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Evaluating the effects of policy innovations: Lessons from a systematic review of policies promoting low-carbon technology

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ABSTRACT

We report on an original systematic review of 165 empirical, *ex post* studies examining policies that promote the development and use of low-carbon technologies. Policy is defined broadly to include diverse instruments (e.g., eco-labels, voluntary agreements, emission credits, and taxes), developed, administered, and promoted by state and non-state actors (e.g., cities, states, corporations, business associations, and non-governmental organizations) that are relevant to climate change. By disaggregating policy designs, we are better able to understand the features of policies (e.g., instrument type, regulatory target, built-in flexibility) associated with effectiveness and the trade offs different features create among evaluation criteria. Our analysis, thus, sheds new light on the final and arguably most important criterion of policy innovations – the extent to which they have lasting consequences.

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1. Introduction

Climate change governance comprises an expanding array of policies (e.g., eco-labels, voluntary agreements, emission credits and trading schemes, and emission taxes), developed, administered, and promoted by state and non-state actors (e.g., cities, states, corporations, business associations, and non-governmental organizations (NGOs)). Despite the proliferation of these instruments and the advancement of typologies for conceptualizing their differences, few attempts have been made to systematically assess what we know about their effects in practice (for exceptions, see Haug et al., 2010; Huitema et al., 2011).

We contribute to this lacuna by reporting on an original systematic review of 165 empirical, *ex post* studies examining policies that promote the development and use of low-carbon technologies. Recognizing the wide range of policies and actors involved in climate governance (Abbott, 2012; Andonova et al., 2009; Hoffmann, 2011), we define policy in broad terms to encompass both state-led and society-led instruments (cf. Jordan and Huitema, forthcoming). This is essential for two reasons. First,

considerable research details the important role society-led governance interventions – often termed private governance or rule making and here termed hybrid instruments – plays as a precursor, competitor, substitute, or supplement to state-led policy interventions (Braithwaite and Drahos, 2000; Bütte and Mattli, 2011; Scott, 2002). Second, this perspective allows policy innovation to be examined as an ongoing process ranging from incremental evolution to radical revolution that involves broad societal-learning processes (Campbell, 2004; Hall, 1993; Voß, 2007). Respectively, these are equivalent to what Cashore and Howlett (2007) term progressive incrementalism and paradigmatic change, where the latter comes from Hall's (1993) work that defined paradigm as “a framework of ideas and standards that specifies not only the goals of policy and the kind of instruments that can be used to attain them, but also the very nature of the problems they [policy makers] are meant to be addressing.” (p. 279) (See also Geels (2002) for an application of similar conceptual distinctions to technological transitions.) Akin to Jordan and Huitema (forthcoming), we view policy innovations as those policies that are new, widely adopted, and impactful.

Impactful, or effective, policy innovations – defined as those that ultimately attain their pre-identified objectives – may be found, we argue, in both the adoption of policies never before used to address a particular problem and/or in a particular context, but also due to novel combinations, either by design or by accident. The latter is important for research on policy diffusion, as accidental invention may be diffused purposefully. Creating new ideas and putting them to use, through various combinations using existing

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resources, serves as an important example of innovation (Jordan and Huitema, forthcoming). Moreover, the process of diffusion – rather than involving perfect imitation – may include alterations that affect the ultimate impacts of the innovation and possibly even create additional innovations (Braithwaite and Drahos, 2000; Voß, 2007). This process is equivalent to what Campbell (2004) terms bricolage: “actors often craft new institutional solutions by recombining elements in their repertoire through an innovative process of *bricolage* whereby new institutions differ from but resemble old ones.” (p. 68)

Our aims are thus three-fold. First, by assessing effects, we explore the final criterion of policy innovations – whether the innovation has “lasting consequences” (Polsby, 1984, 13). Second, we disaggregate policy designs to understand better the features of policies and the context in which policy is enacted that may be associated with effectiveness. We go beyond existing instrument typologies by developing a framework to identify fine-grained details of policy designs that, based on existing research in policy studies, can be expected to affect the lasting consequences of policies in practice. Capturing these finer-grained details permits a more careful assessment of the effects of individual policies. Finally, the analysis offers the starting point for better assessing the entwining of society-led and state-led policy interventions that can capture situations where society-led processes may be the locus of invention (i.e., initiation of new policies) in one instance and then a diffuser of a state-led policy invention in another, and vice versa (Auld and Green, 2011). In other words, the invention, diffusion, and effects of policy innovations may interact with and be affected by societal processes that would be ignored by only treating states and governmental policy processes as units of analysis (Flanagan et al., 2011; Voß, 2007).

