Original research article

Policy packaging or policy patching? The development of complex energy efficiency policy mixes

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ABSTRACT

The ambition of energy policy has long been to reduce carbon emissions, secure energy supply and provide affordable energy services. In recent years an increasing number of policy instruments have been introduced to promote energy efficiency in different sectors across the EU. While previous research has largely analysed the effectiveness of individual policy instruments and their impact on the diffusion of particular energy efficient technologies or practices, our analysis takes a broader view and examines the mix of existing policies aimed at stimulating reductions in energy use. The empirical focus of the paper is on policy goals and instruments aimed at stimulating energy efficiency in buildings in Finland and the United Kingdom (UK). We trace the development of the policy mixes during 2000–2014 and analyse their emerging overall characteristics. The analysis is based on a mapping of policy goals and instruments, documentary analysis and semi-structured interviews with stakeholders. We find that both countries have increasingly complex policy mixes, encompassing a variety of goals and instruments and make use of a range of different instrument types to encourage users to reduce their energy consumption. Despite the shared EU influence, the way in which the policy mixes have evolved in both countries were found to be quite different.

1. Introduction

Stimulating energy efficiency is an important part of many policy strategies aimed at addressing energy and climate policy objectives. The relative focus on energy efficiency has recently increased in many countries across Europe following EU initiatives [1]. According to the International Energy Agency (IEA), stimulating energy efficiency of buildings has a number of potential benefits which include public expenditure savings of around €30-40b across Europe as well as improved occupant health and well-being [2]. As buildings account for a 40% share of energy use in Europe, there is much potential for reducing their energy use. For example a study of the Swedish residential building stock found a maximum technical reduction potential in energy demand of 53% [3]. Similarly a study in Italy found that due to the poor quality of existing housing in the Piedmont region, potential energy savings of 77% could be achieved [4]. However, even cost effective solutions are often not taken up [5,6]. Thus, scholars have started to pay more attention to notions of a social potential for reducing energy use [7] and the limi-

tations of the conventional physical-technical-economic model [8]. Given the identified energy efficiency gap, a range of policy instruments have been introduced in many countries to help increase energy efficiency [9].

Much existing energy policy research analyses the effectiveness of the different types of policy instruments [10], often focused on the impacts of selected instruments. We argue that less attention has been paid to the mixes of policies influencing building energy efficiency, which is an important gap given the high share of energy use in buildings. Murphy et al. [11] found that while policy instrument combinations addressing the energy performance of buildings exist, they appear rather ad hoc, often resulting from EU legislation and overlapping policy aims. This indicates that from an impacts perspective, studying real-life (rather than intended) policy mixes, including their evolution over time, is of importance [12,13]. Examples of previous studies include an analysis of EU countries' National Energy Efficiency Action Plans [14], a study of interaction effects across Dutch policy measures on household energy efficiency [15], and a study of interactions in building energy efficiency policy in 14 European countries [16]. These studies focus on the current state of policies. The literature has largely focused on the analysis of single policy instruments, pairwise instrument interactions or on deliberately designed mixes, and often only capture

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snap-shots in time. Therefore, we argue that further complementary analysis is needed to shed light on the complex, real world policy mixes, how they develop over time and their emerging characteristics such as consistency and coherence. This is important as it influences their potential performance. We also argue that our paper adds value to the existing literature by providing a comprehensive analysis of building energy efficiency policy mixes in two countries and by examining how they develop over time, rather than contributing to discussions trying to identify 'ideal' policy packages (cf [17]). In doing so, we agree with Flanagan et al. [18] that there are no unambiguously 'good' mixes.

Policy mixes are "*complex arrangements of multiple goals and means which, in many cases, have developed incrementally over many years*" [19]: 395. Policy goals can be defined as the "*strategic targets defined by poli*cy actors" [20]: 397, which are not static, coherent or always even hierarchical, but often a range of goals exist that can change over time and be in conflict [18]. Policy means or instruments are the concrete tools to achieve policy goals [21]. Drawing on previous literature on policy mixes within the field of policy design, this article examines the development of policy mixes relating to energy efficiency in buildings in Finland and the UK between 2000 and 2014. The aims of the article are: (1) to describe the development of the policy mixes in the two countries over time and (2) to analyse their emerging characteristics. Our novel insights relate to introducing a conceptual perspective on the evolution of policy mixes into energy policy debates and new empirical analysis regarding building energy efficiency policies in Finland and the United Kingdom (UK).

The remainder of the paper is organised as follows: Section 2 discusses the existing literature on policy mixes and energy efficiency policy and elaborates the conceptual framework. Section 3 details the methodology. Section 4 contains the empirical analysis. Section 5 discusses the main findings. Section 6 concludes.

