SDG7 – ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY

CONCISE GUIDES TO THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

Series Editors
Walter Leal Filho
World Sustainable Development Research and Transfer Centre, Hamburg University of Applied Sciences

Mark Mifsud
Centre for Environmental Education and Research, University of Malta

This series comprises 17 short books, each examining one of the UN Sustainable Development Goals (SDGs).

The series provides an integrated assessment of the SDGs from an economic, social, environmental and cultural perspective. Books in the series critically analyse and assess the SDGs from a multi-disciplinary and a multi-regional standpoint, with each title demonstrating innovation in theoretical and empirical analysis, methodology and application of the SDG concerned.

Titles in this series have a particular focus on the means to implement the SDGs, and each one includes a short introduction to the SDG in question along with a synopsis of their implications on the economic, social, environmental and cultural domains.

SDG7 – ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY

GODWELL NHAMO
University of South Africa, South Africa

CHARLES NHEMACHENA
Alliance for a Green Revolution in Africa, Kenya

SENIA NHAMO
University of South Africa, South Africa

VUYO MJIMBA
Human Sciences Research Council, South Africa

AND

IVANA SAVIĆ
Leiden University, The Netherlands

United Kingdom – North America – Japan
India – Malaysia – China

Emerald Publishing Limited
Howard House, Wagon Lane, Bingley BD16 1WA, UK

First edition 2020

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN: 978-1-78973-802-5 (Print)
ISBN: 978-1-78973-799-8 (Online)
ISBN: 978-1-78973-801-8 (Epub)

ISOQAR certified Management System, awarded to Emerald for adherence to Environmental standard ISO 14001:2004.

Certificate Number 1985
ISO 14001

INVESTOR IN PEOPLE

CONTENTS

This page intentionally left blank

ABOUT THE AUTHORS

Prof. Godwell Nhamo (PhD, Book Project Leader) is a Chief Researcher and a Chair for the Exxaro Chair in Business and Climate Change hosted by the Institute for Corporate Citizenship at the University of South Africa. He has interest in the fields of climate change and governance, the green economy and sustainable development, and he is a National Research Foundation C3 rated scholar. He has published widely in his areas of interest and has over 20 years of work experience in the academic field. Among his offerings are 6 books (5 edited) and over 70 journal articles. Since 2013, he has graduated 10 PhDs and hosted 10 postdoctoral fellows. He also sits on a number of both international and national boards in his research space and has also received several awards and recognition for his outstanding work both locally and internationally.

Dr Vuyo Mjimba (PhD) is a Chief Research Specialist in the Africa Institute of South Africa in the Human Sciences Research Council. He is a development, policy and practice scholar with research interests in sustainable development. His focus is on industrialisation, global value chains, climate change and innovation. He brings more than 12 years of commercial enterprise experience and insights to his research and academic work. In this space, he interacts with both experienced and early career researchers and practitioners, as well as masters and doctoral students exploring a broad spectrum of sustainable development matters in Africa.

Prof. Senia Nhamo has a PhD in Economics from the University of the Witwatersrand. She has expertise in econometrics,

environmental economics and macroeconomics. In the past 15 years, her work has involved tuition, research and academic citizenship in various academic institutions in Africa. Her current research efforts are focussed on revealing the importance of indicators towards the achievement of sustainable development goals.

Dr Charles Nhemachena is an Environmental/Agricultural Economist with more than 15 years' practical research and development skills and experience in Southern Africa and other parts of Africa. His technical areas of expertise include sustainable development, green growth/economy, climate change (impacts, adaptation and vulnerability), monitoring and evaluation, agricultural water management, food security, applied agricultural and environmental management and economics research and development within multi-disciplinary and multinational teams.

Ivana Savić is a Legal Researcher, Strategist and Consultant. She has more than 10 years' experience in the fields of sustainable development, human rights and environmental law, covered at the global, regional and national levels. Her PhD is focussing on Environmental Rights of the Child, and she is enrolled at the Leiden University. The PhD focusses on the interaction and intersection of human rights, environment and trade and investment regimes in the context of sustainable development. It further advocates for the international recognition of the environmental rights of the child, particularly rights to the environment and rights to energy services.

PREFACE

This book emerged from the inaugural Concise Guides to the United Nations Sustainable Development Goals (SDGs) project initiated by The World Sustainable Development Research and Transfer Centre (WSD-RTC) in 2018. The WSD-RTC is working with a United Kingdom based publisher, Emerald, in publishing a book series on all 17 intertwined SDGs. Each volume is co-authored by a team of well-known scholars and senior experts on each field. The volumes in the series demonstrate innovation in theoretical and empirical analyses, methodologies and applications, and an analysis of the means to implement the SDGs. This book therefore documents the above for the energy SDG (SDG7).

