

BOOK REVIEWS

Billions at Play: The Future of African Energy and Doing Deals, by N. J. Ayuk (Clink Street, 2020). 396 pages, ISBN: 9781641465595 (hardback). ISBN: 9781641465601 (paperback), ISBN: 9781641465618 (ebook)

This broad-ranging book is a systematic and in-depth analysis of how oil and gas could catalyze Africa's economic prosperity and transition to clean energy. Africa is suffering from a resource curse, a term applied to countries with abundant natural resources such as minerals, oil, and gas, but with no economic growth to show for it. The lack of economic prosperity is due to resource revenue mismanagement and multi-national companies that exploit the resources, reaping enormous profits, often leaving behind environmental degradation. The little benefit from resource ownership often accrues to the few indigenous individuals in the country's top echelons. Africa, blessed with substantial natural resources, is the wealthiest continent in natural resources (World Atlas, 2021)). Yet it is also the poorest in income and energy use per capita. (e.g. African energy use per capita is less than half of the global average (International Energy Agency, 2018), income per capita is around a third that of Asia (Economic Times, 2020) and Africa has more than 590 million people without electricity (International Energy Agency (2020)).

The author's premise is that Africa's 'resource curse' can be turned into a blessing and drive economic prosperity. Governments could use oil and gas revenues to create trusts that invest the funds and use the returns to meet budget shortfalls during periods of low oil and gas prices and establish institutions to support infrastructure, human capacity development, and entrepreneurs. Oil could be processed to produce fertilizers, cosmetics, plastics, and other oil-based products to feed the agricultural, industrial, and commercial sectors—many oil states in Africa import these products, including refined oil. Petro states could use gas to power their commercial, industrial activities, and households. The surplus could be exported to neighboring countries to stabilize their hydroelectric grids—which are often susceptible to variations in climatic conditions and complement solar power systems. The author cites, among many examples, a country that flares off the gas. Yet, the government has an electricity supply deficit.

The book's bulk outlines how Africa could achieve economic prosperity based on oil and gas through collaboration between oil companies and African leaders. African leaders must be morally solvent, passionate, have the will and knowledge to develop their countries and negotiate the terms with oil companies suitable for their countries. The author discusses how leaders could involve women in the oil and gas industry, support entrepreneurs, incorporate local content requirements in oil contracts, and engage local small and medium-sized companies. Petro states must reduce risk by engaging in exploration and production and creating governance structures that assure investors that their assets are safe. It discusses how transparency regarding oil revenues could reduce citizens' mistrust for the government and eradicate civil unrest to heighten the security of oil and gas exploration, production, and operations. The book also discusses how joining international and local organizations, sharing resources, and trading within Africa could increase Africa's negotiating position when entering contracts with oil and gas companies. It also discusses what oil and gas companies should do to contribute to Africa's economic development goals. The author cites working with governments in diversification, partnering with local companies to transfer technology, collaborating with local educational institutions to build human capacity, and championing the energy transition as a win-win situation that builds mutual trust.

Finally, the author discusses why the African power systems are in such a state of disrepair and how to fix them. The solutions include restructuring the electricity supply chain and breaking the national utilities into separate companies at the power generation, transmission, and distribution

stages. With this unbundling, the author recommends the government retain control of the transmission sector, while privatizing power generation and distribution to attract local and foreign investors and bring in new technologies to improve efficiency.

With roots in Africa, the author connects Africa's problems to specific solutions utilizing natural resources in general before drilling down on the oil and gas industry. He masterfully weaves in each chapter analysis of the problem, examples of countries that have resolved similar issues and, based on this experience, recommends the solutions to African leaders in an easy-to-understand fashion. The chapter on deals is brief but highly informative. Overall, the book has an open, readable layout packed with useful content. This book is a solution manual to Africa's problems and is long overdue. It should be on the shelf of every African policymaker, politician, and those aspiring to be leaders or interested in accelerating Africa's economic growth.

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Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming, edited by Paul Hawken (Penguin Random House, 2017), 256 pages, ISBN 9780143130444 (paperback).

