

ENERGY CHALLENGES IN SOUTHERN AFRICA: BALANCING RENEWABLE ENERGY SOURCE OPTIONS IN THE DEMOCRATIC REPUBLIC OF CONGO

AGATHE MAUPIN



*African perspectives.
Global insights.*

SOUTH AFRICAN INSTITUTE OF INTERNATIONAL AFFAIRS

The South African Institute of International Affairs (SAIIA) has a long and proud record as South Africa's premier research institute on international issues. It is an independent, non-government think tank whose key strategic objectives are to make effective input into public policy, and to encourage wider and more informed debate on international affairs, with particular emphasis on African issues and concerns. It is both a centre for research excellence and a home for stimulating public engagement. SAIIA's occasional papers present topical, incisive analyses, offering a variety of perspectives on key policy issues in Africa and beyond. Core public policy research themes covered by SAIIA include good governance and democracy; economic policymaking; international security and peace; and new global challenges such as food security, global governance reform and the environment. Please consult our website www.saiia.org.za for further information about SAIIA's work.

GOVERNANCE OF AFRICA'S RESOURCES PROGRAMME

The Governance of Africa's Resources Programme (GARP) of SAIIA is funded by the German Embassy. The programme contributes to policy governing the exploitation and extraction of Africa's natural resources by assessing existing governance regimes and suggesting alternatives to targeted stakeholders. GARP examines the governance of a number of resource-rich African countries within the context of cross-cutting themes such as environmental change and sustainability. Addressing these elements is critical for Africa to avoid deepening the challenges of governance and reducing its vulnerability to related crises, including climate change, energy security and environmental degradation. The programme focuses on the mining, forestry, fisheries and petroleum sectors in select African countries.

PROGRAMME HEAD Alex Benkenstein, alex.benkenstein@saiia.org.za

© SAIIA APRIL 2017

All rights are reserved. No part of this publication may be reproduced or utilised in any form by any means, electronic or mechanical, including photocopying and recording, or by any information or storage and retrieval system, without permission in writing from the publisher. Opinions expressed are the responsibility of the individual authors and not of SAIIA.

Please note that all currencies are in US\$ unless otherwise indicated.

Cover photo: Inga Dam 1,
© Agathe Maupin

ABSTRACT

The building of most large dams in Africa dates back decades. However, since the beginning of the 21st century there has been a revival in the building of large-scale hydropower projects, and the Grand Inga project in the Democratic Republic of Congo (DRC) is attracting regional interest. New large-scale hydro projects raise questions both about whether the full potential of the diversity of energy choices has been explored and about the sheer scale of these initiatives in ensuring effective generation, transmission and distribution of electricity. This prompts countries and regional organisations to evaluate the composition of their energy infrastructure, considering the availability of renewable energy sources (RES) and the need to balance those energy choices with scalable power projects.

It also presents an opportunity to balance national interests with regional integration. Analyses of national energy projects often do not consider the potential for inter-regional cooperation, which goes beyond the construction of infrastructure to a focus on power pooling. This paper explores the multiple hurdles faced by the DRC over the past decade in the development of its energy sector, and the challenges hindering enhanced energy cooperation between the DRC and regional stakeholders. It concludes that a growing interest in regional power pooling has created an opportunity for increased energy access and enhanced cooperation. Such cooperation will require not only an increase in the power supply derived from RES, but also a careful alignment of national perspectives with regional prospects.

While the majority of studies about hydropower in the DRC tend to focus on the benefits and pitfalls of hydro projects, few consider the economic and socio-environmental benefits of the exploitation of other RES. This paper draws attention to important developments, such as the conclusion of an energy deal between the DRC and South Africa and the development of a new energy and electricity legislative framework to liberalise the energy sector and increase the share of RES in the DRC's energy mix. Exploring the diversity of RES and their potential to enhance efficient and equitable energy access represents a key step towards sustainable development in the DRC.

ABOUT THE AUTHOR

DR AGATHE MAUPIN is a Visiting Senior Research Fellow at the South African Institute of International Affairs (SAIIA). Prior to joining SAIIA, she was a Research and Teaching Assistant at the Universities of Paris IV Sorbonne and Bordeaux III, where she completed her PhD on the Geopolitics of Water Resources in Southern Africa. She has been working on energy projects and climate change in Southern Africa since 2012.

ACKNOWLEDGEMENT

This occasional paper is based on a research work that included interviews in the DRC in March 2016. The author would like to thank all interviewees in the DRC, and Kathleen Hancock, Professor at the Colorado School of Mines, for reviewing this paper.

ABBREVIATIONS AND ACRONYMS

ADEPI	Authority for the Development and the Promotion of the Inga Site (Autorité pour le Développement et la Promotion du site d'Inga)
CAPP	Central African Power Pool
CATE	Energy Technical Support Unit (Cellule d'Appui Technique à l'Energie)
CFA	Comprehensive Framework Agreement
CODESI	Inga Site Development Commission
COMESA	Common Market of Eastern and Southern Africa
CORAP	Coalition of the civil society for the follow-up of the reforms and public action
EAPP	Eastern African Power Pool
IEA	International Energy Agency
IPP	Independent Power Producers
IRENA	International Renewable Energy Agency
PIDA	Programme for Infrastructure Development in Africa
PPP	Public-Private Partnerships
RES	Renewable energy sources
RESAP	Renewable Energy Strategy and Action Plan
RIDMP	Regional Infrastructure Development Master Plan
SAPP	Southern African Power Pool
SNEL	National Electricity Utility (Société Nationale d'Électricité)
TFTA	Tripartite Free Trade Area
UNDP	UN Development Programme

INTRODUCTION

‘Lighting up the DRC by modernising its energy services.’¹

In 2014 the International Energy Agency (IEA) released an [Energy Outlook](#) report with a focus on Africa, which indicated that the continent has the capacity to generate more than 40% of its electricity from renewable energy sources (RES) by 2040.² In Southern Africa, current installed power generation capacity is close to 60 000 MW, of which the RES contribution is approximately 23%. This output is predominantly generated by large- and medium-scale hydropower stations.³ Moreover, several large-scale schemes, such as the Kariba Dam power stations, started in the 1950s and jointly operated by Zambia and Zimbabwe, and the Congolese Inga 1 and 2 hydropower stations, which came on line in the 1970s and 1980s, underline that the use of hydropower is a familiar feature of the energy mix in the region.

While the building delays and disappointing outcomes of large hydropower schemes have sparked controversy, such schemes have nevertheless remained an important focus for many Southern African governments. Since 2011, SADC has embarked on an ambitious regional Renewable Energy Strategy and Action Plan (RESAP) to gear the region towards the development of its untapped RES potential – including solar, wind, biomass and hydro.⁴ In 2013, RES represented 32% of the region’s new additional power capacity, and a year later up to 59%.⁵ The International Renewable Energy Agency (IRENA) estimates that the RES share in the Southern African Power Pool (SAPP) could increase to 78% by 2030.⁶ This scenario relies on a significant increase in the establishment of medium to small-scale renewable energy projects in the region.