Our assessment identifies characteristics of policies that were generally associated with positive evaluations (e.g., built-in flexibility or longer and well-defined time frames) and those that come with trade offs (e.g., self-regulation that reduces costs but leads to fewer environmental improvements). With the trade offs, we observed that government policies (backed by state authority) performed not as well on efficiency measures, but did well on accountability and impacts; in contrast, societal-led policies (what we term hybrid instruments backed by market, peer, and social sources of authority) did well on efficiency, middling on impacts, but not as well on accountability, as defined further below. Thus, hybrid instruments may meet certain climate change objectives at reasonable cost, but existing studies indicate that this has potential negative consequences for accountability. Moreover, these insights have implications for broader understandings of policy innovation when one accounts for the importance of “blame avoidance” over “credit claiming” for governments (see, Howlett, forthcoming). The absence of clear accountability mechanisms for hybrid instruments, therefore, may be associated with greater risk-taking behaviour and the possibility that increased innovation ensues. At the same time, it may also come with potential negative consequences for policy outcomes (defined as political dynamics and the legitimacy of the governance system as a whole) (see, Jordan and Huitema, forthcoming).

We proceed in five parts. First, we discuss the growing complexity of climate change policy interventions and justify the value of examining policies for the development and use of low-carbon technology. Second, we introduce the analytic framework developed to capture aspects of the context in which policy is enacted and fine-grained details of the policy design. Third, we discuss our approach to the systematic review, with particular attention to the inclusion criteria, coding protocol, and data collection. Fourth, the analysis reports the characteristics of the qualifying studies. We then conclude with a synopsis of our key findings.

2. Complex climate policy interventions and low-carbon technologies

In the last two decades, the changing instruments of government have preoccupied policy makers and scholars attempting to assess whether and how different instruments effectively accomplish societal goals in an increasingly globalized, inter-connected, and complex world. Considerable research associates these changes with: (1) governments’ inability to deal with problems on scales either greater (transnational) or smaller (sub-national) than state policy and regulatory institutions (Cerny, 1995); (2) an increasing capacity among private – both business and civil society actors – to resolve public good problems on their own or in partnership (Knill and Lehmkuhl, 2002); (3) the emergence of fundamentally new technologies and the novel application of existing ones (Auld et al., 2010; Esty, 2004); (4) growing and persistent financial constraints facing governments; and (5) neoliberal ideas about the appropriate bounds and tools of governments vis-à-vis the market (Bartley, 2003; Bernstein, 2002; Braithwaite and Drahos, 2000). Taken together these shifts have drawn attention to an array of smart and soft governance instruments that are seen to allow governments to steer society towards policy goals rather than dictating a particular means of getting there (Rhodes, 1996). We are interested in the policy instruments deployed by governance processes – both state-led and society-led – where governance is understood as: “the interactions among private actors, or between private actors on the one hand and civil society and state actors on the other, giving rise to institutional arrangements that structure and direct actors [behaviour] in an issue specific area (Falkner, 2003).”

Environmental policy, and climate policy in particular, exemplify these trends. Command and control approaches have long been used to regulate environmental harms (and they remain a central approach). Yet, these instruments have faced criticism for their high costs, adversarial approach, and shaky effectiveness – criticisms that have occurred alongside an increased interest in, and push for, the use of market-based instruments (Durant et al., 2004). In addition, a wider array of new environmental policy instruments have gained favour, such as eco-labels, environmental management system standards and audits (Kollman and Prakash, 2001), and voluntary programmes (Prakash, 2000; Jordan et al., 2003; Lyon and Maxwell, 2007), and a diversity of governance mechanisms including private-private partnerships among businesses and non-governmental organizations (NGO), multi-stakeholder governance (Fransen and Kolk, 2007), corporate codes of conduct and self-regulation (Gunningham, 1995), and disclosure and monitoring initiatives (Andrews, 1998; Haufler, 2001). The diversity of instruments presents considerable challenges for research seeking to generate comparative lessons about their relative performance (Dupuis and Biesbroek, 2013).

Climate change is a particularly vibrant area for a proliferation of policy instruments that have been developed, administered, and promoted by state and non-state actors (Abbott, 2012; Green, 2013; Hoffmann, 2011). Yet, with few exceptions (Haug et al., 2010; Huitema et al., 2011), limited research has sought to systematically assess the effects of these diverse climate change policy instruments in practice.

Our analysis contributes to filling this research gap. Climate change is a multifaceted problem involving distinct challenges to do with slowing or stopping the emissions of greenhouse gases (GHGs) (i.e., mitigation) and changing human activities to adjust to the environmental, cultural, and economic consequences of climate change (i.e., adaptation). To narrow the scope of our analysis, we focus on policies promoting the development and use of low carbon technologies, as these technologies are widely seen as pivotal for addressing climate change (Ockwell and Mallett,

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