

Smart Metering and Electricity Demand: Technology, Economics and International Experience

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In recent years smart metering of electricity and gas has attracted much attention around the world. A number of countries and regions have started deploying new metering systems; and many others have set targets for deployment or are undertaking trials. Across the board advances in technology and international experience characterize the metering landscape as a fast-changing one. These changes are taking place at a time when increasing emphasis is being placed on the demand-side in improving the efficiency of energy markets, enhancing security of supply and in unlocking the benefits of energy and carbon savings. Innovative forms of metering can be a useful tool in moving beyond a supply-focused sector and achieving an active demand-side.

In this paper we focus in particular on smart metering in liberalized electricity markets. We firstly set the context for innovative electricity metering in terms of policy, the role of market structure, and the potential for smart metering to increase demand-side participation. We then provide an overview of new metering technologies by examining international trends, the various components of smart metering systems, as well as the likely future developments.

Next we assess the economics of smart metering. First, we explore the variety of functions that a smart meter may include. We aim to bring clarity to the definition of smart metering by categorising these functions as either 'core' or 'additional' features; we also discuss the application of each of these functions to improve understanding of their benefits. The decision to invest in smart metering systems rests on a sound understanding of



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the costs and benefits and how these costs and benefits are distributed across the supply chain. We explore the main cost and benefit categories and analyse how the choice of market model can have an impact on how these are allocated to the various market actors.

There is rarely a straightforward answer to the question of whether the benefits of smart metering outweigh the costs or vice versa. This is not only due to differences in the types of available metering systems and functionality but also to context-specific deployment drivers and questions, market structure, and methodology in analysing the costs and benefits. We explore these issues by reviewing the evidence from cost-benefit studies of smart metering in Europe, North America and Australia. We compare how countries and regions have differed in their approaches and how these differences have had an impact on policy making.

We conclude by outlining the main challenges that remain, particularly in terms of technology choice and its regulation, the methodology of analyzing costs and benefits and the role of uncertainty in investment and policy making.

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