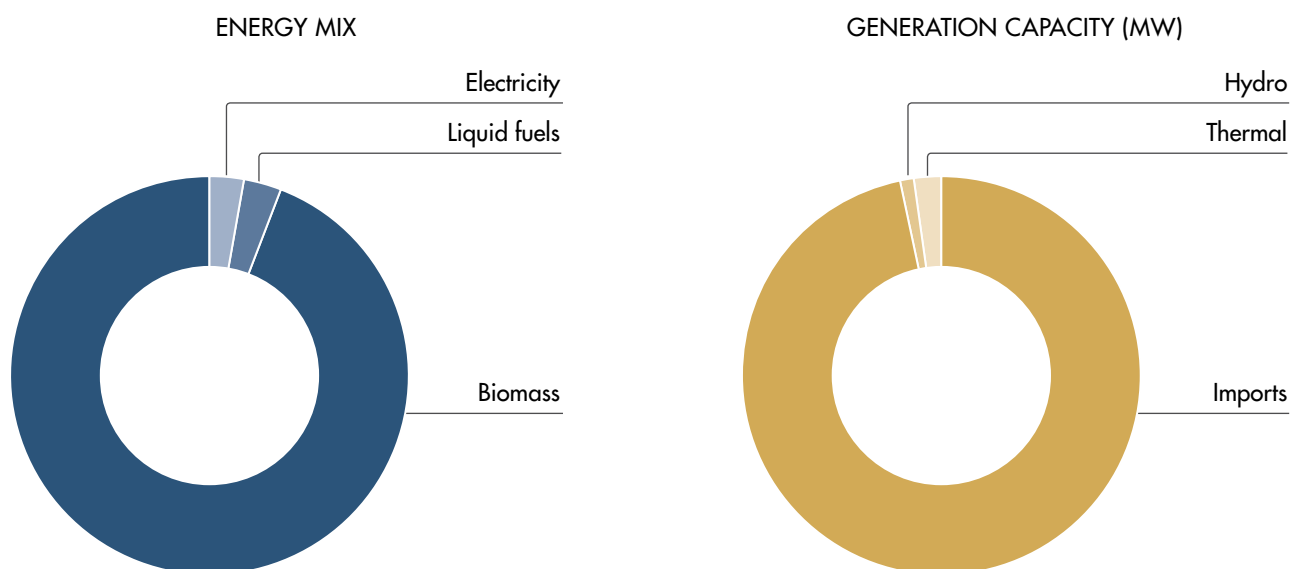
-
- 1 Translation of the concept note title tabled at the Renewable Energy Development Forum, 13–14 November 2015, Kinshasa, DR Congo: ‘*Eclairer la RDC, moderniser les services énergétiques*’.
 - 2 International Energy Agency (IEA), *Africa Energy Outlook*, 2014, https://www.iea.org/publications/freepublications/publication/WEO2014_AfricaEnergyOutlook.pdf, accessed 4 February 2017.
 - 3 Classification based on the hydropower plant size defines large-scale hydropower as a scheme with a capacity to generate more than 500 MW, a medium scale between 500 and 50 MW and a small one below 50 MW. This can vary from country to country. For example, for Norway small-scale hydro is below 10 MW whereas in China, it is below 50 MW and in the EU it is below 20 MW.
 - 4 To date, the final document follows the SADC legal processes. This regional strategy will be released later in 2017.
 - 5 IRENA (International Renewable Energy Agency), *Africa Clean Energy Corridor – Analysis of Infrastructure from Renewable Power in Eastern and Southern Africa*, Abu Dhabi, 2015, http://www.irena.org/DocumentDownloads/Publications/IRENA_Africa_CEC_infrastructure_2015.pdf, accessed 3 February 2017.
 - 6 IRENA, *Southern African Power Pool: Planning and Prospects for Renewable Energy*, Abu Dhabi, 2013, <https://www.irena.org/DocumentDownloads/Publications/SAPP.pdf>, accessed 4 February 2017.

Considering the untapped RES potential and the fact that the average electricity access rate in SADC is barely 25%, there is an undeniable interest in developing RES for the region. The DRC has one of the world's worst electricity access rates at only 11%.⁷ The Congolese government has set the ambitious target of increasing the population's electricity access to 60% by 2025.⁸ With an installed mix of hydropower and thermal capacity of roughly 25 000 MW, the DRC uses only 2% of its estimated hydropower potential of 100 000 MW, distributed over 780 sites in the country. The DRC's generation capacity is a fraction of the size of South Africa's, which dominates the region's generation capacity, accounting for 44 000 MW of the region's 60 000 MW installed capacity.⁹ The DRC currently generates most of its electricity from hydropower. For the total energy mix, including all sources for energy production and consumption, the population uses mostly traditional biomass (wood, charcoal and animal and plant waste; see Figure 1).¹⁰

This heavy reliance on traditional biomass for cooking and heating can also be observed in other countries in the region, such as Malawi, Mozambique or Tanzania.¹¹ In the DRC, this also contributes to the country's status as one of the world's 10 'hotspots' for deforestation.

The DRC's existing energy infrastructure¹² is in poor condition, unevenly developed and in need of maintenance, which raises several challenges in the country's energy sector. Energy access is extremely low and intermittent for the majority of the Congolese population with much of the available energy geared towards large businesses and cities. Consequently, there are frequent power outages, which affect broader infrastructure and industrial development in the country. For example, it has been estimated that businesses

-
- 7 The electrification rate in the DRC is higher in rural areas than in urban areas. It reaches only 4% in urban areas as against 25% in rural areas. This can be partly explained by the high density of population in urban areas in the DRC, notably in informal settlements, following recurrent conflicts in the country. *Ministère de l'Énergie [of the Democratic Republic of Congo], Projet de loi portant sur un Code de l'Électricité*. Kinshasa: Ministère de l'Énergie, 2009; Malawi has the lowest electricity access rate in SADC.
- 8 PNUD (Programme des Nations Unies pour le développement en RD Congo), *Le premier Atlas interactif des énergies renouvelables en RDC*, 2014, <http://www.cd.undp.org/content/rdc/fr/home/presscenter/articles/2014/09/19/le-premier-atlas-interactif-des-nergies-renouvelables-en-rdc.html>, accessed 4 February 2017.
- 9 SAPP (Southern African Power Pool), Annual Report, 2015, <http://www.sapp.co.zw/docs/SAPP%20Annual%20Report-2015.pdf>, accessed 4 February 2017.
- 10 Overall, the transport sector uses 3%, the industrial sector 1.5%, the tertiary sector 0.5% and the domestic sector 95%. All these figures must be interpreted carefully, as they have been flagged as 'perfectible' in several reports, including data provided by the Congolese Ministry of Energy, notably because it is difficult to have precise figures for the tertiary sector, for example. Figure 1 is a combination of the figures found in all the reports mentioned in this paper.
- 11 Overall, the reliance on biomass is less important in other SADC countries, with 68% for Zambia and 66% for Zimbabwe, for example.
- 12 Energy infrastructure – and associated enabling technologies to produce, transmit and manage energy flows – includes not only power plants and transmission lines, but also interconnectors, grids and electricity metering systems.

FIGURE 1 THE DRC'S ENERGY SITUATION

Source: Compiled by author using data from World Bank, Organisation for Economic Co-operation and Development and IEA Statistics, 2014

lost 19.3% of their profits due to power cuts in 2014.¹³ It is apparent that the country's energy needs will not be met without massive investments in its entire energy sector. Although there is installed power generation capacity of 2 500 MW, the existing operating capacity in the DRC reaches about 1 066 MW, which is not sufficient to meet its average peak demand of about 1 300 MW.¹⁴ It is interesting to note that, despite its low generating capacity and frequent blackouts, the DRC is an intermittent electricity exporter to the Republic of Congo (Brazzaville), Rwanda and Zambia. It is therefore not surprising that, given the lack of national and regional access to modern energy services, the Congolese government and its international donors have developed energy policies that pay special attention to neighbouring states' energy needs. Nonetheless, given the state of the DRC's

13 UNECA (UN Commission économique pour l'Afrique), *Accès à l'énergie et sécurité énergétique en Afrique de l'Est: Situation actuelle et moyens de l'améliorer*, 2014, http://www.uneca.org/sites/default/files/PublicationFiles/energy_access_and_security_in_ea_fre_1.pdf.

14 In this case, the peak demand refers to the maximum power requirement of the Congolese system to supply customers at times when power need is greatest, SAPP, *op. cit.*

energy sector, it is unrealistic to expect that it will be able in the short term to supply sufficient power to the region while serving its own industrial and domestic sectors.¹⁵

A further significant challenge is that the DRC's energy mix is not diversified, with a heavy reliance on hydropower for electricity production, and, as noted before, biomass for domestic energy use. Several climate scenarios suggest that one of the most visible impacts of climate change will be on the water resources of the Southern African region. Considering the periodic El Niño events in the region, water stress will rapidly increase, with the water flows of major transboundary river basins, such as the Zambezi and the Congo, becoming increasingly uncertain. Several droughts have already occurred in the region, leaving hydropower generation capacity deeply affected by the decrease in rainfall, dam levels and river flows.¹⁶ The Inga 1 and 2 hydropower stations have been severely affected by recurring decreases in the Congo river's water levels over the past decade.¹⁷ The DRC, ironically the lowest per capita carbon dioxide emitter in the SADC, is particularly vulnerable to climate change impacts.

