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Assessing policy strategies for the promotion of environmental technologies: A review of India's National Solar Mission

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ABSTRACT

There is widespread consensus that no individual policy instrument but rather a “policy mix” is needed to effectively drive the development and diffusion of environmental technologies. However, what exactly constitutes such a policy mix remains largely undefined. This paper takes this discussion a step further by developing a comprehensive framework for assessing and comparing policy approaches for the promotion of environmental technologies. It begins with a critical review of existing policy mix concepts, pointing out key shortcomings. To address the identified challenges, it proposes the concept of a policy strategy as an alternative framework for policy assessment and comparison. This serves as the basis for integrating findings from the literature on environmental innovation and technological change in a comprehensive framework for assessing policy strategies for the promotion of environmental technologies. The framework is then applied for the assessment of India's National Solar Mission, the country's strategy for promoting solar energy technologies. Based on the resulting findings, the potential and limitations of the proposed framework are discussed.

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1. Introduction

Past studies have shown that markets for environmental technologies are highly dependent on government intervention, and, with few exceptions, these markets have been “policy driven” (Jacob et al., 2005; Jänicke and Jacob, 2004). In other words, the role of policy in stimulating and sustaining green technologies is crucial. At the same time, environmental innovation and technological change is a complex and multi-faceted process that cannot be prescribed by the state. Rather it requires a nuanced and flexible approach to policy making (Blazejczak et al., 1999; Hemmelskamp et al., 2000).

In more recent years, scholars have increasingly pointed out the need for a policy *mix* to steer innovation toward environmentally-friendly solutions (Jänicke and Lindemann, 2010). Although the literature on policy and governance for environmental innovation and technological change offers a host of useful lessons for this purpose, no integrated framework for assessing policy mixes for the promotion of environmental technologies has emerged (Rogge and Reichardt, 2013). In this paper, we seek to take this debate further

by developing a comprehensive framework for policy assessment, tailored to the specific challenge of promoting environmental technologies.

To do so, we introduce the concept of a “policy strategy,” further elaborating it based on lessons from the literature on the governance of environmental innovation and technological change. As Raschke and Tils (2007) have pointed out, formalized concepts of strategy have been conspicuously missing from the policy sciences. Meanwhile, in political practice the use of formalized government strategies has become increasingly common. This paper will argue that the concept of strategy provides a useful basis for designing and assessing policies for promoting the development and diffusion of environmental technologies.

Furthermore, it provides a useful structure for comparing policies for the promotion of environmental technologies across countries. Existing approaches to comparative policy analysis have generally taken either a macro-perspective, comparing broad policy paradigms and the related institutional configurations in a particular policy field (Fredriksson and Wollscheid, 2007; Jahn, 2006; Larédo and Mustar, 2001; Mani, 2002), or a micro-perspective, focusing on the comparison of individual policy instruments or reforms (Hemmelskamp, 1997; Jordan et al., 2005; Requate, 2005; Stavins, 1997). The concept of strategy closes a gap between these two perspectives by offering a sector-based, meso-perspective to comparative policy analysis. It focuses not on the merits of individual policy instruments or reforms, but on the

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particular combination of governance arrangements, policy measures and their development and implementation over time.

The paper begins with a discussion of existing policy mix concepts, pointing out important shortcomings and positioning the proposed strategy concept within the related literature. Following this, the building blocks of the proposed strategy concept are presented. On this basis, a framework for the assessment (and potentially the design) of policy strategies for the promotion of environmental technologies is developed. To demonstrate the usefulness of the proposed framework, it is applied to a prominent example from India, the Jawaharlal Nehru National Solar Mission (JNNSM). The final section offers a brief synthesis of results and discusses both the potentials and limitations of the strategy concept as a tool for policy assessment and comparison.

2. The elusive quest for an optimal policy mix

The recent literature on policy mixes has proposed a number of generic concepts for assessing the suitability of policy mixes, i.e. concepts unrelated to the particular policy field. Rayner and Howlett (2009) have stated that so-called “optimal integrated policies” require a policy design “in which multiple policy goals can be coherently pursued at the same time, and, second, policy instrument mixes are consistent, in the sense of being mutually supportive in the pursuit of policy goals” (p. 100). Based on these concepts, Kern and Howlett (2009) have highlighted a number of failures of the Dutch energy policy mix. In particular, they identify a fundamental incoherence between policy goals aimed at market liberalization and the long-term development of a sustainable energy supply.