PEER REVIEW PROCESS

The book underwent the rituals of academic blind peer review. Apart from being the international norm, this blind peer review process is mandatory for South African based authors in order to fulfil the requirements of the Department of Higher Education and Training's policy for recognised research outputs for subsidy purposes. Prof. Nhamo presided over the incorporation of all peer review observations and comments to enhance the quality of the book product. However, authors take full responsibility for any liabilities associated with the production of this book.

This page intentionally left blank

ACKNOWLEDGEMENTS

We wish to thank blind peer reviewers and peer reviewers for their invaluable inputs during the writing and publishing process of this book. We offer our great appreciation to Dr David Chikodzi, a postdoctoral fellow under the Exxaro Chair in Business and Climate Change at the University of South Africa, who assisted us in preparing the GIS maps used in the book. We also thank Emerald for taking on board this book project. Our families are hereby acknowledged for their ongoing support of our work, and we would like to express our sincere thanks to Emerald for further quality control and the product that came out thereof. The book project was coordinated through the Exxaro Chair in Business and Climate Change at the University of South Africa. The Exxaro Chair is a research Chair funded by the Exxaro Resources (Pty) Ltd. Chairman's Fund. The Exxaro Chair, established in 2008, is now in its fourth term running (2018–2022). The vision of the Exxaro Chair is to 'create a Centre of Excellence in Business and Climate Change research, education, and advocacy-oriented community engagement'.

This page intentionally left blank

1

ENERGY IN THE CONTEXT OF THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

1.1. INTRODUCTION

In 2015, the United Nations set in motion the 2030 Agenda for Sustainable Development (AfSD), an ambitious global agenda (United Nations, 2015), thus establishing a transitional platform that will allow the world to move from the unfinished business of the Millennium Development Goals (MDGs) to the new and expanded AfSD. The 2030 AfSD outlines 17 intertwined Sustainable Development Goals (SDGs) and 169 targets that countries should domesticate and localise, depending on their national and sub-national conditions. Among these SDGs is SDG 7 that focusses on ensuring 'access to affordable, reliable, sustainable and modern energy for all' (United Nations, 2015, p. 14). A number of questions arise here. What was the 2015 status quo in terms of SDG 7 in the various countries and their individual regions? What is the nature of national and regional initiatives (policies and legislation) seeking to advance SDG 7? What has been the impact of these initiatives? What are the

chances that these countries and regions will be able to achieve the SDGs by December 2030? What lessons can be drawn from the countries at the forefront? The list of related questions is very long.

Pradhan, Costa, Rybski, Lucht, and Kropp (2017) contend that the 2030 AfSD is a comprehensive and extensive road map presenting targets and indicators that align all countries to pathways leading to sustainable development. To this end, a common belief is that of SDGs as a plausible vehicle to address some of the multiple complex challenges facing humankind today and into the future. Although SDG 7 comes across as having the fewest identified targets – six in total – its central role in the attainment of the entire 2030 AfSD cannot be overemphasised (McCollum et al., 2018). In attempting to understand how SDG 7 relates to other SDGs, the authors performed a large-scale literature evaluation, which confirmed that the positive interactions between the SDGs outweigh the negative ones, both in terms of number and magnitude.

Based on the 2017 data, the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA), the United Nations Statistics Division (UNSD), the World Bank and the World Health Organization (WHO) found that 'the world is making progress towards achieving Sustainable Development Goal 7 … but will fall short of meeting the targets by 2030 at the current rate' (IEA, IRENA, UNSD, World Bank, & WHO, 2019, p. 1). India, Bangladesh and Kenya have made particularly good progress on universal access to electricity, leading to a reduction in the global population without access to electricity to 840 million in 2017, compared to 1.2 billion in 2010. In order to carry this work further, there is a need to prioritise programmes and projects that focus on the scaling up of SDG 7 implementation. To this end, the need to prioritise SDG 7 should be unequivocal. For example, even the oil-rich United Arab Emirates (UAE) makes it clear that 'renewable energy,