The DRC's gloomy energy situation can be partly explained by poor governance and uninformed choices. More precisely, the country lacks an adequate framework and governance architecture for its energy sector, particularly around the national power utility, Société Nationale d'Électricité (SNEL).¹⁸ While the company has undergone several restructuring processes over the past decades, there has been little real improvement in the institution's governance and effectiveness.¹⁹ Against this background, the deployment of non-hydro RES offers an interesting alternative to the controversial large-scale hydro schemes often preferred by governments. Considering the DRC's financial and technical difficulties, a national grid coverage to reach rural areas seems unfeasible. Many RES technologies, such as solar panels (Solar PV), small-scale hydro and wind, can be implemented at a local level, thus avoiding the construction, generation and transmission

15 To date, the DRC's limited national grid includes three main lines between Kinshasa and Matadi, Bandundu, and Lubumbashi, with two interconnections with the Republic of Congo (Brazzaville) and Zambia. There are also two isolated lines in the provinces of Kivu (between Kitundu and Goma) and the Province Orientale between Watsa and Bunia. See Figure 3.

16 In 1992 and 1995, following a strong El Niño phenomenon, which brought less rainfall, the region suffered from a severe drought. As a result, water availability in the Zambezi river decreased significantly, affecting population, food production, wildlife and wetlands ecosystems.

17 The decrease of the Congo river's flow affected the power plants production. Variation of the river flow, sedimentation, and poor maintenance explain the large difference between SNEL's installed power capacity of 2 500 MW and the existing operating capacity of 1 066 MW mentioned earlier.

18 SNEL is the DRC's state-owned national electricity company, created in the early 1970. Like Eskom in South Africa, SNEL has been in charge of the bulk of electricity generation and distribution in the DRC.

19 According to interviews with SNEL representatives in 2013 and 2016, this has not prevented SNEL from participating in most of the country's key decision-making actions for the energy sector.

challenges posed by large-scale projects. In addition, RES deliver undeniable socio-economic benefits in terms of health, safety and equity of access, not to mention a significant decrease in environmental costs.

To underscore the diversity of available RES in the DRC and the many opportunities for sustainable development in the country, this paper begins with an analysis of the DRC's energy situation, with a focus on the country's energy infrastructure and frameworks. Despite serious setbacks in infrastructure development, the Congolese government, with the help of international donors, has started to address some of the pressing challenges facing the country. Although the development of Inga 3 has made little progress, it still encompasses a fair share of the DRC's future energy potential. Nonetheless, despite the conclusion of a bilateral treaty between the DRC and South Africa to develop Inga 3, Inga also illustrates the difficulties in coordinating large-scale energy projects in the SADC region. Secondly, the DRC provides a desirable setting to expand small-scale RES and off-grid solutions in the country, given that the national grid and transmission lines are poorly developed and energy access remains extremely low. This paper proposes that the DRC should shift its priorities from a focus on large projects to diversified medium- and small-scale RES projects. To this effect, the new electricity law that was promulgated in 2014, appears to be a game changer for energy stakeholders. This new legislation would be to open up the country to the rapid expansion of Independent Power Producers (IPPs) and Public-Private Partnerships (PPPs) in the RES field. This paper suggests that the South African experience in the deployment of its own RES sector and the partnership between the DRC and South Africa in the development of the Inga project provide important lessons on RES regional cooperation that will be useful for the DRC and other SADC countries.

To demonstrate what is achievable, this paper highlights small, medium and large RES projects that are currently being developed or that are in operation in the DRC. In addition, the paper provides analysis of the DRC's energy sector using semi-structured interviews with key energy stakeholders in Kinshasa in March 2016. These stakeholders include representatives from the Congolese government, companies involved in the building of power stations, and the generation and transmission of power, as well as energy consumers, financial institutions, non-governmental organisations and civil society advocacy networks. The fieldwork has been supplemented by research on the Congolese energy legislation and regulatory frameworks, and informed by previous analyses on the introduction of RES in the region, notably in South Africa. The author has also incorporated her previous research work on the African power pools and the role of large-scale hydropower infrastructure both at regional and national levels.

THE DRC ENERGY SITUATION AND THE INGA SITE'S PROMINENT ROLE

With an average flow of 41 000 m³/s, the Congo river is second only to the Amazon as the world's most significant river in terms of discharge volume. The river's hydropower potential has long been recognised, particularly at the Grand Inga site, a section of the river about 150 km from the river mouth where the level drops almost 100 m in a span of 15 km. It is estimated that this site alone has an energy-generating potential of 44 000 MW,

the equivalent of South Africa's entire installed power capacity. The Grand Inga Project has changed substantially over time.²⁰ The first dam and station (Inga 1) were built in 1972. Plans to expand the Inga 1 power station were discussed two years later, in 1974, yet the second dam and power station (Inga 2) were not completed until 1982.²¹ While additional dams were considered in another feasibility study in 1997,²² political instability in the DRC prevented progress. When Congolese President Joseph Kabila was elected in 2006, the Grand Inga Project was revisited as part of the broader 'five building sites of the Republic' plan.²³ However, in subsequent years this project faced several challenges. BHP Billiton, which had signed an agreement with the DRC to develop an aluminium smelter in Bas-Congo Province that was to receive approximately 1 600 MW from a proposed third Inga dam and power station, withdrew from the project in 2011. Westcor (a regional consortium),²⁴ which had proposed to advance the Grand Inga Project to distribute energy regionally, was dissolved in 2012. Despite these difficulties, the DRC did not abandon the project and today the Grand Inga Project has evolved into a multi-phase project envisioned to ultimately consist of eight dams and associated power stations, including the existing Inga 1 and 2.

South Africa and its national power utility, Eskom, have been instrumental in the revival of the Grand Inga Project. Since 2011, the DRC and South Africa have worked together towards the establishment of a cooperative framework to further develop the Inga site. Between 2011 and 2014, a memorandum of understanding was signed, followed by a bilateral treaty specifying the terms of their future cooperation on the Inga scheme. The two countries' power utilities, Eskom and SNEL, have been earmarked under the agreement to be the primary participants facilitating the funding, construction and management of the Inga 3 dam.²⁵ Despite several declarations by the Congolese government stipulating that the building of Inga 3 would start in October 2015 with the

-
- 20 Maupin A, 'Energy and regional integration: the Grand Inga Project in the DR Congo', in S Scholvin (ed), *A New Scramble for Africa? The Rush for Energy Resources in Sub-Saharan Africa*, pp. 53–70. London: Routledge, 2015.
- 21 Showers KB, 'Congo River's Grand Inga Hydroelectricity Scheme: Linking Environmental History, Policy and Impact', *Water History*, 1, 2009, pp. 31–58.
- 22 This study was led by a consortium composed of Electricité de France (EDF) and the German consulting group Lahmeyer International.
- 23 In addition to water and electricity, Kabila's 'Cinq Chantiers' include infrastructure, education, employment and health.
- 24 Westcor was composed of the national power utilities of Angola, Botswana, DRC, Namibia and South Africa. It was supposedly dissolved after the DRC expressed its preference for a national project, the BHP aluminium smelter.
- 25 Inga 3 has been divided into two phases called *Basses Chutes* and *Hautes Chutes*. After completion of *Basses Chutes*, a subsequent elevation of the dam wall to 40 m is envisaged which would bring an additional production capacity of 3 000 MW (*Hautes Chutes*). The first phase includes the construction of a power station equipped with 11 turbines to produce 4 800 MW. After the completion of the second phase Inga 3's total output will be around 7 800 MW. Electricité de France. 2014. 'Projet Grand Inga, principaux résultats de l'étude de faisabilité'. Paper presented at Comité Français des barrages et réservoirs, Grenoble, 30 January.



