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# EXECUTIVE SUMMARY

Energy efficiency presents a unique opportunity to address three energy-related challenges: energy security, climate change, and economic development. Past experience shows that energy efficiency has delivered significant benefits. Since 1973, if energy efficiency policies had not been put in place, worldwide energy consumption would be 50% higher. It is estimated that by 2030 up to 83 EJ more energy could be saved if a range of cost-effective energy efficiency measures were implemented (International Energy Agency, 2007a).

Yet, there is an energy efficiency gap. A significant proportion of the energy efficiency improvement potential is not realised – a result of barriers in the energy market. These market barriers inhibit energy efficiency improvements. They take many forms, ranging from inadequate access to capital, isolation from price signals, information asymmetry, and split-incentives. Though many studies have reported the existence of such market barriers, none so far have attempted to quantify the magnitude of their effect in the energy efficiency market.

This book provides a unique insight into barriers to energy efficiency. It provides a methodology and a first attempt at quantifying the size of one type of barrier to energy efficiency: Principle-Agent (PA) problems. PA problems refer to the potential difficulties that arise when two parties engaged in a contract have different goals and different levels of information. Although in some cases energy savings potentials are also analysed, the main purpose of this book is to highlight the amount of energy that is being affected by this particular market barrier.

The study draws on eight case studies from five IEA countries – Japan, the United States, the Netherlands, Norway, and Australia – in the residential, commercial and end-use sectors. In doing so, this book estimates the magnitude of energy that is affected by PA problems in each context. Analysis of the case studies provides policymakers with valuable insights into the significance of the problem and, where necessary, guidance on implementing additional policy measures to overcome these market barriers to energy efficiency.

To identify the existence of PA problems, the study looks at the affected energy use in each country and sector under consideration following a given methodology. This allows the identification of the amount of energy insulated

from the price of energy. Each case study proceeds to: *i*) identify situations where PA problems potentially exist and evaluate the roles of the parties and their transactions; *ii*) estimate the number of end-users affected by PA problems; and *iii*) estimate the affected energy use for each of the affected populations.

Overall, the study finds significant evidence of PA problems—ranging from around 30% of sectoral energy use to negligible effect in the various sectors studied. In absolute terms, the book estimates that over 3 800 PJ/year of energy use is affected by PA problems in the case studies examined – equivalent to around 85% the total energy use of Spain in 2005.

Four main policy lessons can be drawn from the case studies to help policy makers reduce the energy efficiency gap. First, small things add up. While PA problems affect little amounts of energy use at the individual level, whether landlord-tenants or in vending machines, when aggregated, the problem is significant.

Second, PA problems are pervasive, dispersed and complex. As such, no single policy instrument is sufficient to overcome PA problems. Neither regulatory mechanisms, (*e.g.* minimum energy performance standards, or regulated contract design), nor information-based instruments (*i.e.* awareness campaigns) alone will resolve them. Instead, governments should help design well-targeted policy packages to address PA problems in their specific national contexts, and within the particular constraints of a given sector. These packages should include measures to: a) address contract design to ensure end-users face energy prices, b) regulate the level of energy efficiency in appliances and buildings, c) improve access to information about energy efficiency performance.

Third, the national context plays a key role in the potential success or failure of energy efficiency policy. Important contextual factors include institutional support for energy efficiency, the price of energy and public awareness of the importance of energy efficiency. The latter two points in particular have emerged as important influences on PA problems.

Finally, evidence presented in this study is only the tip of the iceberg. With only a few case studies, this book has highlighted significant energy savings potential. Further savings are all the more likely given that this study makes a range of conservative assumptions. More systematic analysis of both PA problems and other barriers is likely to identify further significant potential savings and assist policy makers to 'mind the energy efficiency gap'.