Jean-Baptiste Fressoz. 2024. *More and more and more: An all-consuming history of energy*. London: Allen Lane. ISBN 9780241718896. Hardcover £25.00

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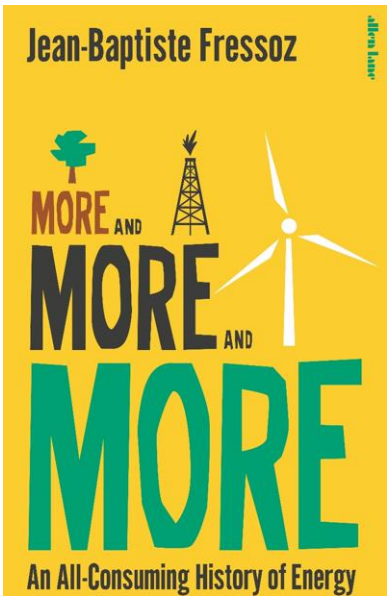

Energy studies, and the corporate and governmental agendas attached to it, has stultified the social sciences. Political ecology, while hostile to the false claims of sustainable development, has—more often than not—accepted the teleological and substitution position of "energy transition," and its accomplices "renewable energy," "clean energy" and "green energy." The simplified narrative of energy transition, which combines the profitable hopes of green capitalism with pacifying the existential concerns of urban inhabitants, academics among them, makes Jean-Baptiste Fressoz's new book, *More and more and more: An all-consuming history of energy*, a foundational and necessary read.

Fressoz is a Senior Researcher at the French National Centre for Scientific Research (CNRS) and has a monthly column in *Le Monde* newspaper. *More and more and more*, is their fifth book and was translated from *Sans Transition: Une Nouvelle Histoire de l'Énergie*. The book contains an introduction, twelve chapters and a conclusion. The book has already received the 2024 EcoloObs Prize and The Political Ecology Foundation book award from CAPE (American Association of Geographers).

The introduction critically assesses the energy history literature, refuting the notion of "energy transition." The book demonstrates "why all primary energies have grown together and why they have accumulated *without* replacing each other." The book denounces the mainstream narrative that "climate crisis demands that we continue the history of capitalism and innovation, even accelerate it, to hasten the advent of a carbon-free economy" (p. 2). The book refutes the notion of energy transition, techno-solutionism and advocates for "energy amputation" (p. 13), thus aligning with features of degrowth.

Refuting the Nobel Prize winning economists William Nordhaus and Paul Romer, Chapter 1 begins by recounting the developmental history of candles, which involves the entails materials such as stearin, slaughterhouse fats, nitroglycerine, whale fat, palm oils, rapeseed oil, kerosene, jojoba tree and oil. The chapter, among other things, reminds readers of the oil industry's farcical claim that it reduced the slaughtering of whales. The chapter, moreover, shows a symbiosis of candles with other energy technologies, meanwhile drawing on available data to show that "gas has consumed twice as much energy as candles and oil lamps to produce half as much light" (p. 25). In this chapter, Fressoz discredits the idea of energy transition in the 18th and 19th century by showing how the production and consumption of materials has never changed due to "technological innovation," instead synergistically accumulated (p. 16).

Chapter 2 debunks material stage-ism, documenting the unsubstantiated marketing related to "the age of steam, the age of steel, the age of coal, the solar age, and so on (p. 31, 42). Drawing on data from the time, Fressoz shows how hydroelectricity would only save "100 tonnes of coal thanks to its rivers," which was meager compared to the "200 million tonnes burned at the time" (p. 38). While discussing Stanley Jevons, Peter Kropotkin, August Bebel, Lewis Mumford among others, Fressoz demonstrates how "[m]aterial-stage history provided a convenient alibi for intellectuals" to justify their work, employing "intellectual tactics [that] are ancient, commonplace and constantly renewed" (p. 39). Developmental and material history, Fressoz impresses, are "not of phases and ages, but of stratification and symbiosis" (p. 42).

