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Policy analysis for energy efficiency in the built environment in Spain

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HIGHLIGHTS

- We evaluate Spain's policies for efficiency improvement in the built environment.
- We show that the policy measures in the 2nd NEEAP are insufficient to realize the savings potential.
- Especially, the policy package for existing buildings needs to be strengthened.

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ABSTRACT

Energy efficiency is considered one of the most cost effective ways to enhance security of energy supply and reduce greenhouse gas emissions. According to Europe's Energy Efficiency Plan, the biggest energy savings potential in the EU lies in the built environment. However, the many barriers to energy efficiency have prevented the implementation of the existing potential so far. This paper evaluates the existing policy instruments aimed at energy efficiency in buildings in Spain as laid down in the 2nd National Energy Efficiency Action Plan (NEEAP). The results show that the current policy package is insufficient to yield the existing energy savings potential in this sector. As much of the savings potential can be found in existing buildings and realization of this potential very much relies on voluntary action, the renovation sector is in need of an appropriate financial framework that mobilizes sufficient public and private financial resources, and transparent and efficient mechanisms to ensure the return on investment and payments from those who benefit from the renovation. Such financial framework needs to be supported by a regulatory framework that is tuned to existing buildings and an organizational framework that effectively connects the different policy layers in Spain.

1. Introduction

Energy efficiency is considered as one of the most cost effective ways for society to enhance security of energy supply and reduce emissions of greenhouse gases and other pollutants (European Commission, 2011). Even so, Europe has only set an indicative target for 2020 of 20% energy savings, while setting binding targets for greenhouse gas (GHG) emission reduction and renewable energy as part of its Climate and Energy Package (European Commission, 2010). The binding GHG target is split in the Emissions Trading System (ETS) for energy intensive industries including power (European Parliament & Council, 2009a) and the 'Effort Sharing Decision' which establishes binding targets for Member States regarding GHG emissions from sectors not covered by the ETS, such as transport, built environment, agriculture and waste (European Parliament & European Council, 2009b).

The 20% energy savings target has been determined relative to the 2007 EU Baseline Scenario (Capros et al., 2008) and comprises an EU primary energy consumption level of 61.7 EJ (1474 Mtoe) *or* a final energy consumption level of 45.1 EJ (1078 Mtoe), both figures excluding non-energy uses (European Parliament & Council, 2012, *Article 3*).[1] Even taking into account the impact of the economic recession and recent policies from the Climate & Energy Package, included in the 2009 EU Baseline Scenario (Capros et al., 2010), the EU is about to only reach half of the 20% energy savings target (Harmsen et al., in press; European Commission,

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[1] Originally the target was defined as a primary energy savings target only. It was in the new Energy Efficiency Directive (European Parliament & Council, 2012) that the final energy savings definition was added as alternative. This definition prevents interaction of additional renewable electricity from wind, solar and hydro with the energy savings target (see for an extended discussion Harmsen et al., 2011a). However, in using the final energy savings definition one should be aware of the possibility of fuel-to-electricity substitution which in final energy terms provides energy savings but in primary energy terms might lead to additional energy use in case of inefficient electric appliances.

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2011; Ecofys & Fraunhofer, 2010). The new Energy Efficiency Directive (European Parliament & Council, 2012) has been designed to close this gap. However, it is claimed by several NGOs that this Directive which was agreed upon by the European Parliament, Council and Commission in June 2012 will fail to reach the 2020 20% energy savings target.[2]

According to Europe's Energy Efficiency Plan (European Commission, 2011), the biggest energy savings potential in the EU lies in the built environment. Energy efficiency improvements in the built environment not only imply energy savings and, as a consequence, lower energy bills. According to different authors (Gago et al., 2012; UNEP: SBCI, 2009; Levine et al., 2007), energy efficiency improvements in buildings can reduce GHG and other pollutant emissions, improve energy security, stimulate the growth of new businesses and jobs, as well as, improved quality of life, health and comfort. These additional benefits might increase the economic attractiveness of energy efficiency investments. Furthermore, the contribution to other development goals allows for strategic alliances with other policy fields and provides broader societal support for energy efficiency goals (Levine et al., 2007; Convery, 2011).

Energy savings in the built environment are also topical in Spain. WWF (2010) e.g. stresses that energy refurbishments are a huge opportunity for employment creation and, therefore, key for the economic recovery, especially nowadays due to the current inactivity of the building sector and its high unemployment rates. For example, Cuchí and Sweatman (2011) state that the refurbishment of 10 million dwellings into low energy households between 2012 and 2050 would generate 110–130 thousand direct jobs in Spain.

According to Labandeira et al. (2011), energy efficiency policy is essential in Spain due to the acute energy dependence and the fact that Spain is not meeting its GHG target. The latter is confirmed in analyses by Harmsen et al. (2011b) pointing at the need of more stringent energy efficiency policies for Spain (and other Member States) to comply with its *binding* Effort Sharing Decision target for the non-ETS sectors which includes the built environment.

