

R. W. Sandwell, ed., *Powering Up Canada: A History of Power, Fuel, and Energy from 1600*. Montréal: [McGill-Queen's University Press](#), 2016. xi + 482pp., map, figures, tables, plates, appendices, notes, bibliography, index. Cloth; ISBN 978-0-7735-4785-8, Cdn \$120.00, Paper; ISBN 978-0-7735-4786-5, Cdn \$ 37.95.

As we turn on our computers to write our book reviews, most of us probably give little thought to the source of the energy which powers our machines. Depending on the part of Canada we live in, our computers, lights and appliances may draw their power ultimately from massive hydro-electric dams situated some hundreds of kilometres away from our desks, gas-powered facilities using petroleum from Alberta, Saskatchewan, or (for most Canadians) overseas, or in Ontario, Québec and New Brunswick, from nuclear power plants. It is less likely today that our electricity comes from Pennsylvanian coal, although that would have once been the case for many people in the most populous parts of the country. Ultimately, we probably don't care much about the source of our power. Electricity looks the same from each source, even if we may recognize the different implications of each mode of production, especially after reading this essential collection of essays on Canadian energy history. A rare few of us may draw our electrical energy from the sun or from wind power, and if this is the case, we can perhaps even point to the location at which the energy is produced. But, as these essays show us, the provision of energy often depends on complex networks, most of which are hidden from our view and understanding.

Other historic power sources were much more intuitive. We know that food allows us to exert ourselves, and we can appreciate that it did the same for the animals that many households used to employ for heavy tasks, with horses able to provide about ten times more power than a human. Firewood is by definition tangible. As Joshua MacFadyen comments, "Trees are nature's solar energy batteries" (133). We can feel the wind, and we can see the force of water that may turn a wheel. But that direct connection to energy production is largely in the past.

Canadians are like many other people in industrialized countries that benefit from relatively inexpensive energy. And we want to access it by paying even less, an indication that we see this type of energy as a right. In the most recent Ontario election, all three main parties campaigned on lowering electricity rates. Without a doubt, the expansion in types and amounts of energy has changed Canadian life in an extraordinary fashion. As editor Ruth Sandwell points out, the Canadian experience is noteworthy because of its high levels of per-capita consumption, but also because "it is one of the few industrial nations firmly entrenched as a net exporter of energy" (15). This collection of essays provides a baseline for work in the field, and it offers a new and unusual periodization of Canadian history. In key ways, the book underscores key trends in Canadian business history: the importance of government subsidies, state regulation or lack of regulation, questions of national autonomy, and (conversely) dependency on other countries.

When I taught my fourth-year Canadian environmental history course in 2017, I started with two of the plates from this book. These are derived from research by Richard Unger and John Thistle, and they graphically display the changes in energy consumption from 1800 to 2010. In these graphs, a new way of envisaging Canadian economic history is on display. The first plate looks at the absolute amount of energy produced through various forms. Here the stability of amounts is apparent until around 1941. At that point, the total amount of petajoules consumed

annually by Canadians reached 2,000, and it thereafter underwent a dramatic “take-off” that continued until 2001, reaching 11,000 petajoules. Even taking into account the tripling of the Canadian population from 1941 to 2001, the increase in energy use was dramatic. (The graph shows a decline in energy consumption by 2010, perhaps reflecting greater energy efficiencies and also the economic downswing.) A second plate shows the components of energy provision across time. Here the distinctiveness of the Canadian experience is apparent. As late as 1891, the majority of Canadian energy came from firewood, and it remained a substantial component, greater than hydroelectricity, as late as 1951. Working animals remained prominent well into the twentieth century, as two of the chapters in this collection detail. Essentially, these essays explicate these two graphs, and they go far beyond them in exploring the implications of the different forms of energy.

The insights are numerous throughout this book. Food as a way of powering human energy is often taken for granted, but George Colpitts shows how pemmican (bison meat and fat) allowed fur traders to travel further into the west and the north, and it illustrates the close links between commercial expansion and the bison hunt. Pemmican was a much more productive food source than the corn carbohydrates, peas and lard upon which voyageurs had previously relied. Likewise, in a country blessed with expansive forests, firewood heated homes and cooked food. But it had its own dynamic, as sources inevitably declined closer to places of use, and individuals had to transport the wood for longer and longer distances.

Following E.A. Wrigley, the book is divided into two sections: “The Organic Regime” and “The Mineral Regime”. The contributors recognize that coal, petroleum, and gas are ultimately organic as well, and hydroelectricity too has similar origins in nature and the sun’s energy. Only nuclear power, once heralded as Canada’s principal contribution to energy modernity, stands apart from the others, and Laurel Sefton MacDowell shows how the long-term consequences of this form of power have still not been adequately addressed.

This book is particularly good in examining the repercussions of the different forms of energy. Some of these require extensive technological networks which could be more expensive than the energy source itself. As Colin Duncan and Ruth Sandwell show, manufactured gas networks in early twentieth century cities provided lighting for houses, but it was difficult to measure usage. Gas companies tended to charge for the provision of the energy source, not count its usage, thus entering into conflict with consumers who wished to be charged for the energy that they actually consumed. Andrew Watson’s chapter on coal shows how this form of energy came to predominate for a specific period, but how Canadian resources, located in Cape Breton, Alberta, Saskatchewan and Vancouver Island, were usually not located close to the main markets. Nonetheless, coal represented a game-changer as an energy source, as it contributed “an immensely increasing proportion of total energy consumed, and add[ed] to the remarkable increase in the scale of energy used” (214). A number of chapters show the importance of state sanction and support for particular energy regimes, such as the government’s decision to subsidize coal shipping in the 1930s as a way of addressing the impact of the depression on the coal mines of Cape Breton.

The chapters are often based on extensive use of census materials, as the Canadian government liked to collect data on most forms of energy (but not commercial firewood). Each chapter also

goes beyond the quantitative evaluation of the energy course. Steve Penfold's chapter on petroleum liquids reveals most clearly the cultural impact of that form of power: "Beginning with its natural qualities – an energy-dense liquid stock that could be easily transported and could be processed into many forms of useable fuel – humans built oil into a total system with considerable momentum, touching an astonishing range of human activities" (296).

More than most edited collections, this is a strongly coherent set of essays, reflecting the project's conception as a means of conveying the shifting energy characteristics of the country. These are rich contributions that should stimulate much thought about the ways in which Canadians have engaged with the economic sphere around them. As Eric Sager writes, "Change in the utilization of energy sources is a product of culture and the social relations in which economic change is embedded" (171). Energy is a key point for re-examining the economic history of a country. The longevity of what one might consider more sustainable forms of energy, (such as fire wood and animal power), illustrate fundamental elements of the distinctive historical trajectory of Canada.

Colin M. Coates
Glendon College
York University