods be

addressed by adopting a consumption-based policy approach (Peters, 2008). In contrast to the currently applied production- or territory-based approach (i.e. implemented with an economy-wide carbon tax), the consumption-based approach does not focus on emissions generated within a country's own borders, but on global life-cycle emissions caused by the products it consumes. A widely discussed implementation is the combination of a national carbon tax and a border-adjustment system, which taxes imports and exempts exports based on the embodied emissions of the traded goods (Alexeeva-Talebi et al., 2008; Böhringer et al., 2012; Jakob et al., 2013). However, carbon pricing suffers public-acceptance problems (Kallbekken et al., 2011) and has therefore been applied in relatively few countries (OECD, 2013). Moreover, the “carbon tax plus border adjustment” combination has not yet been applied in any country, and mixed assessments of its efficiency and fairness (IPCC, 2014a) suggest that this is unlikely to change any time soon.

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An alternative consumption-based approach uses product-oriented instruments such as informative labeling; financial and fiscal incentives; and different types of standards. While such policies are widely applied in OECD countries, as well as several non-OECD countries (WTO and UNEP, 2009), they are in general limited to the use phase of products (e.g. CO₂ emission standards for vehicles; energy-efficiency standards for buildings). Only voluntary labeling conventions such as the German Blue Angel (WTO and UNEP, 2009) account for embodied emissions—that is, those originating from the manufacturing and distribution of products. However, such embodied emissions are responsible for more than half of the total GHG emissions caused by consumption (Girod and de Haan, 2010; Moll et al., 2005). They could be addressed by extending product-oriented climate policy to include embodied emissions, as has occurred in the case of bio-fuels and is being discussed for vehicle standards (Kokoni and Skea, 2014), or by increasing the stringency of labeling that addresses whole-life emissions, as has taken place with labels reflecting the use-phase emissions of buildings (Grösser, 2013). Evaluating past developments of product-oriented environmental policies provides valuable insights into their potential future development. For instance, it can show whether the mutually reinforcing development of voluntary and mandatory standards for building (Grösser, 2013) and timber sustainability (Gulbrandsen, 2014) also holds true for other sectors and regions. In addition, we do not yet have a review of the current state of product-oriented climate policy, which would provide the starting point for its future development.

This article addresses this research gap by evaluating how past product-oriented policies evolved in different consumption sectors, in order to inform possible policy extensions and reinforcements. In the process, we examine those policy developments geared towards embodied emissions. In contrast to Kokoni and Skea (2014), we analyze not only policies addressing embodied emissions, but also product-oriented climate or climate related policies in general. Thereby similar to Grösser (2013) and Gulbrandsen (2014) the development of over time is considered. Extending current research, our evaluation covers all consumption categories, while focusing on policy development in the European Union, since this region is a climate-policy leader (Van Schaik and Schunz, 2012). Thereby, we also provide an overview on the current state of consumption-oriented climate policy. The policy-development dynamics we identify are synthesized to stylized policy dynamics that form a framework for the development of product-oriented climate policy.

Section 2 sets out the case for shifting to consumption-based and product-oriented climate policy. In the method section (Section 3), we define two dimensions for assessing the development of product-oriented climate policy and describe our evaluation approach. Section 4 presents the development over time of product-oriented climate policies across the most relevant consumption sectors, focusing on legislation in the European Union. Section 5 sums up the observed policy dynamics in a framework, and discusses the implications for future national and international policies. Finally, Section 6 concludes.

2. Background: the rationale for product-oriented policies

To explain the policy focus of this article, this section describes the relevance of embodied emissions and, hence, the benefit in moving to consumption-based climate policy. Subsequently, we examine such consumption-based policies in order to make the case for exploring product-oriented policies.

2.1. The relevance of embodied emissions in international trade

Fig. 1 shows production- and consumption-based GHG emissions for Europe. It reveals that 22% of consumption-based emissions are imported as embodied emissions (Fig. 1). In smaller developed countries such as Belgium, Norway, Switzerland, and Hong Kong, the proportion is above 50% (Hertwich and Peters, 2009). Most imported embodied emissions are related to the use of fossil fuels in manufacturing, but emissions from land-use change are also relevant. According to Butler and Laurance (2008), tropical deforestation is substantially driven by major industries and economic globalization via timber operations; oil and gas development; large-scale farming; and exotic-tree plantations. According to a study published by the European Council (2013), 10% of worldwide gross deforestation can be attributed to consumption in Europe—mainly of food, but also of paper, furniture, and textiles.

Between 1990 and 2010, the production-based GHG emissions of the countries that agreed an emission-reduction target within the Kyoto Protocol (Annex B) decreased by 8%, while consumption-based emissions increased by 5% (IPCC, 2014b). This indicates the risk of regional climate policy becoming ineffective because GHG-intensive production is simply shifted abroad. It has been shown by emission models that this carbon leakage would be more pronounced in the long term with unilateral production-based climate policy (Barrett et al., 2013). Besides limited environmental effectiveness, this approach leads to concerns about economic competitiveness (OECD, 2007). As a consequence, early movers can easily be discouraged and climate policy is further delayed (Helm et al., 2012). Because of these drawbacks, many scholars advocate a shift to consumption-based policies (Girod et al., 2014; Kokoni and Skea, 2014; Peters, 2008).

2.2. An overview of consumption-based policies

In this section, we provide an overview of consumption-based policies, define product-oriented climate policies, and illustrate some possible options for policy design, such as the flexibility of standards.

Table 1 shows an overview of climate-policy instruments in general derived from the UNEP and WTO report on climate policy and trade (2009). Many of these can be implemented in either a production- or a consumption-based manner. At national or sectorial level, carbon pricing can be introduced via a tax or cap-

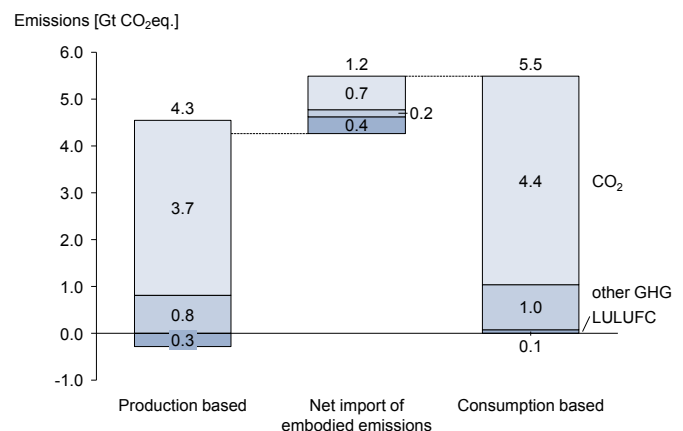


Fig. 1. European GHG emissions for production- and consumption-based accounting, 2011. Note: Net import estimated for GHG emissions based on relative share for CO₂ emissions in 2009 (Boitier, 2012). Land Use, Land-Use Change, and Forestry (LULUCF) import based on estimate for European share of global embodied deforestation consumption (VITO, 2013) and estimate for global LULUCF emissions (Baccini et al., 2012).

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