

Process Industry Economics: Principles, Concepts and Applications, 2nd Edition

By D. Brennan

Elsevier Inc., Amsterdam, Netherlands, 2020, 285 pages,
ISBN: 978-0-12-819466-9 (Paperback \$190.00 from Elsevier),
ISBN: 978-0-12-819560-4 (eBook \$190.00 from Elsevier)

Reviewed by Jonathan Verrett

University of British Columbia

David Brennan's introductory chapter of *Process Industry Economics* opens with a quote by the author: "Economics encompasses all things and all people." Trying to create a summary for such a complex topic is a challenge, and yet the author succeeds in doing so in a succinct and organized fashion. The book presents relevant general principles and highlights these using illustrative examples from various industries. It remains concise by providing relevant references to further resources rather than being exhaustive. This is likely a necessity when trying to provide a general guide for a subject as intricate as process economics.

The second edition is a lightly updated version of the first edition published in 1998. The chapter structure and main concepts remain largely the same. The new edition includes a few additional sections on developments in environmental, process safety and sustainability, and some updated examples.

Explanations in the text are grounded in anecdotes that provide relevant historical examples for the concepts being explained. This provides the reader insight into a variety of industries that are revisited throughout the text, including aluminum smelting, chlor-alkali processes, ethylene derivatives, and fuels. Though the text naturally has a focus on the Australian context (being the author's main affiliation) it contains relevant examples from around the world including the United Kingdom, United States, and Japan among others. The concepts it explores are general and can be applied to many different contexts. Many data sources and examples are from the 1960s to the 1990s, although this does not take away from the principles the book explores. One potential reason for this, which the author addresses in the preface, is the increasing lack of public economic data, which is a significant challenge for process economics courses and researchers. Unfortunately, there are only a few sentences on computer tools, which offers little guidance to the reader despite the relative importance of these in the field.

The text would serve as a relevant guide for those completing a capstone design project. It includes major chapters one might find in texts on process design,^[1,2] namely process industry market evaluation (Chapter 2), assessment of fixed costs (Chapter 3), assessment of production costs (Chapter 4),

as well as project economic analysis tools (Chapter 5). These chapters provide relevant summaries with references to further works for students or instructors. They are then followed by ten example exercises in Chapter 6 to practice the skills presented in the preceding chapters. Given the relatively small number of worked examples, the book may be challenging to use in a stand-alone process economics course. For this purpose, it may need to be supplemented to ensure sufficient student practice.

Where the book distinguishes itself from others is in providing the reader with additional insights into decision-making in process industries. It does this through chapters on technological development in process industries (Chapter 7), capital investment decisions (Chapter 8), and industry planning and structure (Chapter 9). Chapter 7 highlights challenges and development timelines of new process technologies and assessment of the maturity of different industries and technologies. This is as relevant as ever in process industries and engineering in general, given the continuing focus on technical development and entrepreneurship. Chapter 8 offers further insight into strategic planning around process industries; for example, assessing whether to expand an existing plant or to create a new one. It also discusses how to work with others to create and communicate such analyses in a company setting. Chapter 9 offers a more expansive view of the industry, discussing links between companies, governments and professional organizations.

The book offers a solid foundation in process economic analysis as well as insight into decision-making in process industries. It is a strong guide with relevant, general principles that stand the test of time.

REFERENCES

1. Towler GP, and Sinnott RK (2013) *Chemical Engineering Design: Principles, Practice, and Economics of Plant and Process Design*. 2nd edition. Butterworth-Heinemann. Amsterdam, Netherlands.
2. Turton R, Shaeiwitz JA, Debangsu B, and Whiting WB (2018) *Analysis, Synthesis, and Design of Chemical Processes*. 5th edition. Pearson. New York, New York. □