DRAWDOWN is not "just" a new book on how to reduce greenhouse gas emissions and reverse warming; yet that is its printed title. It is actually a *portal* into a very active community of world-class scientists, engineers, economists and policy makers who are continuously developing a very comprehensive database, subject to continuous development and revision, of the most impactful potential solutions to global warming. I recommend buying the book, which is inexpensive, and also to engage in the continuous updates, revisions and on-line communications related to it at https://www.amazon.com/Drawdown-Comprehensive-Proposed-Reverse-warming/dp/0143130447/ref=sr_1_1?ie=UTF8&qid=1542660750&sr=8-1&keywords=project+drawdown.

The book is very thought provoking and offers several surprises. For example, who would have thought that educating girls and family planning would rank as the 6th and 7th most effective means of reducing global greenhouse gas emissions? According to the team's calculation they do! Less surprising, yet equally impactful knowledge comes in the quantitative assessment of 80 different solutions. These range from the expected ones, such as improved technologies in refrigeration to avoid releases of greenhouse gases, as well as ozone depleting ones, through the many useful and accelerating new technologies in wind turbines, solar PV, electric vehicles, building automation and many other technologies. Again, the real breakthrough value of the book lies in not only explaining why these are technology developments that need to be accelerated, but the quantitative assessment of their potential relative impact on global warming.

The *context* in which this book has emerged makes it even more relevant and impactful than the explanation of the relative impacts that all these different technology solutions by themselves might have; although that is of course very valuable knowledge as well. The context I refer to is that of current political and policy debates about cost-effective pathways to emissions reductions. One very visible expression of that is the International Energy Agency's (IEA) 2018 report, which states that "energy destiny lies with government" (see *Oil and Gas Journal*, Nov. 13, 2018). Progressive fossil energy companies, globally, are charting their own pathways towards emissions reductions as essentially being in partnership with—not in opposition to or ignorance of the—the role of governments. Examples of some expressions of this sentiment are seen in mission statements for most of the global oil and gas company "supermajors" (loosely defined), and all other fossil as well as renewable energy providers.

Rather than focusing on a single solution or sector of solutions, Project Drawdown has done the math on what humanity is capable of achieving with the broad range of tools already in use around the globe. For that reason, Drawdown—as a book and as an ever-evolving data base—provides major assistance and insights for each company, each municipality, each state and each nation that find themselves in the process of analyzing, debating and gradually converging on the optimal solutions for each of them, individually, to reduce their greenhouse gas emissions. The emergence of a book like Drawdown is of major value for companies to better understand how the collective impact of a broad range of solutions, with many different tools, implemented at scale, will have vast and beneficial impacts on Earth's overall climate trajectory over the next several decades.

It their most recent reports, the IEA has articulated well that there are in fact many technology, policy and financial tools available to solve the many challenges brought about by global warming. Some of the IEA's key solutions pathways include: eliminate emissions from fossil energy at all possible speed and develop all possible synergies between fossil and renewable energy systems (e.g. use of solar energy to operate oil and gas processing facilities in places like the Middle East). The Drawdown book offers a range of pathways for countries with very different agricultural, industrial, cultural and economic systems to become successful in reducing emissions while attaining growth based on their unique economic advantages. It provides 80 specific solution pathways to an industrial global society that currently struggles a great deal with HOW to co-optimize all nations' goals of increasing their economic growth and public welfare.

DRAWDOWN provides a rich menu of viable solutions to the many challenges brought about by the current global warming trends. First, we must eliminate emissions from fossil energy at all possible speed. We CAN do this! What is already happening is that we capture and utilize the CO₂ for a wide range of value adding processes and products. Secondly, we must not only greatly accelerate the rate of growth of renewable energy systems, but also develop all possible synergies between fossil and renewable energy systems. To cite the IEA once again: "Crafting the right policies and proper incentives will be critical to meeting our common goals of securing energy supplies, reducing carbon emissions, improving air quality in urban centers and the related economic growth".

The most important conclusion is that we need to do all this NOW! Drawdown is an excellent tool for anyone new to this challenge to get started.

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