The aim of this paper is to assess Spain's policy package for improving energy efficiency in the built environment as laid down in the 2nd Spanish National Energy Efficiency Action Plan (NEEAP), a reporting obligation to the European Commission under the Energy Services Directive (European Parliament & Council, 2006). Our focus is on thermal energy efficiency as the thermal energy demand is most important both in Spain's residential and non-residential sector.

The set-up of the paper is as follows: In chapter 2 we analyze Spain's energy savings gap. Chapter 3 provides background information on the built environment in Spain. Chapter 4 reviews the energy savings potential of Spanish buildings. Chapter 5 carries out the policy theory reconstruction for the Spanish NEEAP and chapter 6 provides the policy assessment. In chapter 7 we finalize with conclusions and recommendations.

2. Does Spain have an energy savings gap?

The analysis of the energy savings gap has been carried out for the EU27 (see e.g. European Commission, 2011; Ecofys and Fraunhofer, 2010) but relatively limited attention has been given to individual Member States. The question is whether what is true for Europe also counts for individual Member States. We choose Spain as our study object for this article: one of the bigger EU member states for which we found no policy analysis linked to the energy savings target.

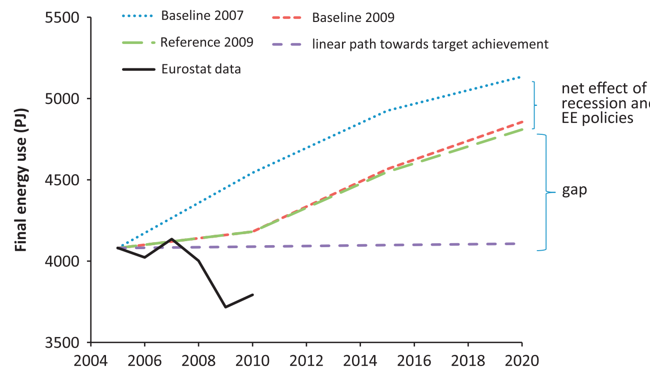

Fig. 1. Final energy savings gap in Spain (based on Capros et al., 2008 and Capros et al. (2010).

Fig. 1 shows the 2020 final energy savings gap for Spain, i.e. the amount of final energy savings in order to achieve the 20% target. This target, determined relative to the 2007 EU Baseline Scenario (Capros et al., 2008), is similar to an absolute final energy use in Spain of 4108 PJ in 2020 which means 1027 PJ of savings given the 2020 final energy use projection of 5135 PJ in the EU 2007 Baseline Scenario. According to the 2009 EU Reference Scenario and 2009 EU Baseline Scenario (Capros et al., 2010), Spain will consume 4809–4857 PJ final energy in 2020 which would leave a 701–749 PJ energy savings gap.

The fact that Fig. 1 shows an energy savings gap for Spain for both recent scenarios developed for the European Commission,[3] indicates that – at least at the level of the European analysis – Spain's energy savings policy package is judged too weak for closing the gap. It would have been interesting to add a more recent EU baseline scenario to the above analysis – especially given the fact that 2009 scenario outcomes for 2010 show considerable differences with actual energy use development in Spain as reported by Eurostat, see Fig. 1,[4]—but at the time of writing this article such scenario was not available.

Another data source for Spain's future energy use is the 2nd National Energy Efficiency Action Plan (NEEAP) (MITyC & IDAE, 2010) which was approved by the Council of Ministers on 29 July 2011 and submitted to the European Commission as reporting obligation under the End Use and Energy Services Directive (European Parliament & Council, 2006). According to the NEEAP, Spain has a final energy savings gap of 4.2%, but meets the 20% primary energy savings target (2/3 from final energy savings and 1/3 from more efficient primary energy conversion), see Fig. 2.[5] This would imply that Spain's policy package is strong enough to deliver the target which contradicts the outcome of the EU projections for Spain. We will discuss this contradiction in chapter 7.

[2] See e.g. ⟨http://www.siliconrepublic.com/clean-tech/item/27784-wwf-slams-eus-new-energy-e⟩ and ⟨http://www.euractiv.com/energy-efficiency/france-saved-energy-efficiency-d-news-513263⟩

[3] Including all new policies up to December 2009.

[4] A main explanation is the fact that 2005 is the base year for the EU projections (based on Eurostat statistics) and the data for 2010 are already a scenario result.

[5] The link between a 20% primary energy savings target and a 20% final energy savings target is the following: 20% final energy savings would result in 20% primary energy savings in case primary conversion efficiencies do not change; 20% final energy savings would result in more than 20% primary energy savings in case primary conversion efficiencies increase; and 20% final energy savings would result in less than 20% primary energy savings in case primary conversion efficiencies decrease (e.g. in case of a switch from gas to coal or in case of large scale use of carbon capture and storage).