



ANALYSIS

Political-institutional barriers to energy efficiency



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ABSTRACT

Energy efficiency is touted as a critical component of societies' response to the challenges of climate change, economic development, and energy security. Although a rich literature exists on various impediments to energy efficiency, insufficient attention has been given to political-institutional barriers. We propose a classification of these obstacles, and group them into three broad categories: political obstruction, conflicting guidelines in the governance structure, and lack of policy coordination. We illustrate them at work on three cases where energy efficiency measures were prevented, impeded, or slowed down by some of these barriers. Although we welcome increased attention to all types of barriers to energy efficiency in recent years, efforts in this regard may be severely limited if more attention is not given to barriers of the political-institutional type.

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1. Introduction

Energy efficiency has been touted as a critical component of societies' response to the challenges of climate change, economic development, and energy security [1,2]. Substantial improvements in energy efficiency can "reduce the need for investment in energy infrastructure, cut fuel costs, increase competitiveness, lessen exposure to fuel price volatility, increase energy affordability for low-income households and cut local and global pollutants improving consumer welfare" [3, p. 36]. Energy efficiency is considered a major energy resource, as it can potentially deliver reductions in demand exceeding any other fuel output in several countries. Hence it is not merely a "hidden" fuel, but is in fact the "first fuel" [4].

There are two widely recognized caveats to this potential. First, the Jevons paradox –

the tendency for efficiency improvements to lead to increased demand – tells us that energy efficiency gains are followed by a rebound effect, diminishing the overall impact of the measures on energy demand [5]. Real energy efficiency improvements are bound to be smaller than their initial theoretical potential, and the extent of this difference can be substantial. Part of this rebound effect may not be a negative outcome, as it may simply follow from the "taking back" of energy savings in order to achieve health benefits, poverty alleviation, or productivity improvements that were otherwise inaccessible to consumers, for instance [6]. In any event, this effect leads several authors to argue that efficiency improvements need to be governed with care, for instance by being coupled with conservation policies (e.g., [7]).

The second caveat is that energy efficiency remains a puzzle to many analysts because even when they make economic, environmental, cultural, and social sense,

improvement measures often do not materialize. For various reasons, there exists an "energy efficiency gap" or "energy paradox" [8–15] (see also Refs. [16,17]).

The potential benefits of energy efficiency and these two caveats have led to rich literatures that classify barriers of various forms. These classifications helped feed studies that attempt to comprehend and empirically measure barriers to improved energy efficiency, and consequently provide more specific recommendations as to how these can be overcome. We contribute to these literatures on barriers to the adoption and successful implementation of energy efficiency measures, by focusing on political-institutional barriers. Whereas various scholars looked at barriers of different forms (economic, behavioral, organizational, and cultural, in particular), the attention to political-institutional barriers has been limited, especially in classification efforts. However, as we show in this paper, a specific understanding of these barriers can play a

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critical role, as efforts to overcome other types of barriers are likely to be insufficient without careful consideration of their political-institutional counterparts, which may prove very difficult to eliminate.

The article follows a straightforward structure. First, we review the relevant literature to situate our contribution. Second, we propose a definition of political-institutional barriers and describe what makes them distinct from other types of barriers. We then present a classification of political-institutional barriers, which we developed with the objective of facilitating the identification of specific types of political-institutional difficulties or obstacles to the adoption, design, or implementation of energy efficiency measures. Finally, to show the importance that these barriers can have in practice, we illustrate the occurrence of these barriers in three case studies in Section 4. The cases were chosen for their illustrative potential, but broad generalizations are avoided. We discuss the factors highlighted by these cases in the conclusion.

2. Methods and literature review

Spanning over more than three decades, rich literatures from various theoretical perspectives now detail barriers to – and, more recently, drivers of – energy efficiency. For our literature review, we covered – from the more general to the more specific – political economy, energy policy, and energy efficiency studies. We looked both at studies that provide classification attempts for barriers, as well as work that discusses different solutions to barriers, including recent reports from international institutions such as the International Energy Agency, the United Nations Environment Programme, and the United Nations Industrial Development Organization.

Moreover, the discussions about conceptual frameworks to understand, analyze, and address barriers to improvements in energy efficiency have been enriched more recently by empirical attempts to provide recommendations depending on firm size, country, type of activity, or sub-sector (for a summary, see Refs. [18,19]). Since energy efficiency usually has its place, to varying degrees, in the energy policy of most national governments (see Ref. [20]), several studies provide helpful insights into how the governance of energy efficiency can effectively overcome these barriers [4,21–23]. Throughout the review, we focused on the attention that these contributions have given to barriers related to political actors and institutions.