coupled with energy efficiency and electrification of the end users is the area of focus for the policy makers in the country' (World Energy Council (WEC), 2019, p. 6). In fact, managing global energy transition pathways and energy security remains everybody's business and one of the most pressing needs of our time. Given the foregoing, there are three global proclamations of interest with which this book is concerned, namely: the United Nations Framework Convention on Climate Change (UNFCCC); the Paris Agreement (United Nations Framework Convention on Climate Change (UNFCCC), 2015); and the 2030 AfSD, specifically SDGs 7 (universal energy access) and SDG 13 (climate action) (United Nations, 2015). As noted by the WEC (2019), global greenhouse gas (GHG) – carbon emissions continue to rise and the world needs to be constrained to the 2 °C scenario (Nam-Cho & Kimb, 2019). However, what is of interest is that, while world leaders continue to discuss and implement energy transition, the movement away from dirty, fossil-powered energy generation systems is likely to be abrupt. This is so because the world has been witnessing multiple tipping points in favour of a clean, low carbon future (Nhamo, 2015).

As global leaders continue to debate matters pertaining to sustainable energy, Africa remains the theatre for improvement. The Organisation for Economic Cooperation and Development (OECD, 2017a) maintains that all its countries met the target of universal access to energy. However, at the time of this report, many countries were still lagging behind in terms of meeting the targets for renewable energy and energy efficiency. The story is different for Sub-Saharan Africa (SSA), where energy access remains very low and where electricity coverage was estimated at 35% overall and about 19% in the rural areas (WEC, 2019). To move more quickly towards closing the energy gap in SSA, the sub-continent should focus on project management and address inefficiencies in the

electricity sector. Major issues in the industry include power generation deficits, inefficient distribution, high tariffs, connection fees and huge backlogs in investment. While there has been some progress in bringing solar and wind power on board, SSA remains limited by technology patents, most of which do not come cheap. Nevertheless, there is notable work being undertaken seeking to address these and other challenges. Some selected facts on SDG 7, from a 2018 United Nations report, are presented in Box 1.1.

BOX 1.1. SELECTED FACTS ON SDG 7.

- From 2000 to 2016, the proportion of the global population with access to electricity increased from 78% to 87%, with the absolute number of people living without electricity dipping to just below 1 billion.
- In the least developed countries, the proportion of people with access to electricity more than doubled between 2000 and 2016.
- In 2016, 3 billion people (41% of the world's population) were still cooking with polluting fuel and stove combinations.
- The share of renewables in final energy consumption increased modestly, from 17.3% in 2014 to 17.5% in 2015. Yet only 55% of the renewable share was derived from modern forms of renewable energy.
- Global energy intensity decreased by 2.8% from 2014 to 2015, double the rate of improvement seen between 1990 and 2010.

Source: Adapted from United Nations (2018, p. 7)

Addressing these challenges is not going to be cheap. The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP, 2019) notes that there is a need for total investments of about $1–1.27 trillion annually to achieve the stated objectives. These figures were supplied by a cluster of organisations that include the World Bank, IEA and IRENA. From the total estimated cost, universal access to electricity alone will demand $52 billion, clean fuel about $4.4 billion, renewable energy an estimated $442–$650 billion and energy efficiency about $560 billion annually. In addition, on average, the realised financing for SDG 7 stood at about $514 billion per year, leaving a funding gap of $500–$750 billion annually. The Asia-Pacific region alone is estimated to need over $500 billion by 2030 (UNESCAP, 2019). The good news is that investments in renewable energy capacity reached $272.9 billion in 2018 (Frankfurt School of Finance & Management, 2019).

In light of the above background, this book presents some insights regarding how the world has been responding to the global call for universal access to affordable, reliable, sustainable and modern energy (United Nations, 2015). It adds to the growing literature on the 2030 AfSD in general, and on SDG 7 in particular. The rest of the chapters will focus on the central role of energy in the attainment of the 2030 AfSD; access to affordable, reliable and modern energy; increased share of renewable energy in the mix; discourses surrounding energy efficiency; the methodological orientation for the book; and the book outline. These perspectives will be addressed further in each of the regional chapters featured in the book, as well as in the concluding chapter.

1.2. CENTRAL ROLE OF ENERGY IN ACHIEVING THE 2030 AGENDA

There is no contestation regarding the fact that the SDGs are linked, thereby fulfilling the long determined concept of ‘all

for one and one in all' (Ntona & Morgera, 2018; Tosun & Leininger, 2017; Vladimirova & Le Blanc, 2015). One of the objectives of the 2030 AfSD is to attain policy coherence, leading to sustained development. This intention demands that the 17 individual SDGs speak to each other and become interconnected (Tosun & Leininger, 2017). To this end, stronger ties have been identified between SDGs dealing with food, water and energy security. Trade-offs were also realised for SDG 7, especially when dirty energy is used to power economies, leading to increased carbon emissions which, in turn, result in global warming and climate change (Pradhan et al., 2017).

