

Chapter 1

Introduction



Notwithstanding the ample and critical challenge regarding clean energy access globally, the African continent is the region with the highest number of people facing this issue worldwide. According to recent estimates, in sub-Saharan Africa, close to 580 million persons lack access to electricity (IEA, 2020) and over 900 million cook with inefficient and polluting stoves (WHO, 2020), representing, respectively, 52 and 85% of the subcontinent's 1.1 billion inhabitants.

This situation inhibits socio-economic development in the region and prevents populations from prospering. In addition, this painful statement is in stark contrast to the large availability of energy resources across the continent.

Providing reliable access to energy will unlock substantial benefits and improve living conditions of sub-Saharan African citizens. Moreover, it will allow the development of the economic and industrial sectors as well as reinforce the competitiveness of the whole region. In addition, the utilisation of clean and renewable energy resources will lessen the dependence on fossil fuels and contribute to global climate change mitigation efforts.

Technical solutions exist to reach the first target of Sustainable Development Goal 7 (SDG 7.1.1), namely ensuring by 2030 universal access to affordable, reliable and modern energy services. However, significant additional investments in low-carbon technologies are required in order to achieve access to clean energy for all. In sub-Saharan Africa, around \$350 and \$23 billion are needed for the power and clean cooking sectors, respectively (Corfee-Morlot et al., 2018).

Given the limited public resources and in order to avoid unsustainable debt to gross domestic product (GDP) ratios, most of the investment needed has to come from the private sector. Indeed, public finance alone will not be able to bridge this funding gap. However, the public sphere has a vital role to play in catalysing private investments in clean energy access initiatives. For its part, the private sector may bring not only capital but also a broad range of skills as well as innovative mechanisms to foster the allocation of funds into this pressing development challenge. Therefore, both are crucial and need to be complementary.

Private capital providers tend to limit investments or cover risk premiums due to higher perceived risks in the region, thus reducing the availability of affordable capital for clean energy-related projects. Indeed, the cost of financing is still relatively high in sub-Saharan Africa, despite ongoing reliability improvement and decreasing technological costs in the energy sector. Therefore, many project developers and companies face important difficulties in accessing the necessary capital to build and scale up innovative business models.

In this context, this book has the objective to contribute to the scientific literature related to sustainable development and the future of energy in the region. The general purpose is to support the achievement of an enabling investment climate in sub-Saharan Africa, with a particular focus on the energy sector. More specifically, the present book aims at analysing how to (i) enhance capital allocation in projects and organisations that foster clean energy access in the region, (ii) mobilise private capital at scale and (iii) decrease the cost of financing through risk mitigation strategies.

To that end, this publication adopts a comprehensive approach, encompassing economic, financial, political, environmental and social perspectives. Moreover, this book aspires to go beyond traditional initiatives and presents innovative solutions to approach the financing of universal clean energy access in sub-Saharan Africa. In addition, it seeks to adapt to the various specificities and remain consistent with the cultural and socio-economic contexts of the African continent.

Mainly because of the negative consequences generated by a lack of access to clean energy on socio-economic development and environmental concerns, this particular topic has been widely discussed by several research centres, think tanks and academics, providing a solid basis for the elaboration of the present book. Most of this work has focused on one specific aspect or technology associated with clean energy access in emerging countries. On top of that, emphasis is usually put on actions available to the public sphere, with the objective of creating enabling investment environments and attracting private capital at scale. However, little work has been done on potential initiatives that private actors can undertake.

This book concentrates on a specific geographical zone, sub-Saharan Africa, which is the world region where energy poverty is the most severe. Moreover, it aims at highlighting specific initiatives and actions available to the public and private spheres, at an international, regional and domestic level. It provides a holistic view of the opportunities and challenges related to the financing of clean energy projects and companies in sub-Saharan Africa, encompassing different technologies adapted to energy needs in urban and rural areas.

The book aims to be accessible to a wide readership of both academics and professionals working in the energy industry, the financial sector and the political sphere, as well as to general readers interested in the ongoing debate about energy, sustainable development and finance. Moreover, it has the objective to provide a solid basis for further analysis regarding the financing of clean energy access initiatives in specific contexts and for research projects in both academic institutions and think tanks. More specifically, the book targets project developers, policymakers, regulators, public and private financial institutions, asset managers, development agencies and researchers.

