

Earlier, in § 3.2.5, Léautier draws the important distinction between reliability, the responsibility of the system operator, and adequacy, which under some rather optimistic assumptions, might be left to the market. Now in Chapter 9, Léautier argues that there is no sound micro-economic case for a capacity market. The detailed list of arguments put forward in defence of capacity markets is fair and each argument is elegantly rebutted, concluding that the only remaining defence is as a legitimate political choice. This is to ignore the most important argument, that generation investments are highly durable, often with lengthy construction periods, while futures markets are lacking for more than two years ahead. Missing futures markets (often with a failure to properly price the full range of ancillary services) in an industry more than usually subject to the vagaries of political and regulatory distortions (as frequently described in this book) means that the risk and hence cost of capital will often be unacceptably high. That said, the discussion of how to design capacity markets and variants such as reliability options is excellent.

The final chapter is a succinct and wise summary of what we now know about the economics of electricity markets and how their design can be improved, arguing for an energy-only locationally priced wholesale market with proper CO₂ pricing. One can (and I do) take issue with this, but Léautier is sufficiently clear about his arguments that he provides the tools with which to reach possibly different solutions. He also accepts that policy makers “must find reasonably efficient compromises between economics and political realities”. I would argue that economics is more nuanced than this book often suggests, but as a clear demolition of faulty economics this book has few if any equals.

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Consumers, Prosumers, Prosumagers. How Service Innovations Will Disrupt the Utility Business Model, edited by Sioshansi Fereidoon (Academic Press–Elsevier, 2019). 550 pages. ISBN: 9780128168356

If you are curious about the future potential of distributed and digitalised clean energy, you will be fascinated by this book. If you want to believe in the continued success of today's electricity utility business model, you might find it rather uncomfortable to read. Fereidoon Sioshansi's latest edited volume explores how units as small as households can become energy owner-user-managers with their own mini-systems and business relationships. To describe the possibilities, he and his co-authors coin a new word: “prosumager.”

More ambitious than the now familiar solar prosumer, a prosumager considers the full range of currently available technologies and invests additionally in their own distributed storage and smart energy management systems. The heart of the book is a discussion of the implications of that choice.

On the one hand, installing storage means that this group will be “even less dependent on the distribution network” than prosumers. On the other hand, in their “more exotic” variants prosumagers may nonetheless sometimes wish to use public distribution networks to “trade or share their energy generation and consumption imbalance with others” on a peer-to-peer basis. Think of transactive or community projects.

Although today prosumagers are “miniscule in number,” Sioshansi is confident that the phenomenon will grow “as innovators take advantage of lower costs and improved technologies to carve out profitable niches.” Consequently, greater and greater energy consumer/actor stratification is “a matter of time.”

This is a project of fifty-six co-authors. Together they have assembled a superbly rich up-to-date compendium of examples. Many of the case studies are from the cutting-edge: pilot-scale projects, mainly in geographies that are friendly to behind-the-meter—sunny, prosperous and spacious California and Australia (in Australia 20% of residential customers now have rooftop solar). In particular, the authors are interested in new intelligent digital control systems, and how these can enable coordination and optimisation of myriad heterogeneous small distributed assets. As they note, the key to smart demand is to smooth automation to minimise “input from or inconvenience to” human owner-users and the grid.

The authors also investigate the potential implications of stratification for business model change and market regulation.

Sioshansi’s title declares that prosumagers will “disrupt the utility.” The analysis of business experiments (few are yet commercially proven) however casts a wide net, looking both at opportunities for utilities to offer service innovations that can suit the needs of prosumagers and at digital energy start-ups. This breadth is valuable: the examples span energy aggregation, the bundling of different energy and non-energy goods into attractive packages, sophisticated monetisation, charging for access to micro-trading platforms, and arrangements that guarantee a customer peace of mind amid the increasing complexity of the new energy landscape.

As is to be expected with any early adopter or peer-to-peer phenomenon, the authors find a role also for “social value stacking” to combine financial and nonfinancial consumer propositions, notably by “tokenising” environmental and other ethical values. Here I found myself thinking about Michael Grubb’s argument in *Planetary Economics* (2014) that renewables and prosuming are transformative in part because they mean that electricity ceases to be an undifferentiated and undeliberated commodity. Social stacking in electricity is the equivalent of selling food with organic certificates or at local farmers’ markets.