Material symbiosis "and relationships of mutual dependence" of wood and coal are explored in detail in chapters 3, 4 and 5 (p. 42). "Without abundant wood," explains Fressoz, "Europe would simply have had no coal, and hence little or no steam, little or no steel, and few or no railways" (p. 55). Rooting chapter 4 in how the 1851 Crystal Palace/Great Exhibition in London was seemingly built primarily of steel and glass, we are reminded of the profound dependency these materials have on wood in their production. The possibility of oil

extraction cannot exist without large amounts of coal, wood, human labor and much more. This sets the stage, in Chapter 6, to debunk Timothy Mitchell's (2023 [2011]) *Carbon democracy* that explored the governmental implications between the "supposed transition from coal and oil" (p. 86). Reflecting on datasets, scholarly works, and events, Fressoz shows how Mitchell wrongly: (1) "compares oil and coal at different moments in their history" (p. 86); (2) "neglects the importance of the international coal trade, which, in the 1950s, still surpassed that of oil" (p. 89); and (3) furthers a specific material thesis. Refuting Mitchell, Fressoz points out how the "miners were not defeated by oil [as Mitchell claims] but by the army, redundancies and foreign coal" (p. 91). Overall, Fressoz shows how Mitchell transposed Thatcher's 1984 offensive against coal miners to the rest of history.

Demonstrating the profound importance of trees within industrial production, Chapters 7 and 8 show that "[e]ven if invisible, wood is omnipresent" in the production of steel, oil, and their logistical infrastructures (p. 104). The hybridization of wood with petrochemicals to produce plywood, plasterboard, particle board, and, later motivated by war, wood pallets and corrugated cardboard revolutionized shipping logistics and shaped urban planning. This goes further: all timber extractivism was accomplished with machines that "depended on oil to produce this wood." Fressoz reminds us that a "tree harvester burns 10 to 15 liters of diesel per hour" (p. 119) and, citing a recent study, that "2 to 3 liters of diesel are consumed per cubic meter of wood extracted, meaning that wood has become, in part a fossil fuel" (p. 119). Said simply, "there has never been an energy transition out of wood" (p. 125). Discussing the forebears of energy transition, Chapter 9 outlines the Social Credit in England and Technocracy movements in the US. The predecessors of degrowth studies and Elon Musk, the Technocracy movement advocated universal wages, hydrological dams, powerlines, nuclear power and, of course, energy transition. From the technocracy movement, it was atomic scientist Harrison Brown, in 1967, who coined the term 'energy transition.' Chapter 10 discusses the struggle between nuclear development and hydrocarbon industries, revealing the utopianism, fears and numerous scientific and material problems related to nuclear power transition. The reciprocal connection between nuclear scientists, the fossil fuel industry and ideas of the 'limits to growth' are unexpectedly intimate.

Chapter 11 shows how the 1973 energy crisis furthered the political importance of "energy transitions." Against reality, policy makers and experts continue to believe based on limited data, (flawed) estimations and modelling that nuclear, solar and wind can substitute hydrocarbons, ignoring that their entire production depends on them. Focusing with greater detail on climate change, Chapter 12 discusses the mythical carbon benchmarks employed by The Intergovernmental Panel on Climate Change (IPCC), Exxon Mobil's energy transition as climate denialism, the US governments' instrumentalizing of the IPCC, and faults within climate modelling, which resulted in obsessions with so-called green finance and geoengineering. The concept of "sustainable development" emerges as a byproduct of energy transition discourse, enabling an energy specialist to contend that: "There is no conflict between global warming and economic development" (p. 201). This is why Fressoz concludes: "'Transition' is clearly not the cause of climate resignation, though it is merely its justification" (p. 211).

Fressoz concludes by briefly reviewing wind and solar power statistics; "green steel;" the cement industry; plastic production; hydrocarbon industries deploying wind energy in their operations; smart phones; the challenges of mining raw materials; and the cost estimation to accomplish energy transition. Refraining from pitching solutions to the reader, Fressoz provides ardent assessment, highlighting the dangerous and immense "seductive power of transition" that "justify [the] present procrastination" on socioecological and climate issues (p. 220). To summarize the key message of the book: If there is any chance at adequately mitigating climate catastrophe, then degrow material and energy consumption.