In addition, the present book provides a fervent call to action in order to elaborate inclusive and sustainable energy pathways in sub-Saharan African countries. It not only outlines the barriers, but also presents solutions available to public agencies, professionals active in the energy industry and various financial institutions (public and private) in order to mitigate and decrease the risk perception of different capital providers, as well as redirect financial flows towards access to clean energy.

Considering the vast subjects covered in this book, we included small introductory boxes at the beginning of each chapter in order to guide the reader through the various topics explored. Those boxes have the objective to introduce the overall content of each section, indicate which readers are particularly targeted and explain the reasons behind the integration of the aspects described as well as their importance for the overall theme.

The first part of this book (Chaps. 1–3) has the objective to provide an overall context around the energy access challenge in sub-Saharan Africa and its financing. The second part (Chaps. 4–9) aims at exploring public and private risk mitigation strategies and innovative investment schemes, as well as specific barriers hindering their use and implementation. Finally, the book ends with conclusions and targeted policy recommendations intended to enhance the financing of clean energy access across the region (Chap. 10).

More precisely, after the present Chap. 1 (**Introduction**), the book consists of the following chapters, which are briefly presented hereafter.

Chapter 2 (**Energy access in sub-Saharan Africa: general context**) starts by exploring the opportunities and challenges related to energy in sub-Saharan Africa. It then presents the investment trends and the financing gaps associated with the power and clean cooking sectors in the subcontinent.

Chapter 3 (**Risk analysis and mitigation strategy identification**) aims at describing different investment opportunities in the clean energy sector. It also provides a mapping of the barriers hindering their financing in the region. The investment risks are classified into four distinct categories: (i) economic and financial factors, (ii) the overall country situation, (iii) the business environment and (iv) environmental and social considerations. Furthermore, this part also presents core stakeholders which, through action or inaction, may influence the risk perception of potential capital providers.

Once obstacles to financing are properly identified, actions may be undertaken to improve the risk-reward profiles of investment opportunities. With appropriate mechanisms and facilities in place, investments in clean energy access activities can be scaled up. Therefore, the second part of the book exposes various instruments and strategies aimed at mitigating risks for potential capital providers. They are divided into four different spheres of interest: (i) public policies and initiatives, (ii) public financial and fiscal mechanisms, (iii) private financial structures and schemes and (iv) private initiatives.

The selection of a tailored and cost-effective set of tools and actions strongly depends on the context in which it is implemented, including the resources available and the maturity level of markets. This book does not focus on particular countries,

but rather aims to give an overview of the mechanisms available to public and private players, allowing to leverage affordable capital for clean energy access initiatives.

To that end, public policies and initiatives, as well as specific reforms associated with the energy sector, are explored (Chap. 4: **Public policies and initiatives in the energy sector**). This section includes an analysis of the necessary adaptations to sub-Saharan African contexts, the challenges associated with the introduction of public actions, as well as particular measures aimed at preventing policy implementation gaps.

Moreover, emphasis is placed on alternative and innovative financing instruments and schemes tailored to the specific needs of the clean energy sector (Chap. 5: **Direct and indirect investments in the energy sector**), as well as on solutions aimed at improving and stabilising the overall investment climate.

In addition, this book focuses on the development and strengthening of local capital markets (Chap. 6: **Capital markets for the financing of clean energy access in sub-Saharan Africa**), as several schemes presented here are highly dependent to the well-functioning of the financial sector, including secondary and derivative markets. Accordingly, the complementarity with the banking sector is presented, and approaches aimed at transforming underdeveloped capital markets in the region are explored. Furthermore, opportunities in the bond markets and in carbon finance are covered, encompassing an overview of concerns that may potentially hinder their use in the subcontinent.

Chapter 7 (**Risk mitigation instruments targeting specific investment risks**) focuses on guarantee instruments and insurance, as well as on their availability in the clean energy sector. Moreover, this section addresses the currency and liquidity risks, considering the complexities of sub-Saharan African contexts and the energy sector.

Initiatives and actions at the disposal of project developers and managers are presented in Chap. 8 (**Business model adaptation**), with a particular focus on strategies for risk transfer, avoidance and compensation. Furthermore, solutions are explored to support internal risk management processes and business management in the energy sector.