Credit: Agathe Maupin

FIGURE 2 THE DRC INGA SITE (EXISTING)
INGA 1 DAM (LEFT)
INGA 2 DAM (BELOW)



Credit: Agathe Maupin

first electricity coming on line by 2020, there are still many exchanges back-and-forth concerning the Inga site development. This illustrates the complexity of advancing such a large-scale hydropower project between the DRC and South Africa, notwithstanding the strength of their bilateral cooperation.

While some stumbling blocks have been identified and partly addressed, the following issues still require serious attention if Inga 3 is to be implemented in a reasonable amount of time. First, the challenges in the Congolese energy sector and the ongoing turmoil in SNEL have to be addressed. Beyond the actual infrastructure build, the institutional mandates and capacities of the different ministries involved in energy governance in the DRC constitute a major challenge to increased energy access. For example, at least five ministries are involved in energy governance in a broad sense.²⁶ Among them, the Ministry of Hydraulic Resources and Electricity is responsible for developing the country's energy policy. Since 2006, the country has embarked on a transformation of its energy sector that is heavily reliant on this ministry, which also coordinates several special entities, including a secretariat that deals with administrative issues like permit delivery and policy enforcement, and a strategic unit (Cellule d'Appui Technique à l'Énergie, or CATE) that provides technical support to SNEL. CATE has played an instrumental role in the development of Inga 3, acting as the central coordinating unit in the promotion of the project on behalf of the Congolese government to international donors and potential financiers.

Despite the key role of the ministry, the country's energy management responsibilities (for example, resource management, energy generation and distribution) are described in several policy documents and fall under several ministries. Since 1970 more than 16 documents have been drafted to transform the DRC's electricity sector.²⁷ Unsurprisingly, this has created confusion, notably among the country's energy stakeholders, making it difficult for the Ministry of Hydraulic Resources and Electricity to fulfil its oversight and coordinating responsibilities. In 2007 a strategic five-year plan, followed by two other policy documents, created a comprehensive institutional and legal framework for the DRC's energy sector.²⁸ These documents also specified the creation of several institutions to improve the energy sector. However, most of the planned energy entities, such as an authority to oversee consumer interests, a fund to finance the country's electrification and an agency to oversee the process of electrification and facilitate private investment in the

26 The Ministry of Hydrocarbons, the Ministry of Mines, the Ministry of Agriculture and Rural Development (rural electrification) and the Ministry of Environment, Nature Conservation and Tourism (with a service dedicated to renewable energies).

27 Ministry of Hydraulic Resources and Electricity [of the DRC]. *Evolution du secteur de l'électricité en RDC depuis la colonisation à ce jour*. Kinshasa: Ministry of Hydraulic Resources and Electricity, 2008.

28 DRC, *Document de Stratégie pour la Réduction de la Pauvreté 2006–2010 (DSRP 1)*. Kinshasa, 2006; DRC, *Document de la Stratégie de Croissance et de Réduction de la Pauvreté 2011–2015 (DSCR 2)*. Kinshasa, 2011; DRC, *Programme d'action du Gouvernement 2012–2016*. Kinshasa, 2012.

energy sector, have not progressed at a sufficient pace to assist the Ministry of Hydraulic Resources and Electricity in meeting the country's energy needs.

Official documents also underscored how the country's generation capacity and transmission system would be expanded with the building of new hydropower stations and the rehabilitation of old ones. Despite a multi-year effort, spearheaded by the World Bank, to rehabilitate Inga 1 and 2, this project is still incomplete. Its initial budget has more than quadrupled, with little progress achieved after several years. This raises serious concerns about the outlook for the successful execution of Inga 3 if the DRC, despite the assistance of the World Bank and several international partners, has been unable to rehabilitate the much smaller Inga 1 and 2 dams.²⁹

Second, the inability of the DRC and South Africa to finance such a large project in its entirety creates difficulties. They have had mixed success both in securing investors and in finding a reliable market for the electricity to be produced. Despite several promotional workshops in Kinshasa clarifying the technical and financial requirements of Inga 3, the building consortium scheduled to be selected at the end of 2014 remains unassigned. Convincing international donors and finance investors that Inga 3 will be viable has been difficult. Only two bidders out of the original three developers have remained committed to completing the bidding process.³⁰ The World Bank, which committed \$73.1 million in 2014 in support of the Congolese hydropower development effort, (of which \$47.5 million was dedicated to Inga 3 and \$25.6 million to the development of medium-scale hydropower projects), recently suspended funding. The principal reason for this decision seems to be a change in the Congolese government's strategic direction regarding the development of large- to medium-scale hydropower projects in the country.³¹ As defined in a document issued by the Congolese president, the government's objectives are to address the energy needs of its five 'special economic zones' and to increase electricity coverage across the country.³² Predictably, the most important priorities in this plan include the Inga site development and the construction of transmission lines to Kinshasa and the Katanga Province in the southeast of the DRC. The potential relevance of Inga to other SADC countries is also highlighted, notably in the Congolese government's 2012–2016 action plan. Additionally, in its discussions with the DRC, South Africa has raised the urgent need to initiate negotiations with the Zambian and Zimbabwean

The inability of the DRC and South Africa to finance such a large project in its entirety creates difficulties. They have had mixed success both in securing investors and in finding a reliable market for the electricity to be produced

29 DRC, 2006, *op. cit.*; DRC, 2011, *op. cit.*; DRC, 2012, *op. cit.*

30 The initial consortium included the Three Gorges Corporation and Sinohydro from China, Actividades de Construcción y Servicios (ACS), AEE (from the Eurofinsa Group) from Spain, and the Canadian SNC Lavalin and Daewoo-Posco from South Korea. Daewoo-Posco dropped out in 2016.

31 The World Bank, 'World Bank Group Suspends Financing to the Inga-3 Basse Chute Technical Assistance Project', Press release, July 25, 2016, <http://www.worldbank.org/en/news/press-release/2016/07/25/world-bank-group-suspends-financing-to-the-inga-3-basse-chute-technical-assistance-project>, accessed 9 February 2016.

32 Five special economic zones are located throughout the country (around the main cities in the western, southern, eastern and northwestern and central regions), and have the triple objectives of balancing the economic growth and development of the country, attracting foreign investors and integrating the DRC's economy into regional value chains.

authorities on the building of transmission lines from the Congolese delivery point at Kolwezi to South Africa. Beyond focusing on the Inga site, the national plan also refers to several small to medium hydropower plants across the country,³³ but little progress has been achieved in this area.

Third, several socio-environmental concerns have been raised which require attention to avoid the negative externalities of Inga 1 and 2. With 89% of the population without access to electricity, it is no wonder that Congolese civil society, with the help of international non-governmental organisations,³⁴ have been vocal on the impact of the project. In an open letter to the World Bank in 2014, the Civil Society Coalition for Reform and Public Action (CORAP), which is composed of diverse associations including labour unions and civil rights groups, expressed three main concerns.³⁵

- Consideration for the energy needs of the Congolese people in the DRC's share of Inga 3's future production. The coalition also noted that compensation was still outstanding for the population displaced to Camp Kinshasa during the construction of Inga 1 and Inga 2.
- Concerns about the socio-environmental impact assessment conducted and recommendations for another assessment.
- Access to information from the government on a more frequent and inclusive basis.

They have stressed that civil society representatives should be included in the Inga Site Development Commission (CODESI) and the recently established Authority for the Development and the Promotion of the Inga Site (ADEPI).³⁶ According to CORAP representatives, the Congolese government has responded fairly positively to their calls and they hope for better inclusion of civil society in the Inga 3 development.³⁷ In addition, the establishment of the ADEPI structure,³⁸ in response to South Africa's concern about

33 The other new hydropower stations envisaged by the 2012–2016 plan are: Bendera (17 MW), Busanga (240 MW), Ivugha (2.5 MW), Kakobola (9 MW), Kamimbi (60 MW), Katende (64 MW), Nzilo 2 (120 MW), Semuliki (72 MW) and Zongo 2 (140 MW).