Many of the book’s authors are specialised in regulation and market design. They are intrigued to explore how prosuming challenges today’s framework and principles and introduces new conundrums. In what ways are existing regulations a barrier to exotic innovation? Will prosumagers “make good choices” or will their interests and actions compromise the functioning of the public network and therefore societal fairness and equity? One clear conclusion from this analysis is that regulatory regimes that have “worked so well for decades are struggling to keep pace” with the new grid-edge.

Chapters 2 and 8 explore how the “new dynamics” of distributed energy and demand flexibility are requiring a rethink of tariffs and the electricity system architecture. Tariffs, “historically designed to recover costs within acceptable social and regulatory goals of equity, understandability, and volatility” now need “to serve a new purpose: engaging demand to help the system achieve an efficient mix of resources.” Moreover, to avoid network congestion and/or expensive infrastructure upgrades, tariffs should seek to distribute balancing services “close to distributed generation” to minimise bidirectional flows of energy over the network. This is the grid world turned upside down: there is still a key role for utilities—but it is not one that all of them will want to recognise.

I had the privilege to participate in a workshop with several authors shortly before this book’s publication. That meeting provided a brilliantly clear one-line summary of the business

and regulatory implications of prosumer activity: in the words of co-author David Shipworth “in P2P, your legal status may change when the sun shines.” The more formal conclusion of the book is that “The new world offers new opportunities but also adds new complexities. Those who can navigate the complexities welcome the opportunities.”

There are limits, of course, to how thoroughly even a 550-page volume can discuss the diversity of the current forces for change in energy provision, management and use. Will solar-with-storage-and-smarts really be able to revolutionise systems in northern Europe’s un-sunny and densely populated apartment block cities? Will nifty start-ups and regulatory refinements really be the key drivers of energy system disruption under the larger imperative of net-zero decarbonisation targets? What would the #schoolstrike kids make of this focus on market-driven change?

Another caveat is a question that I ask myself more and more frequently: how far can we meaningfully discuss the future of electricity systems when the voices in the room are only those of the electricity sector? Cars are mentioned as a factor for prosuming but only chapter 18 looks closely at charging. Yet we know that vehicle manufacturers are acutely interested in the same opportunities as utilities—and that they bring big balance-sheets and large policy lobbying muscle. Similarly, the telecoms sector and the “FAANG” ICT giants (Facebook, Apple, Amazon, Google, Netflix) surely belong in this discussion, although noting that they are less interested in electrons as such than in the data that individual electricity consumers and appliances can now generate.

Similarly, the energy world has learned a lot in the last few years about digitalisation and its impacts. But there is not yet a shared dialogue with the wider digital community—at least, the energy debate does not share the vocabulary of the Silicon Valley developer and does not seem at home in that context. It is a little strange to read a book about digital business innovations without frequent repetition of the words “minimum viable product.” “Platforms” are sometimes grids and sometimes the phenomenon of new marketplace apps that link seemingly unrelated sectors and—as MIT notes—“virtually always win” the competition with the conventional market-maker. Cybersecurity is mentioned only in passing.

Finally, throughout this book there is an interesting ambiguity about how far the coming disruption in electricity systems will start with technology change or simply with unhappy customers. This might be worthy of more analysis: a recent thought-provoking article by Thales S. Teixeira in the *Harvard Business Review* (06/2019) finds that while CEOs think that technology and start-ups drive business model change, objectively “the most common and pervasive pattern of disruption is driven by customers.” Teixeira argues “They are the ones behind the decisions to adopt or reject new technologies or new products. When large companies decide to focus on changing customer needs and wants, they end up responding more effectively to digital disruption.” His examples are from many sectors: loans, video games, mass retail, hospitality, news, auto transportation, personal grooming, commercial real estate, insurance, payments, audience measurement, luxury handbags, pharmacy, telecoms, and B2B software. Energy, however, is yet to be examined. The question of how electricity incumbents understand disruption, and how best they can respond, perhaps deserves more discussion in the next work in Sioshansi’s lively series. I look forward to reading more.

References

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