This rigorous historical overview, summary of scientific debates and studies combined with a sharp analysis establishes *More and more and more* as a mandatory classic. While Fressoz's main point remains humble and common sense—"the entanglement and symbiotic expansion of all energies" (p. 9)—most social scientists, and even political ecologists continue to uphold the myth of energy transition. *More and more and more* rightfully deserves high praise, imparting fundamental historical realities that live into the present. Anyone interested in capitalism, energy development, degrowth, and extractivism should read this book because it breaks a myth, common in academia, that perpetuates (green) capitalism and, consequently, socioecological catastrophe.

While the book draws on a repertoire of studies and statistics, it remains significant that Fressoz acknowledges the conservative, tenuous, and often faulty realities inputted into models. This is exemplified by

debunking countless models justifying energy transition by excluding materials, anticipating substitutions (that would never exist), making assumptions, and omitting various realities related to energy production. This debunking naturally extends to breaking down ideologically driven historical studies of various overlapping, and differing, political persuasions—liberal, Marxist and technologists—that, in the case of Mitchell (2023[2011]) and, in passing, Malm (2015), were demonstrated as materially simplistic, technically inaccurate and politically romantic, especially in matters of hydrological, wind, and solar energy extractivism.

There remains, however, a least one subtle, negligible oversight. While the book is dedicated to revealing the mutually dependent "entanglement and symbiotic expansion of all energies" (p. 9), Fressoz still employs the word "renewable energies." This, in fairness, was artfully minimized throughout the book and were often quotes from other people, which combines with their critique of electric vehicles, wind, solar and hydroelectric energy and their complicity with modernist expansionism. "This book," Fressoz declares, "is not a critique of renewable energies," instead it is about how "the concept of energy transition is preventing us from thinking properly about climate change" (p. 2). This early denunciation, while it might have strategic value for readers unfamiliar with this topic, seems rather contradictory. Ideas of energy transition, sustainable development, "clean," "green" and renewable energy cannot be separated so easily. In fact, they are mutually constitutive of each other and reinforce (green) capitalist extractivism and consumerism.

The idea of calling large-scale, intensive industrial technologies—requiring the full gamut of heavy production processes—"renewable energy" remains another (modernist) political technique that is foundational—and instrumental—to the concept of energy transition. Without hydrological, wind, solar, biomass, forestry, agricultural and uranium energy extractivism—which are all pitched as renewable energies—then the concept of energy transition has no substance and nowhere to stand. Renewable energy remains the simplified technological narrative that generates profit and calms the existential concerns of urban inhabitants. The marketing, and subtle photographic portrayals (Ulloa, 2023) promoting the false dichotomy between hydrocarbons and lower-carbon infrastructures continues to plague industrial societies to advance state control and, more so, market growth.

This concern does not suggest that renewable energy is not possible; because it has been and continues to be. While lower-carbon technologies (as the book acknowledges) are essential for any—pluriversal and degrowth-style—socioecological transformation, what is popularly understood as "renewable energy" is far from it (Dunlap, 2018, 2021; Dunlap *et al*., 2024). The term "renewable energies" implicitly suggests that wind, solar, hydrological, tidal wave and other so-called 'green' infrastructures are somehow separate from the production of cement, steel, plastic, carbon composites, wires, digital systems, coal, oil, natural gas, nuclear energy, transportation corridors, energy grids and, lesser considered, the prison system that recycles electronic discards with interned labor. Like the idea of energy transition, so-called renewable energy performs an intervention to influence imaginations to believe in green capitalism and modernism. While "fossil fuel+" was designed to alert the climate justice movement to the complex harms of so-called renewables, "lower-carbon infrastructures" expresses a slightly more accurate general term (Dunlap, 2018, 2021). It remains urgent, as the book indicates, to accurately destabilize the concept of energy transition, but also everything that props up this myth.

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