Introduction

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The European Union has the biggest open power market in the world, supported by an extended and reliable grid that has been over a century in the making. The regulation of this grid has changed significantly in recent years for several reasons. It is these changes and these reasons that inspired us to write this book, where we tell the story as we experienced it: through a European lens. The book takes stock of what we have learned along the way. It is targeted at academics and practitioners and focuses on some of the key issues that continue to be debated today.

The book consists of three parts, each of them divided into two chapters. In the first part, we treat implementation issues related to incentive regulation, that is ‘aligning the interests of the grid operators with the interests of their customers’. The analysis starts by looking at Great Britain, where the innovation of power grid regulation began in the 1990s and incentive regulation was introduced to improve the cost-efficiency of the grid operators at the transmission and distribution levels. Over the following two decades, the British model evolved from ‘RPI-X’ towards ‘RIIO’ to adapt to a changing environment with more emphasis on grid innovation and renewed attention to the quality of the grid services and the challenges posed by the energy transition. In the meantime, the British-style incentive regulation also became the main reference model for the rest of Europe.

However, other EU Member States should not blindly follow the British model. In Chapter 2 we first argue that it is important to choose a model that the national regulatory authority can handle; and authorities across Europe have different skills and resources. We then explain that the business of power grid operation is essentially a set of tasks. Different tasks have different cost and regulatory characteristics, which can require a different regulatory approach. The context also matters: one country can be in the middle of an investment cycle trying to keep capital costs under control, while another is sweating the assets to make the best use of the infrastructures that are already in place. Consequently, no panacea exists for the regulation of electricity grids. On the contrary, a

workable alignment between the regulatory tools, the characteristics of the targeted network task and the regulator's capabilities must be properly identified and implemented.

The second part of the book focuses on seam issues – that is, on the fact that in the EU there is ‘one market, one system, but many operators and authorities’. The long-standing goal of creating a single market for energy in Europe requires the coordination of the several private actors and public entities existing at the Member States level. An EU layer has gradually developed on top of the national regulatory frameworks through the adoption of subsequent ‘energy packages’. The harmonization of rules and the institutionalization of cooperation between national regulators and system operators have been repeatedly sought by European policy-makers. Some results were achieved, as shown by the adoption of common network codes and the establishment of ENTSO-E, a body gathering all the transmission network operators in Europe. Nevertheless, as Chapter 3 discusses, EU institutions as they are today do not offer an easy and fast path to the full elimination of all the seams in the European power system.

The process of market integration is not the only reason for the emergence of seam issues. The renewable push and the progressive decentralization of the power system are increasing the number of active network users. Patterns of energy flows are changing and becoming more difficult to predict. The change is particularly transformative at the distribution level, where the traditional approach based on ‘fit and forget’ is no more satisfactory. Chapter 4 zooms in on this topic and addresses the coordination problems emerging between transmission system operators and the distribution system operators connected to them. In a world of more active distribution grids, new coordination mechanisms concerning congestion management, system balancing and data handling must be agreed upon and implemented in a timely fashion. This is necessary to ensure that a level playing field in energy markets is maintained and the transition to a decarbonized power sector occurs at a low cost for network users.

In the third part of the book we explore the border between the ‘grid’ and the ‘market’, which continues to be challenged and disputed more than 20 years after the decision to unbundle the first from the other potentially competitive segments of the industry. This border is not clear-cut, but there are ‘grey areas’ where it is not apparent whether the best choice is to allow competing companies to freely provide a service or to assign a monopoly right to a single regulated firm. Chapter 5 discusses

three of these cases: should a system operator also own the grid it operates? Is the function of market operator a competitive activity or should it be subject to monopoly regulation? Is energy storage a grid asset or a market asset that cannot be controlled by the network company? These are old questions, debated since the beginning of the electricity liberalization process, that are being revisited in the era of digitalization and innovation in storage technologies.

New grey areas have emerged as well in recent times, with European power grids moving into unknown territory. At the transmission level this is the case with grids going offshore to connect wind farms, while at the local level the case is that of distribution grids developing the infrastructure for charging electric vehicles. In many European countries, regulators have used this new territory to experiment with innovative regulatory approaches, which if found to be successful can be imported to the rest of the system. In Chapter 6, the last of the book, we investigate these two grey areas and try to understand whether the experience gained so far suggests encouraging competition from new actors or rather including these emerging businesses in the franchise of the existing regulated network companies.