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Local Electricity Markets

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Chapter 1 - New electricity markets. The challenges of variable renewable energy

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Abstract

The development and large-scale dissemination of the new and variable renewable technologies took place from 1990 onwards in most developed countries, in a process led by Europe. To promote the renewable sector development financial incentives, both for investment and for the payment of renewable energy, were always present. These incentives usually consisted of guaranteed feed-in tariffs that ensured a return of the investments made in this new business—thus minimizing the financial risks and building a more attractive business for private companies in the renewables sector. That approach was the main basis that essentially supported the remarkable growth of the renewable sector in Europe in the past 30 years.

Nowadays, the renewable energy sector is already mature in most aspects. The cost of generating electricity from wind or solar (photovoltaic) resources is competitive with conventional gas or coal-based technologies. However, some challenges still exist in the transition of the electrical power sector to a desirable carbon-free, near 100% renewable-based sector—and one of those main challenges is the negotiation of the electricity generated by these novel technologies, due to the time and spatial variability of the primary resources as well as their poor predictability and dispatchability of the power generated.

This chapter addresses those challenges as well as the approaches available to overcome them within competitive electricity markets.

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Keywords

Renewable energy; electricity markets; power generation variability; variable renewable energy

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