Many recent studies, including empirical work attempting to measure barriers, start from Sorrell et al.'s classification [13,14,24] which categorize barriers according to different theoretical backgrounds. In the

economic category, market failures (e.g., imperfect information, split incentives, adverse selection, principal-agent relationships) are distinguished from market barriers (e.g., heterogeneity, hidden costs, access to capital, risk). The behavioral category re-groups barriers such as bounded rationality, inertia, or values, while the organizational type includes power distribution and culture within the firm [17].

Sorrell et al., however, exclude barriers found in earlier empirical studies that stem from political-institutional factors, treating them separately as “contextual factors” [24]. Observing results from empirical studies, the authors mention for instance that “the government does not give incentive to improve energy efficiency”, ‘lack of enforcement of government regulations’ and ‘lack of coordination between different government agencies’ fail to explain why cost-effective technologies are being neglected by individual organizations” [24, p. 42]. At first glance, this is surprising: in several earlier classification attempts, part of the discussion on barriers has revolved around the role of government actors in impeding energy efficiency improvements in various sectors. In a short but oft-cited contribution, Weber, for instance, distinguished four types of barriers: behavioral, organizational, market and institutional. Of these, the latter type refers to barriers “caused by political institutions, i.e. state government and local authorities” [15]. Hirst and Brown had also pointed to “structural” barriers outside the control of the individual end-user, which included codes and standards, as well as government fiscal and regulatory policies [9]. To be sure, Sorrell et al. do argue that these factors can have an important influence, but do not consider them to be barriers, since the focus in the framework is on decisions and behaviors within firms. As a result, the discussion neglects an elaborate development of the actors and institutions external to these organizations. This is an important lack: Reddy [25], for instance, had described a more thorough list of all actors influencing improvements to energy efficiency, which included politicians, government agencies and departments, and international institutions.

Empirical studies and reviews also alternatively list some form or another of barriers linked to governmental actors, for instance insufficient enforcement of standards [26], lack of governance leadership/interest [27], weak legislation [28], limited financial incentives by the government for energy efficiency [28], lack of integration of energy and environmental issues during policy formulation [29], or non-existing labels/standards for energy-efficient products/processes [29]. Other recent studies have also pointed to different government or regulatory barriers,

but again merely provide an incomplete list of some examples found in empirical studies (e.g., [30–33]).

To our knowledge, there exists no systematic attempt to conceptualize this type of barrier and categorize the different possibilities. One interesting contribution is Cagno et al. [34], who proposed an expansion of Sorrell et al.'s framework, pointing to shortcomings and empirical difficulties. Cagno et al. introduce the notion of barriers that are “external” vs. “internal” to the firm, and leave a place for “government/politics” barriers, insisting that “regulation and policy may affect the diffusion of technologies and/or energy suppliers imposing standards or particular policies to regulate the market, modifying the price and/or the availability of services/products, as well as influencing a single firm through various policies” [34, p. 295]. However, they not only simplify this category down to either “lack of proper regulation” or “distortion in fiscal policies”, but also end up incorporating these two possibilities within internal “information” barriers as part of the empirical framework. The same can be said of Thollander and Palm's comprehensive discussion of barriers [17], which explicitly includes Weber's “institutional” barriers, but remains limited to briefly listing “codes and standards” and “government fiscal and regulatory policies” as “structural barriers”, with little development.

Another interesting attempt to provide a more complete framework comes in Reddy's “actor approach” taxonomy [35], which differentiates barriers at the micro (project) level, the meso level (related to the organizations affiliated with the project), and the macro level (state, market or society). This approach provides an important contribution in detailing the causal mechanisms linking barriers to outcomes. Reddy provides examples of barriers of the political type, which are spread across the meso level (understaffed implementing agencies, for instance) and the macro level (energy policy legislation, for instance), and argues for the identification of actors and institutions having different responsibilities and roles depending on the level of the barriers identified.

This leaves several gaps to address. It is our contention that efforts to identify and suggest ways to remove barriers to improvements in energy efficiency will remain incomplete or prove ineffective without proper consideration for barriers of the political-institutional type. Many of the contributions of these literatures downplay or give little attention to political-institutional barriers, and although some of these barriers are indeed considered by several authors, many issues remain regarding the understanding we have of them. Despite a

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