2. Theoretical approach to policy mixes

2.1. Energy efficiency policies and policy mixes

Many existing studies on energy efficiency policy focus on the effectiveness of individual policy instruments (or a few instruments) such as energy audit programmes [22], energy performance certificates [23], energy performance regulation [24] or market based instruments such as the UK's Green Deal [25–27]. Furthermore, previous studies have often looked at energy efficiency policies' impact on the diffusion of particular technologies or consumer practices (e.g. [28,7]) or the effects of policies on technological innovation [29]. While studies on single instruments are valuable, it is also important to consider the wider context in which instruments are designed and implemented. In order to promote energy efficiency, a whole range of instruments is required which need to be implemented comprehensively [9]. For example, complementary policy instruments are required to create a structural market for energy saving [30], while evaluations of policy instruments should take into account that "*several different measures are usually required for an effective policy mix*" [31]: 75.

Over the last decade a small but growing literature on policy mixes or interactions between different energy efficiency instruments has emerged (e.g. see [15,17,32,13,33,16]). Boonekamp [15], for example, developed a qualitative matrix for assessing the interaction effects between 15 energy efficiency instruments. A European project looked at a range of policy instruments influencing energy efficiency in the industrial, transport and building sectors [34]. Recent work has examined the coherence of the EU's energy security and climate mitigation policies including energy efficiency [33]. Rosenow et al. [16] provide an analysis of selected

building energy efficiency instruments in 14 European countries focussing on pairwise interactions of instruments at one point in time. They do not study the evolution of the overall policy mixes over time. In this literature, analysis of pairwise interactions often takes place through theoretical considerations (e.g. [32,16]), expert judgement or both (e.g. [17]). Costantini et al. [13] analyse the effects of energy efficiency policy mixes for the residential sector on patent applications and find a positive inducement effect. A good review of the literature on qualitative and quantitative methodologies employed for the appraisal of interacting energy and climate policies is provided by Spyridaki and Flamos [35].

Existing research shows that there are many problems associated with energy efficiency policy mixes. First, they are often an uncoordinated outcome of instruments stipulated by the EU and overlapping policy aims [11]. Second, the design of comprehensive energy efficiency policy mixes is complicated by the variety and complexity of end-users [1]. Third, policy mixes evolve, and there is an emerging literature on how policy mixes change over time and with what consequences for their potential effectiveness [18,19,36]. It is the latter challenge which the analysis in this article is contributing to (how mixes emerge and change over time), while others have recently contributed to an emerging literature on how to design an effective policy mix (e.g. [16]).

2.2. Conceptualising the development of policy mixes: policy packaging and policy patching

The existing literature on energy efficiency policy mixes focuses mainly on the ex-post evaluation of policy interactions. In contrast, the approach taken in this article is interested in an ex-ante assessment of policy mixes. This approach builds on the policy design literature which judges the potential effects of policy mixes on the basis of criteria such as consistency and coherence, and analyses why many existing policy mixes are sub-optimal. Howlett and Rayner understand policy design as follows: "*how specific types of policy tools or instruments are bundled or combined in a principled manner into policy 'portfolios' or 'mixes' in an effort to attain policy goals*" ([37]: 172). We draw on Howlett and Rayner [37] who define consistency as "*the ability of multiple policy tools to reinforce rather than undermine each other in the pursuit of policy goals*" ([37]: 174). Coherence is the "*ability of multiple policy goals to co-exist with each other and with instrument norms in a logical fashion*" ([37]: 174). However, goals and instruments are added to and subtracted from the mix over time. Policy makers are not completely free in their choices as policy mixes are path-dependent and typically evolve through four processes: *layering*, *drift*, *conversion* and *replacement* [36,37,19].

Layering refers to the process of adding new policy goals and instruments to existing policy mixes without discarding previous measures [37]. Howlett and Rayner [36] argue that this often results in incoherence among goals and inconsistency of instruments. In turn, "*drift occurs when new goals replace old ones without changing the instruments used to implement them. These instruments then can become inconsistent with the new goals and most likely ineffective in achieving them*" [19]: 395. Third, "*[c]onversion involves the reverse situation whereby new instrument mixes evolve while holding old goals constant. If the old goals lack coherence, then changes in policy instruments may either reduce levels of implementation conflicts or enhance them, but are unlikely to succeed in matching means and ends of policy*" [19]: 395. Finally, *replacement* describes a process in which a conscious effort is made to fundamentally restructure both goals and instruments in a coherent and consistent manner by sweeping aside old elements and designing a new mix de novo [19,36]. However, Howlett and Rayner [37] note that empirically most existing policy mixes have developed through *layering*, *conversion* or *drift*, often resulting in inconsistent and incoherent policy mixes. Situa-