34 Among others, the Open Society Initiative for Southern Africa and International Rivers have been involved. International Rivers has participated in the organisation of an advocacy network against the Grand Inga project. See International Rivers, 'The Inga 3 Hydropower Project', <https://www.internationalrivers.org/campaigns/the-inga-3-hydropower-project>, accessed 9 February 2017.

35 See <https://cnongd.files.wordpress.com/2014/03/position-de-la-socic3a9tc3a9-civile-sur-le-projet-inga-3-basse-chute.pdf>, accessed 3 March 2017.

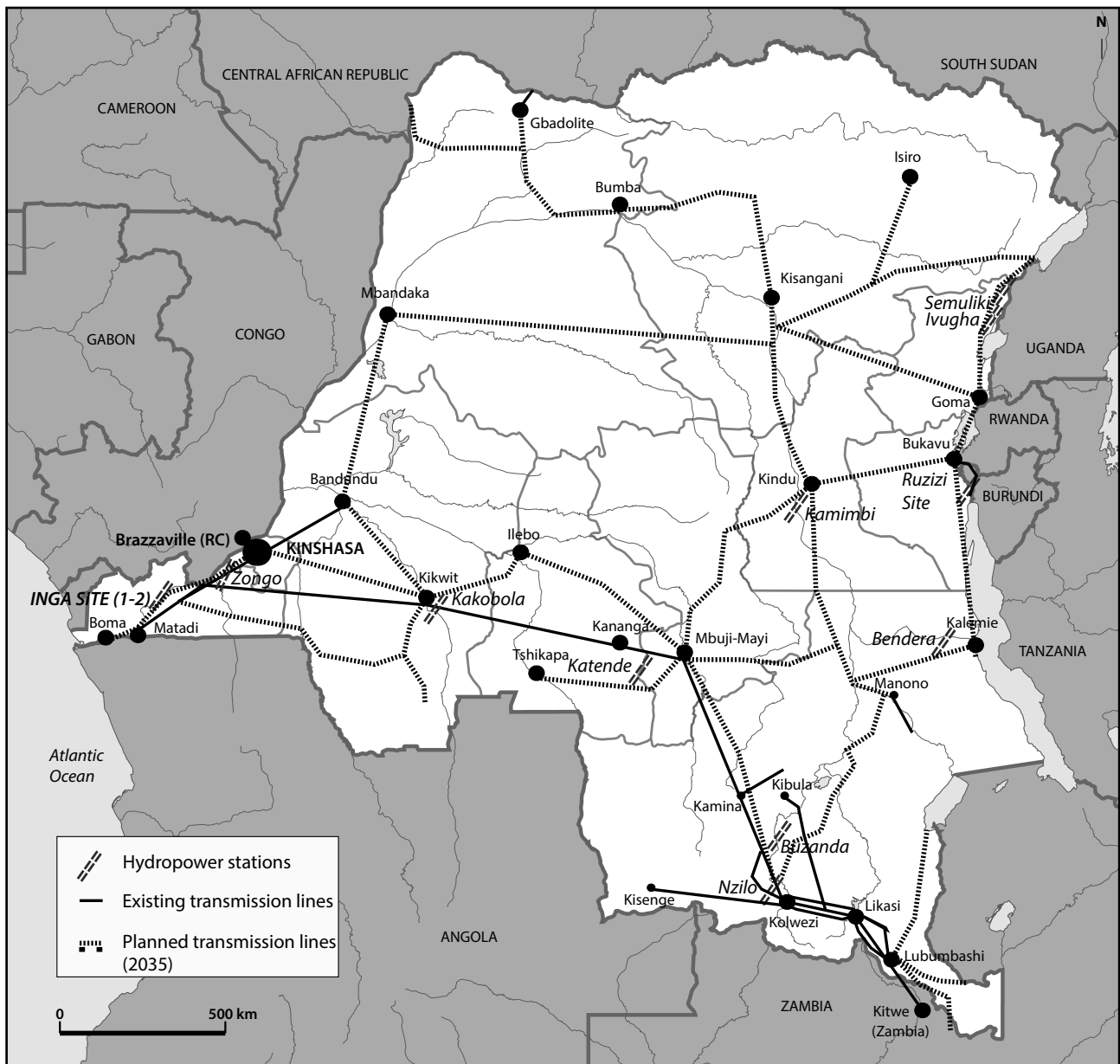
36 CODESI has been operating under the direct authority of the Congolese prime minister Mapon Matata Ponyo, while ADEPI has recently been established (Ordonnance n°15/079, 13 October 2015) under the direction of Bruno Kapandji Kalala, the former DRC Minister of Hydraulic Resources and Electricity.

37 Interviews with the CORAP representatives in Kinshasa, 10 March 2016

38 Two committees, a Joint Ministerial and a Permanent Technical, have been proposed to facilitate the development, operation and management of the project in the DRC with South African representatives.

the need to advance the Inga project's legal framework and institutions, is a critical step forward.

FIGURE 3 OVERVIEW OF THE DRC'S EXISTING POWER NETWORK



Source: Designed by author, using SNEL documents

Overall, the DRC's energy infrastructure – for generation, transmission and distribution – is in poor condition, underscoring the country's fragile financial and institutional capacities. Consequently, the ability of the DRC to fully exploit its hydropower potential remains doubtful, as does its capacity to provide electricity to the region.

THE REGIONAL ENERGY SCENE: INCREASING ACCESS BY DEVELOPING RENEWABLE ENERGY?

South Africa and the DRC have successfully paved the way to establish an energy cooperation framework. However, significant shifts are necessary to succeed in increasing energy access for the two countries within the region. As pointed out earlier, a major shortcoming of the Inga Treaty between the DRC and South Africa is the absence of a regional approach. This is an essential first step towards ensuring the construction and rehabilitation of transboundary transmission lines from the DRC to South Africa, crossing Zambia, Zimbabwe and Botswana.

Despite warnings from SADC energy ministers that the region would soon run out of surplus capacity if planned projects are not commissioned and implemented on schedule,³⁹ the region is increasingly facing diminished generation capacity.⁴⁰ This situation is also applicable to other African regions, where growing energy needs are being met by a diminishing surplus of regional generation capacity. With a total installed power capacity of around 60 000 MW, the region has a regular operating power capacity of about 46 000 MW. More than 75% of this operating capacity comes from South Africa, which is overwhelmingly the largest producer and consumer of electricity in the region as well as being its premier exporter, with one of the subcontinent's highest energy access rates at 85%.⁴¹ However, despite an installed power capacity of 44 000 MW, which matches its estimated energy needs, South Africa's operating capacity averages 36 000 MW.⁴² Mozambique and Zambia trail far behind as the next biggest providers with an average of 2 200 MW each. Angola and Zimbabwe are not far behind them with 1 800 MW and 1 500 MW respectively. The DRC follows with 1 000 MW. Tanzania produces about 800 MW, while Botswana, Namibia and Malawi provide an average of 400 MW each. Swaziland and Lesotho's contributions are both below 100 MW. Importantly, the region's power generation is derived mainly from coal, while hydro accounts for approximately 20% of the regional electricity pool.