Additionally, an entire section (Chap. 9: **The role of multilateral agencies and development banks**) concentrates on multilateral agencies and development banks, focusing on their role in the financing of clean energy access in sub-Saharan Africa. Through their particular relationships with national governments and their local expertise, those institutions are highly important and uniquely positioned to tackle this development issue. Moreover, they have a wide set of tools at their disposal in order to improve the risk-return profiles of investment opportunities in the clean energy sector. Thus, it is appropriate to require that their limited resources are used effectively to crowd in private capital. This chapter ends with a proposition of business model evolution for development agencies, including an emphasis on mobilisation tools, capacity building programs and stakeholder engagement.

Finally, the last section (Chap. 10: **Conclusions and policy recommendations**) focuses on policy recommendations for the public sphere, involving national and local governments as well as international public institutions. Three core areas considered

as necessary to pave the way for private players are presented: (i) the creation of an enabling business and investment environment, (ii) the improvement of risk-reward profiles of investment opportunities in the clean energy sector and (iii) public strategies aimed at catalysing private capital.

The analysis of this book focuses on two important domains: the power and cooking sectors. They indeed strongly affect socio-economic conditions, human well-being and the environment.

Within the power sector, the present publication includes investment opportunities in decentralised systems, power generation plants, as well as national electricity grids, while relying on the multitier framework¹ (MTF) initiative to assess electricity access.

The energy resources considered for electricity generation are solar PV, wind, hydro and natural gas. The latter is not a renewable energy resource, and its utilisation emits non-negligible greenhouse gases (GHG) into this atmosphere. However, given the scale of the energy access challenge in sub-Saharan Africa, natural gas, when locally available, represents a cleaner option to generate power compared to coal or oil.

Nuclear energy is not included in this book as the analysis of the associated risks is very specific. Considering their particular features, the implementation of nuclear power plants should be preceded by the disclosure of all relevant information and the consultation of civil society.

Regarding clean cooking, the emphasis is put on liquified petroleum gas (LPG), improved biomass cookstoves, electrical cooking systems and biogas digesters. Solutions using piped natural gas have been disregarded for the purpose of this analysis, first because of lack of pipelines across Africa, second since new installations in the continent would require to cover long distances and third as low levels of demand associated with cooking do generally not justify such scheme.

Even though they can influence the financing of clean energy access in sub-Saharan Africa, geopolitical considerations, including international treaties, cross-border laws and trade relations among countries, are not covered in this book. In addition, this book concentrates on public policies emanating from sub-Saharan countries and international public organisations, but not on the ones coming from other countries.

This is the third open access book in the *Springer Briefs in Energy* series produced recently by researchers of the Fondazione Eni Enrico Mattei to address issues related to energy access in sub-Saharan Africa. The first book “*Energy in Africa: Challenges and Opportunities*” (Hafner et al., 2018) addresses energy challenges (including energy access) on the African continent (and the Sub-Saharan region in

¹Launched in June 2015 by the Energy Sector Management Assistance Program (a global knowledge and technical assistance program administered by the World Bank), the MTF initiative is an innovative tool aimed at measuring energy access and providing valuable data and analytics. It uses a multidimensional approach, acknowledging the necessity to go beyond traditional binary variables (access or not) and considering other factors, such as reliability and affordability, to assess the service levels experienced by end-users.

For a complete definition of each tier associated with access to household electricity supply and clean cooking solutions, please refer to Annex 12.1.

particular) and proposes pathways for an accelerated energy transition. The second book “*Renewables for Energy Access and Sustainable Development in East Africa*” (Hafner et al., 2019) presents a modelling framework for least cost 100% electrification scenarios by 2030 in East Africa, investigates the role of renewable energy and provides policy-relevant inputs for the achievement of a cost-effective electrification process in the region. Both books also address some key barriers related to the investments required to upscale Africa’s energy systems, and they elaborate general policy recommendations targeted at international cooperation and development institutions, local policymakers and private stakeholders in the region. The present book focuses much more deeply and comprehensively on the huge challenge related to financing clean energy access in sub-Saharan Africa, by analysing holistically and in-depth investment risk mitigation strategies and proposing innovative financing structures. It also provides ample policy recommendations.

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