Depending on one's context, there is a likelihood that ensuring 'access to affordable, reliable, sustainable and modern energy for all' (United Nations, 2015, p. 14) as stipulated in SDG 7 can be deemed the greatest SDG of all. Sachs et al. (2018) support this understanding through their conceptualised six transformations to achieve the SDGs. The role played by SDG 7 is directly expressed in four of the six transformations, namely: education, gender and inequality; energy decarbonisation and sustainable industry; sustainable cities and communities; and digital revolution for sustainable development. The other two transformations, in which SDG 7 is not expressly mentioned, are: sustainable food, land, water and oceans; and health, well-being and demography. The six transformations are featured in the Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN) Sustainable Development Report of 2019 (Sachs, Schmidt-Traub, Kroll, Lafortune, & Fuller, 2019).

As indicated earlier, SDG 7 remains the greatest of the goals. Poverty (SDG 1) is difficult, if not impossible to end without a secure, adequate and reliable supply of energy. In addition, the agriculture sector that leads to ending hunger and malnutrition (SDG 2), in turn leading to healthy lives (SDG 3), depends on

access to energy too. Energy is required to power health as well as water and sanitation facilities. Not only is energy required to sustain good health, but clean energy sources are also critical in fighting diseases associated with indoor air pollution (Kimemia & Annegarn, 2016). In addition, there is no quality education (SDG 4) without access to electricity and other forms of energy. Furthermore, gender issues – SDG 5 (Nhamo, Nhamo, & Nhemachena, 2018) matter in sustainable and modern energy. Women are becoming active participants in energy entrepreneurship across the world. The water–energy–food nexus (SDG 6 and SDG 2) is one of the focus areas in this century.

Without sustainable energy and energy security, the world will not be able to create sustainable jobs (SDG 8) and develop the necessary developmental infrastructure linked to SDG 9 (United Nations, 2015). The construction industry is one of the key energy consuming sectors. To add to the equation, areas and communities affected by limited access to energy are characterised by inequalities (SDG 10). The dream of having sustainable and smart cities (SDG 11) is growing globally (Ramaphosa, 2019). In that regard, sustainable energy remains at the centre of driving activities and growth in such cities. Settlements and city ecosystems rely heavily on a continuous and reliable energy supply to power the transport systems, construction industry, for heating and cooling, general lighting, powering security systems, manufacturing and services industry. Energy also remains a vital element in sustainable consumption and production (SDG 12) in all settlements. Furthermore, matters pertaining to sustainable energy, especially clean sources and technology, renewable energy and energy efficiency play a major role in addressing the challenges associated with climate change and climate action (SDG 13).

As the world continues on pathways that focus on reducing carbon footprints under the Paris Agreement (UNFCCC,

2015), matters of energy will not take a back seat. Many believe that SDG 7 and SDG 13 are closely linked and complementary (IEA, IRENA, UNSD, World Bank, & WHO, 2019). Further details regarding SDG 7 targets and indicators are provided in Table 1.1. As of 9 April 2018, 175 Parties had ratified the Paris Agreement, with 168 Parties having communicated their first nationally determined contributions (NDCs). The NDCs are one of the twin pathways under which the Paris Agreement is implemented and focusses mainly on reducing carbon emissions. The other pathway is the development of national adaptation plans.

Access to affordable, reliable and sustainable modern energy remains vital in exploring the ocean (blue) economy, as enshrined under SDG 14. The blue economy has opened up opportunities that include the utilisation of oceans and seas for food, transportation, minerals, water, leisure and health (United Nations Economic Commission for Africa (UNECA), 2016). Beach tourism, cruise ships, yachting, sport fishing, mariculture, maritime industries, ports and harbour facilities, natural gas and crude oil ventures, as well as sand mining and port dredging, are all development initiatives that require energy. In addition, the protection, restoration and promotion of sustainable use of terrestrial ecosystems, as well as management of forests and halting biodiversity loss, as embedded in SDG 15 (United Nations, 2015), are functions that are powered by energy. Lastly, the promotion of peaceful and inclusive societies (SDG 16) is also driven by energy use, while the nurturing of the Global Partnership for Sustainable Development (SDG 17) also falls into the same category. Therefore, there is no doubt that sustainable energy drives the SDGs.

The next sections will trace SDG 7 in the context of four main indicators that include access, clean fuel, the share of renewables and energy efficiency.