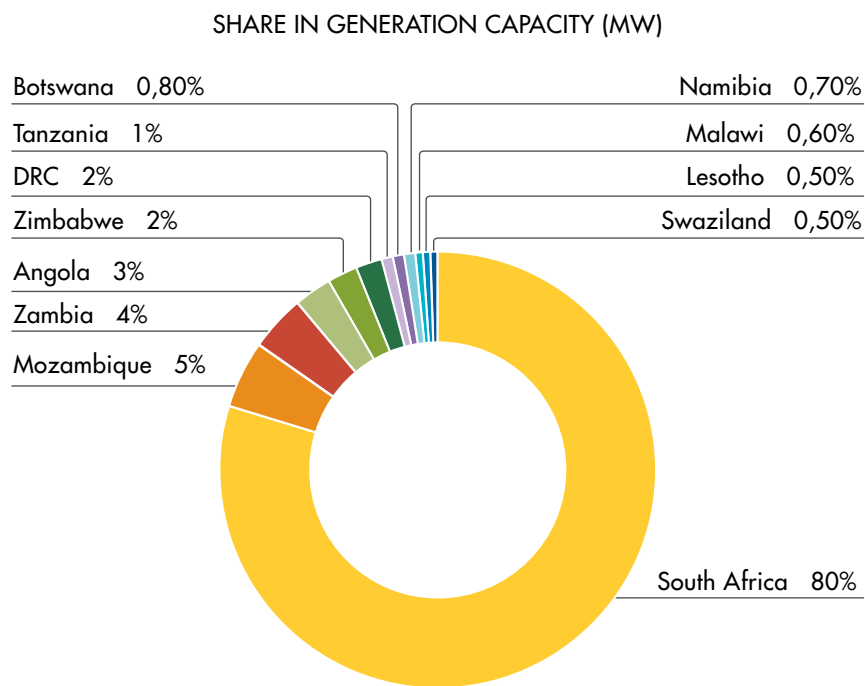
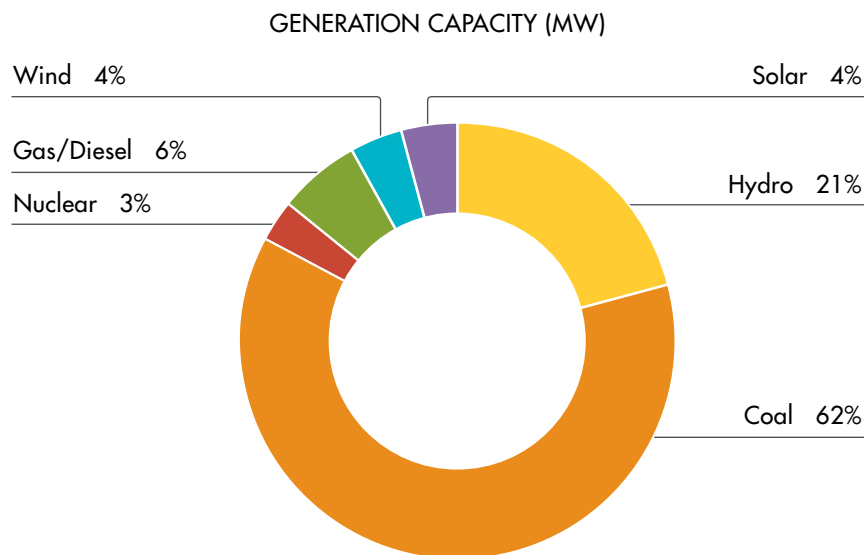
39 In 2007, a SADC summit held a special session focusing on strategies to accelerate regional infrastructure development and directed the SADC Secretariat to work out the details of a regional Master Plan for Infrastructure Development in close cooperation with the SADC Member States. 'Communiqué of the summit of the Southern African Development Community, 17 August 2007, http://repository.un.org/bitstream/handle/11176/270115/A_62_831-EN.pdf?sequence=3&isAllowed=y, accessed 9 February 2017.

40 The SADC Strategic Plan calculated that in order for national economies to operate properly regional reserve requires supplies of 10% in terms of installed energy capacity.

41 Mauritius has an energy access rate of 100% and the Seychelles islands are close to 96%.

42 SAPP, *op. cit.*

FIGURE 4 THE REGIONAL ENERGY SITUATION



Source: Compiled by author using data from IRENA, 2013 and SAPP, 2015

Except for South Africa, the power generating capacity and electrification rates in individual SADC states are extremely low. It is thus difficult to establish an average regional energy mix for the region; most countries rely heavily on traditional biomass which constitutes more than 50% of their primary source of energy. The quality of energy access is also highly differentiated at the national level. A small, relatively wealthy section of the population in most SADC countries has access to reliable electricity and fuel resources while the majority of the citizens rely on energy sources such as charcoal and other types of traditional biomass that have negative health and environmental impacts.⁴³ Inequality in energy access is also evident between rural and urban regions. National capitals and large cities have fairly good access to the national grid, whereas rural areas often remain off-grid. Finally, it is important to note that access to the grid is no guarantee of reliable energy access in the Southern African region – blackouts and brownouts are also common in the region.

One of the most striking regional challenges lies in how unequal national energy networks are among SADC countries. African regional economic communities have been developed with several goals in mind, including the desire to bridge development gaps between member states. In SADC these gaps include disparities in terms of energy infrastructure, energy efficiency, power generation and energy access. Under the regional economic communities' umbrella, specific sub-regional organisations, such as power pools have been implemented to manage regional energy issues⁴⁴ in addition to several regional legal instruments. For example, SADC has developed a Regional Infrastructure Development Master Plan (RIDMP).⁴⁵ This plan aims to complement the SADC Energy Protocol,⁴⁶ along with other sector-specific strategies and plans. On this basis, regional responses now speak more adequately to regional electricity needs.

Today, the presence of trade mechanisms and centralised regional bodies such as the SAPP, suggests that solutions are possible at the regional level. Created in 1995 by the national power utilities of SADC, the SAPP successfully managed the integration of the coal-based grid of its southern members and the hydro-based grid of its northern members via

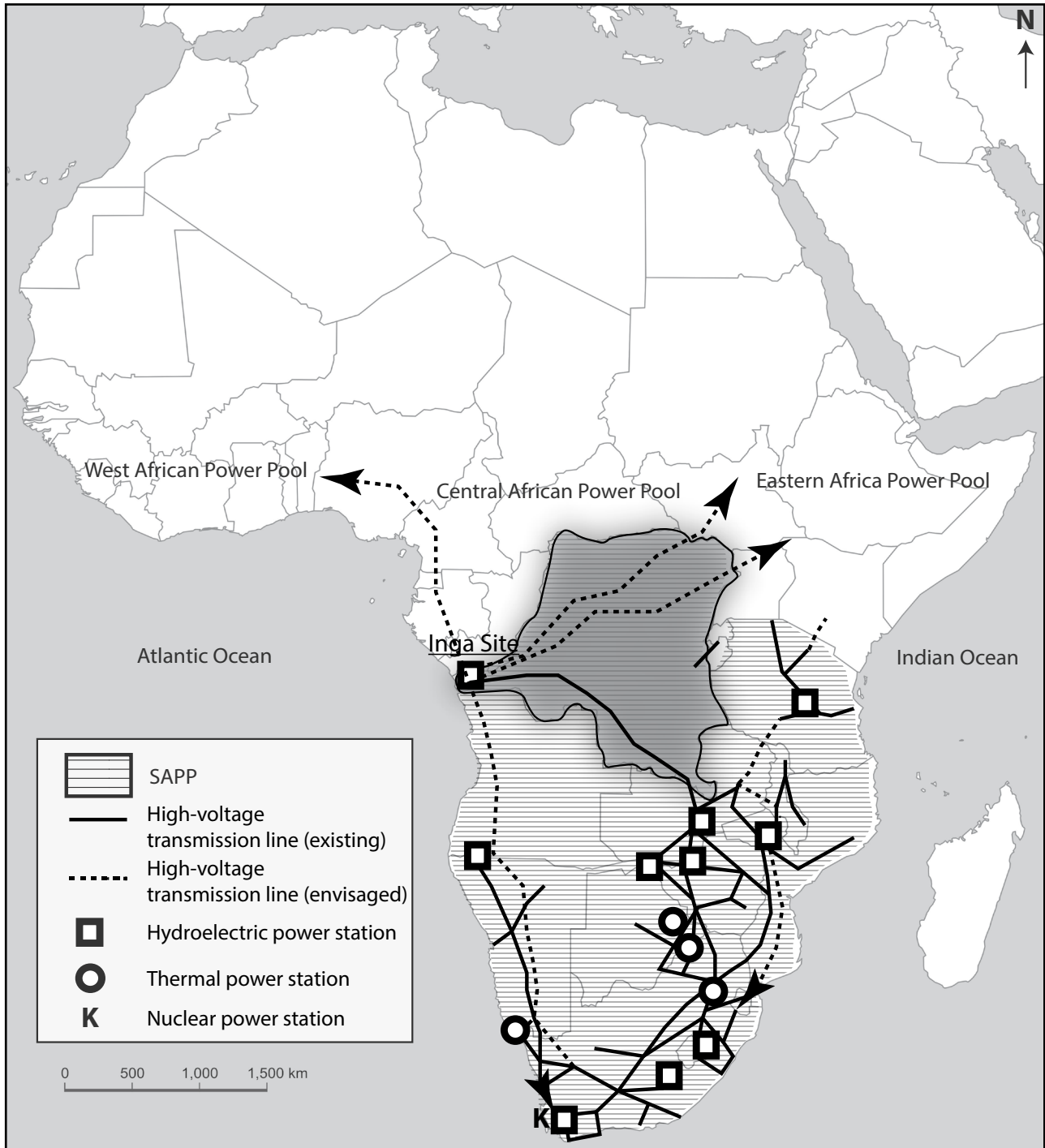
43 Fuelwood, charcoal, agriculture waste and animal dung are often used to meet the energy needs for cooking, heating and lighting. Most concerns are linked to indoor air pollution, fire hazards and environmental degradation.