It is somewhat unsurprising that the authors do not find the “optimal” policy mix they have set out to find. The authors themselves concede that arriving at an optimal policy is not “an easy managerial task” but rather the outcome of “‘tough’ political struggles” (p. 404). In this paper, we go a step further and suggest that the concept of an “optimal” policy mix is fundamentally flawed. It not only masks the important political dimension already conceded by the authors. It also ignores the fact that policy trade-offs are in fact part and parcel of the policy making process. It is not and will not be possible to entirely eliminate or resolve these trade-offs. Rather it is the task of policy makers to balance a host of different policy goals both within and across different policy fields. This not only involves the technocratic task of “optimizing,” but it involves normative decisions on the relative priority of certain goals over others and striking a politically feasible balance between partially conflicting (yet potentially equally valid) policy goals.

As Flanagan et al. (2011) state, an important value-added of the policy mix concept is, in fact, its ability to focus “attention to the trade-offs between policies as they impact upon the extent to which the ultimate intended goals or outcomes of innovation policy are realized” (p. 704). In other words, policy makers cannot and should not be expected to eliminate inconsistencies entirely. Rather tensions and conflicts among a “broad and ever-changing range of more or less explicit and implicit, final and intermediate goals and objectives” (p. 708) are inherent to the art (rather than science) of policy making.

In fact, policies aimed at promoting environmental technologies—the focus of this paper – serve the explicit purpose of challenging dominant socio-technical regimes and the corresponding policy regimes. As suggested in transition theory, the displacement of a dominant socio-technical regime by an emerging environmental technology is dependent on a process of niche formation and development before a new technology reaches the level of maturity needed to challenge and eventually replace an incumbent technology (Elzen et al., 2004; Rip and Kemp, 1998;

Geels, 2002; Grin et al., 2010). In a co-evolutionary perspective on policy and technological change, policies aimed at developing such niches may serve the explicit purpose of introducing inconsistencies into the broader policy regime. Correspondingly, the concepts of policy coherence or consistency are not useful assessment criteria on their own. More common assessment criteria, such as effectiveness and/or (dynamic) efficiency are more relevant as a starting point for assessing such policy mixes (Gunningham and Grabosky, 1998). And as these two criteria immediately indicate, the consideration of trade-offs is an inherent part of the assessment process.

Hence, the proposed policy strategy concept acknowledges the normative dimension of policy making. Policy making is a process of setting priorities based on a host of different factors, including value judgments, political opportunities and pressures as well as questions of efficiency and effectiveness (Fischer and Forester, 1993; Fischer and Gottweis, 2012). This implies that alternative approaches for tackling a common policy challenge may yield a host of different possible solutions or *strategies*. The ultimate goal of an assessment is, therefore, not simply to evaluate the level of coherence among policy goals and measures, but to point out specific trade-offs and potential synergies (Del Río González, 2007; Nilsson et al., 2012). Moreover, it acknowledges that trade-offs and synergies among policy objectives may co-exist. For instance, while one policy goal may imply trade-offs vis-à-vis another in budgetary terms, it may offer synergies in political terms.

3. From optimal policy mix to policy strategy

Beyond the acknowledgment of this normative dimension of policy making, the relevance of policy strategies is further underlined by their increasing role in the *practice* of policy making, in particular in the field of environment and sustainable development policy (Quitkow, 2011; Steurer and Martinuzzi, 2007; Steurer et al., 2010). Among other things, the strategy concept presented in this paper has been inspired by advisory work conducted by the author and colleagues at the Environmental Policy Research Centre (FFU) at Freie Universität Berlin in support of strategy development processes at the German Ministry of Environment.

This increasing practical relevance of policy strategies is met by a relative scarcity of literature on the topic, mainly focused on the development of generic strategy concepts. Building on these generic concepts, this paper develops a framework for designing and assessing strategies focused on the specific task of promoting environmental technologies. In a first step, this section reviews existing literature on strategies in the public sector and proposes a working definition of policy strategy. This serves as the basis for the development of a more focused assessment framework, which is elaborated in Section 4.

For the policy field, Raschke (2002) has defined strategies as “the pursuit of goals in constant interaction with a reactive environment” (translated from the German original), highlighting among other things the dynamic, process-oriented nature of the concept. According to Fischer et al. (2007), variants of this definition are shared by most policy practitioners. In a similar vein, Steurer (2007) highlights the fact that strategies find a middle ground between what he calls the planning and the learning school in the practice of public administration. While the former emphasizes the role of formalized planning, the latter corresponds to an incrementalist approach to policy making, where change comes about via undirected, mutual adjustments and has the character of a collective learning process (Lindblom, 1979).

Policy strategies, on the other hand, are by characterized by a set of policy goals, while acknowledging the need for flexibility in the choice of policy instruments (Jänicke et al., 2003). Following

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