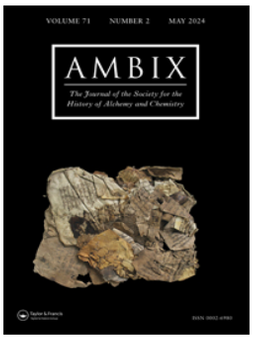

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Ketens van Fossiele Grondstoffen: Procestechnologie en de transitie naar duurzaamheid

By Ton van Helvoort. Pp. 357. Amsterdam University Press: Amsterdam. 2024. £29.60. ISBN: 978-94-6372-478-4.

Frank Veraart

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Book Review

Ketens van Fossiele Grondstoffen: Procestechnologie en de transitie naar duurzaamheid. By TON VAN HELVOORT. Pp. 357. Amsterdam University Press: Amsterdam. 2024. £29.60. ISBN: 978-94-6372-478-4.

What efforts are necessary to wean the chemical industry off its fossil addiction, and which paths are already being explored? Ton van Helvoort's *Ketens van Fossiel Grondstoffen* ("chains of fossil resources") delves into the significant challenge of transitioning the chemical industry away from its reliance on fossil fuels. This book seeks to provide answers through a historical lens, tracing the development of the chemical industry to address the essential resource transition. From a Dutch national perspective, Van Helvoort examines the evolution of chemical process technology and industrial complexes. Spanning nearly three hundred pages, the book takes readers back to the origins of chemical process technology driven by coal, oil, and natural gas extraction, which laid the foundation for our fossil-dependent society, from vehicle fuels to plastics for packaging and everyday items.

Van Helvoort provides a thorough exploration from the viewpoint of Netherlands-based chemical companies like DSM, Shell, Dow, DuPont, and others that led to the formation of petrochemical clusters. The author extensively discusses the role of research, advances in process technology, experimental phases in pilot plants, and the efficiency improvements in factory construction and expansion. By-products from chemical processes led to further diversification and integration with other processes and products, creating tightly interconnected industrial clusters.

In the second half of the book, the author addresses how this fossil-based Gordian knot is being untangled. He explores and comments on the initiatives these companies are taking in response to increasing environmental and climate demands, often through public-private collaborations. The book offers a comprehensive overview of national and European environmental and climate policies and how they co-shaped changes in the chemical industry. It describes the emergence of new collaborations between companies, governments, and research institutions. Van Helvoort provides an extensive review of various possibilities and challenges in the search for new resources. Biomass and plastic waste streams, which can be processed into new chemical feedstocks through gasification and pyrolysis, represent new raw materials for industry. Additionally, hydrogen and sustainably generated electricity emerge as future energy carriers. The discussions of the physical and chemical possibilities and limitations of these new raw materials offer fascinating insights into their potential applications. For instance, it becomes evident that even the more controversial biofuels – those that cause deforestation and compete with food supply – will likely remain necessary for specific applications requiring high temperatures in chemical processes and as fuel for aviation.

The book concludes with a compelling reflection on the resistance, evasive manoeuvres, and challenges in transitioning to a fossil-free petrochemical industry. Here, Van Helvoort critically evaluates carbon capture and storage (CCS) as a "dead-end" solution that only prolongs existing interests and technologies (p. 291). He also reflects on eco-modernism and the de-growth debate in his final chapters, providing a better understanding and untangling of contemporary discourses from proponents and opponents alike.

The book reads like a socio-technical study that uses the history of science and technology to engage with transition and policy studies. The historical long-term perspective convincingly underscores the entangled nature and interdependencies of chemical industrial complexes. The book offers a counterbalance to many transition studies that tend to focus on radical changes in technological niches. In contrast, Van Helvoort focusses primarily on the actors of the existing regimes – companies, research institutions, and process technology itself –

as central to his narrative. These are slowly evolving through numerous path dependencies and lock-ins, towards climate neutrality. The book provides an excellent overview of past technical and policy developments, with numerous examples showcasing the interplay between technical possibilities, process choices, and preferences. It also offers a solid historical and contemporary overview of policy measures and intentions impacting technological developments. However, the insider perspective on process technology means that other actors receive little explanation – for example, policy measures and societal responses are presented as a scenery against which chemical process technologies and the search for new resources develop.

The book's distinct focus on developments in the Netherlands leaves only a brief treatment of the "upstream" part of resource chains outside the country. It pays no attention to historically entrenched global economic inequalities or social and environmental impacts on the people and places involved, from Asia to Africa and South America. Alternatives to products and production methods outside the chemical process industry are not part of the described developments and their expectations. Similarly, the "downstream" perspectives on consequences for users and their reactions are treated as afterthoughts. Agency is primarily attributed to researchers, companies, universities, and policymakers. The specific Dutch focus helps to highlight and deepen specific cases, but it also gives the book a nationalistic character which, given the many international links and the transnational interconnectedness of the chemical industry, has a somewhat alienating effect. The language is pitched at a broad audience, but the "we" in the book seems to be those interested in the development of chemical process technology – the engineers, policymakers, academics, and journalists shaping or studying this process.

Beyond the limitations imposed by its focus, *Ketens van Fossiele Grondstoffen* remains a very interesting and informative book that illuminates the contemporary dilemmas and challenges from within the chemical communities and its stakeholders. The "chains" of the title gradually become apparent: the book not only follows the global chains of fossil resources but also indicates that, in attempting to forge more sustainable alternatives, we are still chained to developments in chemical process technology, which imposes its own boundaries of scope, pace, and directionality.

Overall, Van Helvoort's work provides profound insight into the intricate web of interdependencies within the chemical industry, offering a vital perspective for anyone interested in the intersection of chemical process technology and sustainability transitions.

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Frank Veraart
Eindhoven University of Technology