44 A power pool is used to balance electricity over a larger network. It is a mechanism for power exchange between two and more power utilities, which provide or generate electricity. Power pools are also formed and interconnections developed to cover network efficiency over increasingly long distance. Five power pools currently exist across the African continent.

45 SADC, *Regional Infrastructure Development Master Plan Executive Summary*, August 2012, Gaborone, http://www.sadc.int/files/7513/5293/3530/Regional_Infrastructure_Development_Master_Plan_Executive_Summary.pdf, accessed 9 February 2017.

46 SADC, *Protocol on Energy*, 1996, Maseru, http://www.sadc.int/files/3913/5292/8363/Protocol_on_Energy1996.pdf, accessed 9 February 2017.

FIGURE 5 OVERVIEW OF THE SAPP EXISTING POWER NETWORK



Source: Designed by author using SAPP, 2015

transmission facilities in Zambia and Zimbabwe.⁴⁷ These national grid interconnections have been established incrementally under SADC supervision.⁴⁸ While the SAPP activities were limited in the beginning, the capacity in the region has increased significantly, from 35 000 MW in 1995 to 42 000 MW in 2005 and to 60 000 MW today. Enforced regional market mechanisms in the SAPP have contributed to facilitating short-term electricity supply contracts between national power utilities. In turn, such contracts have enabled the operation of an interconnected regional power system, notably to deal with short-term imbalances experienced by national power utilities. In 2010, SADC developed a Regional Energy Access Strategy and Action Plan that emphasised the importance of improving energy access for all in the region, notably by developing off-grid solutions.⁴⁹ More recently, SADC has established a regional Centre for Renewable Energy and Energy Efficiency, located in Namibia.⁵⁰ This centre is the third SADC subsidiary organisation approved by SADC energy ministers following the establishment of the SAPP in 1995 and the Regional Energy Regulators Association in 2002. In brief, power pooling and associated regional plans are becoming instrumental in contributing to an expanding market for RES and to increasing the share of power derived from RES.

To implement the regional strategy, the SADC governments' ability to engage at the regional level and link energy infrastructure building with national socio-economic development priorities and environmental protection will be vital

Several regional and national initiatives have started to tackle these challenges, including creating smaller and off-grid power utilities, emphasising renewable energy and adding IPPs. To implement the regional strategy, the governments of the SADC countries' ability to engage at the regional level and link energy infrastructure building with national socio-economic development priorities and environmental protection will be vital. The RES expansion concerns both national and regional levels and raises questions about SADC countries' capacities (and willingness) to work together on the development of regional projects – and more broadly, a sustainable regional energy future – without falling into a competitive trap regarding the selection of regional projects. There is also room for better integration of energy stakeholders in the decision-making and implementation processes at a regional level. While a broader agenda that includes access to affordable, reliable, sustainable and modern energy for all under the Sustainable Development Goal 7 has been acknowledged worldwide, with the ambitious objective of being achieved by 2030, future energy choices rest strongly on the policies and infrastructure-building capacity

47 The SAPP members include the national power utilities from Angola, Botswana, Democratic Republic of Congo, Lesotho, Mozambique, Malawi, Namibia, South Africa, Zambia and Zimbabwe.

48 Maupin A, 'Building a Regional Electricity Market: SAPP challenges, PERISA Case Study 4 Public Goods', SAIIA (South African Institute of International Affairs), August 2013, <https://www.saiia.org.za/special-publications-series/443-perisa-case-study-4-public-goods-building-a-regional-electricity-market-sapp-challenges/file>, accessed 9 February 2017.

49 SADC, Regional Energy Access Strategy and Action Plan. Gaborone, 2010, http://www.euei-pdf.org/sites/default/files/files/field_pblctn_file/EUEI_PDF_SADC_Regional_Energy_Access_Strategy_Mar_202010_EN.pdf, accessed 9 February 2017.

50 South African Department of Energy, '34th meeting of SADC Energy Ministers, Sandton Convention Centre, Johannesburg', press release, 24 July 2015, <http://www.gov.za/speeches/34th-meeting-sadc-energy-ministers-24-jul-2015-0000>, accessed 3 March 2017.

of countries.⁵¹ Among the Southern African regional members, some efforts to develop adequate national policies and planning have recently been triggered by the expansion of renewable energy worldwide, notably with increased RES affordability and growing North–South and South–South technology transfers. To concurrently bridge the gaps between energy access and increased electricity supply, SADC countries should develop and implement policies in their respective energy sectors, address inadequate energy choices that result in unbalanced energy mixes and increased greenhouse gas emissions, and improve the management of their national power utilities.

SHEDDING LIGHT ON THE DRC REGIONAL AND NATIONAL RENEWABLE ENERGY SOURCES POTENTIAL

In most SADC countries, the use of RES is not a recent phenomenon. Large-scale hydro schemes such as the Kariba and the Cahora Bassa dams produced power for the northern part of the SADC region during the 1960s to 1980s. However, the harnessing of RES potential has been limited to large-scale hydropower stations and using biomass by default for meeting basic energy needs. What is under consideration today is not only the expansion of RES technologies – notably the remarkable diversity of sources in the region (including solar, wind and geothermal) and their implementation at various tiers – but also a change in the power generation and energy mix model, which would include off-grid solutions and competitive energy trades. South Africa, Zimbabwe and Tanzania have been the largest regional recipients of RES investments over the past decade.⁵² This includes large- to medium-scale hydro projects such as the Batoka Gorge extension in Zimbabwe, which has been identified as one of the regional priority projects supported by the SAPP.

With one of the lowest energy access rates in the region, the DRC has responded positively to the regional interest in RES. The Inga 3 project is also considered a priority project by SADC. The DRC's central location could play in the country's favour in the future. It is uniquely linked with three of the four regional grids in sub-Saharan Africa: in addition to the SAPP, it is part of the Central African Power Pool (CAPP), headquartered in Brazzaville, Republic of Congo, and the Eastern African Power Pool (EAPP), in Addis-Ababa, Ethiopia. These two power pools could also derive benefits from the completion of the Inga 3 project and its next phases.⁵³ Compared to the SAPP production capacity of 60 000 MW, the CAPP production capacity barely reaches 6 000 MW, while the EAPP is

51 SADC (Southern African Development Community) Protocol on Energy. Gaborone: SADC, 2006; Energy Programmes and Projects. Gaborone: SADC. 1996. SADC. 2010. Regional Energy Access Strategy and Action Plan. Gaborone: SADC.

52 REN21, *SADC Renewable Energy and Energy Efficiency Status Report*, 2015, http://www.ren21.net/wp-content/uploads/2015/10/REN21_webfile.pdf, accessed 9 February 2015.

