

## BOOK REVIEWS

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*Behind and Beyond the Meter. Digitalization, Aggregation, Optimization, Monetization*, edited by Fereidoon Sioshansi (Academic Press–Elsevier, 2020). 423 pages. ISBN: 978-0-12-819951-0.

“Behind the meter” (BTM) refers to new assets and behaviours on the customer side of the electricity meter, leading to different patterns of consumption, or to generation and/or storage of electricity. It encompasses the idea that rather than everything interesting happening on the upstream or “system” side of the meter located at the customer premises, the demand side is now becoming more active and can contribute to system balancing either by changing net imports or becoming an exporter at times. Such a shift in focus has strong synergies with electric generation becoming less dispatchable, for example due to the large deployment of intermittent renewables.

Coherently with this idea, the new edited book by Fereidoon Sioshansi argues that we need to understand more about what is happening behind the meter and how it can best be integrated into the upstream system; in the editor’s words, this is the “most interesting, unexplored and potentially fertile area to explore” within the electricity sector.

The term “behind the meter” is itself not without contention in this context. Whether the new technologies and behaviours are “behind” or in front of the meter depends on which direction one is looking from. If we need to understand more about customer-side actions, perhaps we should put ourselves in the customer’s shoes, in which case the interesting thing is what happens on our side of (i.e., in front of) the meter. Using an expression such as “behind the meter” could be argued to miss the point entirely, since it adopts the industry’s perspective. Nonetheless, that is where the industry largely sits and is an accurate reflection of most of the topics covered in this volume which, with a couple of partial exceptions, present the industry point of view.

“Behind and beyond the meter” is the third in a series of collections edited by Fereidoon Sioshansi and gives a broad-ranging overview of case studies and issues arising in the industry relating to, in the words of the sub-title, digitalisation, aggregation, optimisation and monetisation of customer electricity assets. It comprises 20 chapters plus four introductory or concluding sections from a total of 45 named contributors. While organised thematically, each chapter is largely self-standing and most of them are based on case studies of one type or another, so it is a book that can be dipped into in any sequence. This swirl of concepts again is representative of the state of industry discussions on the topic, with lots of ideas and projects, not always clear which are competing and which complementary.

The compendium format does mean that the book is strongest in advocating the case studies included (often by their proponents), and less so in drawing out their weaknesses or inconsistencies between them. For example, the tension between some forms of community energy or virtual power plant models and efficient and equitable recovery of distribution costs is addressed but not confronted in the case studies. The same occurs with the potential tension between the currently valuable role of aggregation and increasing automation reducing transaction costs.

As a former regulator I may be biased, but the foreword and preface of the book, each written by current regulators (from NVE and CRE), are a great start to the book, concisely

outlining the policy and regulatory issues for the sector associated with behind the meter developments. The imagery of moving the distribution grid from a “black box” of connect and forget to a “coloured box of complex opportunities” sets up the pattern of the following chapters, each drawing snapshots of particular colours.

Part 1, titled “Visionaries, dreamers, innovators”, provides a range of case studies from an individual house, to aggregators, platforms and diverse business models. The detail of technologies applied to an individual house to get to a zero net energy position is fascinating, but far removed from most households and with gross imports of over 12,000 kWh from a mainly fossil fuel fired grid, more carbon intensive than the great majority of homes (despite claiming “carbon neutrality”).

Part 2, “Implementers and disrupters”, mostly continues the approach of each chapter describing and assessing a particular case study, with examples from Germany, Australia, USA, UK, Austria and a European survey of smart meters. It includes more analysis, particularly in chapter 8 on “what’s in it for the system?” which starts to develop the economic impacts of alternative behind-the-meter approaches. Chapter 9 then develops insights about consumer behaviour and technology diffusion, recognising that the characteristic S-curves have little predictive power – “more a muddle than a model”. Applying the analytical framework from these chapters gives the reader clearer insights on the case studies throughout the previous and remaining chapters.

Part 3, “Regulators, policymakers and investors”, has a more academic flavour, focusing on issues such as tariff design and price response, giving a clear sense of the current state of the art. The penultimate chapter (19) finally centres on the customer perspective, addressing the 2.2million+ solar roofs in Australia and asking “what’s in it for the customer?” and how this varies across different states and customer types. Interestingly, the analysis suggests that what drove Australians to invest in solar roofs will not necessarily hold for other behind the meter technologies.

As Jesse Scott noted in her review of Sioshani’s previous compendium, “Consumers, Prosumers, Prosumagers” in this journal (Volume 8, Issue 2, September 2019), after reading the book I cannot refrain myself from observing that the electricity industry looking inward will only raise some of the relevant issues and we would strengthen our understanding through better engagement across sectors. However, for those coming to the power sector from other industries and backgrounds, this volume provides a thorough survey of the issues arising from “behind” the meter. As the epilogue highlights, decentralisation and digitalisation are surely well underway, along with activation of new interactions, whether through aggregators, platforms or other means, justifying the initial claim of the book to cover most interesting and fertile territory.

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