53 CAPP was created in 2003; the members include the national power utilities from Angola, Burundi, Cameroon, Central African Republic, DRC, Equatorial Guinea, Gabon, Republic of Congo, São Tomé and Príncipe, and Chad. The EAPP was established in 2005 and consists of Burundi, the DR Congo, Egypt, Ethiopia, Kenya, Libya, Rwanda, Sudan, Tanzania and Uganda; ECCAS and CAPP, 2014, http://www.ceeac-eccas.org/index.php?option=com_content&view=article&id=22&Itemid=81, accessed 9 February 2017.

below 30 000 MW (with Egypt contributing up to two-thirds of the region's production). Both have taken serious steps towards creating regional electricity markets, although none are as advanced as the SAPP. More importantly, both power pools note the hydropower potential of the DRC in their project agendas. The EAPP suggests that the Grand Inga Project could potentially supply East Africa, but concludes that this project will not be realised within the next 25 years, given its significant financial and technical difficulties.⁵⁴ In the CAPP, both Inga 3 and Grand Inga have been identified as prioritised projects. This underscores a common confusion about the project. After completing Inga 1 and 2, provisions were made for a Grand Inga dam, which was envisioned as a project including the Inga 3 dam and a fourth large dam called Grand Inga. However, this was abandoned in favour of a phased project, with the building of several dams from Inga 3 to Inga 8. Nonetheless, several documents, including the official exchange between the DRC and South Africa, often refer to 'the Grand Inga Project', even though the project focus is, for now, only on Inga 3.

There is no doubt that the Inga site has gained increasing interest from the rest of the continent and this could serve as a linchpin for all African power pools. Other large-scale hydropower projects are also being built or envisaged. For example, the Grand Ethiopia Renaissance Dam is halfway to completion; with a future power production of 5 500 MW, it could become a serious competitor to Inga 3 and its planned follow-on phases in the EAPP and SAPP. However, despite the initial investment of development finance institutions such as the African Development Bank and the World Bank in the Inga 3 project's planning and financing, the recent change of mind by the World Bank⁵⁵ will probably have a serious impact on other international partners and, as a result, on the feasibility of Inga 3. As mentioned earlier, the World Bank provided support for the creation of the Inga 3 Management Unit, which was operated by CATE and should now fall under the authority of the newly developed ADEPI.⁵⁶ Nonetheless, it has reiterated its support to the development of the Congolese energy sector as a whole.

To start building the Inga 3 dam and plan the follow-on phases, enhancing energy cooperation with South Africa and the region will be essential. However, overcoming political instability and energy-related infrastructural and institutional problems will also be key for the DRC's development plans. For example, after a monopoly of several decades, SNEL has slowly been transformed into a commercial company. Nonetheless, this has not fundamentally changed the company's situation and concerns about its capacity remain

54 EAPP and EAC. *Final Master Plan Report: Regional Power System Master Plan and Grid Code Study*, 2011, Addis Ababa: EAC.

55 The withdrawal of the World Bank is supposedly the result of recent changes introduced by the Congolese government regarding the direction taken by the project. See The World Bank, *op. cit.*

56 African Development Bank Group, Inga Site Development and Electricity Access Support Project (PASEL), Project Appraisal Report, 2013, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Multinational_-_Inga_Site_Development_and_Electricity_Access_Support_Project__PASEL_-_Appraisal_Report1.pdf, accessed 9 February 2017.

key for international donors. Construction companies are also experiencing significant obstacles in the DRC. For example, building energy infrastructure and developing economic corridors or hubs require electricity. This is a serious issue in the DRC where Congolese infrastructure development plans have not provided funds to support building. Importing generators is expensive in a country where import taxes are high and costs are increased by corrupt practices along the whole import chain. Moreover, generators operate mostly on diesel, which is yet another imported product in the DRC. Setbacks in the building of the Zongo 2 hydropower station (150 MW) have also illustrated the challenges faced by construction companies operating with SNEL. The Zongo hydropower stations are located near Kinshasa in the Bas-Congo province. Zongo 1 was built in the 1960s (75 MW) and Zongo 2, commissioned in 2012, is still under construction. Ironically, CATE has partly attributed Zongo 2's delays to SNEL's late payments of its electricity bills.⁵⁷

The implementation of energy infrastructure relies in part on existing electricity production, but also the potential to trade electricity to address shortfalls. Regional power pooling could provide a temporary support to remedy energy shortages in the DRC and therefore, to improve access to and reliability of electricity supply.

Although the DRC is endowed with enormous hydropower potential, in a context of climate change and potential increase in water stress situations, it should diversify its energy mix. Unveiling a new electricity law has inspired the DRC to break away from past practices, such as the monopoly in its national energy sector.⁵⁸ In addition, small-scale power plants and off-grid production units seem to fit well into the DRC's decentralisation plans, notably to increase electricity access in rural areas. While considering how to harness its renewable energy power, the DRC has also taken a step towards addressing the country's energy access challenges by favouring the introduction of PPPs and IPPs.

Indeed, it needs to approach, engage and respond to its energy challenges more comprehensively, by identifying clear priorities. For example, there is an urgent need for the Congolese government to question the efficiency and sustainability of its national power utility. Distributing electricity infrastructure more equitably across the provinces and rehabilitating and extending household electricity access in cities is essential to enhancing stability in the country. To this end, in the recently developed documents mentioned above, small-scale renewable energy projects (such as small-scale hydro, modern biomass and small solar units) in addition to Inga 3, have been identified as priorities by the Congolese government. CORAP has also stressed these priorities.⁵⁹ So far, many small-scale hydro sites have been identified throughout the country but there is no financial plan

Distributing electricity infrastructure more equitably across the provinces and rehabilitating and extending household electricity access in cities is essential to enhancing stability in the country

57 Other circumstances, according to a note released by CATE on the state of the Zongo 2 building progress, were problems with cement supply and weather-related difficulties for road construction. Delays are also explained by financial issues. See International Rivers, *How the Inga Dams are holding the Congo's Energy Future Hostage*, 6 September 2015.

58 Maru MT, 'Ethiopia's Regional Diplomacies: a Dominant Interpretation of the Horn of Africa', SAIIA Policy Briefing, 112, 2014, http://www.saiia.org.za/doc_view/600-ethiopia-s-regional-diplomacies-a-dominant-interpretation-of-the-horn-of-africa, accessed 4 February 2017.

59 Interviews with CORAP representatives in Kinshasa, 10 March 2016

FIGURE 6 THE DRC ZONGO FALLS AND ACCESS ROAD UNDER CONSTRUCTION



Credit: Agathe Maupin



Credit: Agathe Maupin

or timeline to develop and implement them. Most of these projects fit into the context of emission reduction targets and clean development promotion, recently enhanced by the signature of the 2015 Paris Agreement on climate change. RES deployment could benefit from financial aid provided under the UN Framework Convention on Climate Change.

Recently, the DRC has drawn benefits from the UN Development Programme through the completion of an atlas of its RES potential. Key findings in this comprehensive mapping, released in 2014, include the identification of the possible location of more small-scale hydropower units (with a capacity of less than 10 MW), excellent conditions for solar power development in the Maniema and Katanga provinces, and wind power in the latter, and important biomass capacities in the central and northern provinces, such as Bandundu.⁶⁰ The Katanga and Kivu areas also host possible geothermal sites. Another key milestone is the DRC's new legislation on electricity, also introduced in 2014.⁶¹ Decree 14/019 modifies various aspects related to the production of power and will deeply transform the DRC energy sector. Among the changes, the DRC's electricity market will be more accessible to external operators. Notably, the new bill will establish regulatory mechanisms for dispute settlements among operators, as well as between operators and customers. In brief, allowing the establishment of private power plants and a more competitive market constitute significant changes in the DRC's energy framework, which have been welcomed by the majority of energy stakeholders.⁶²

South Africa offers an interesting example to the DRC on how it has successfully managed to balance the national deployment of RES, including at a small-scale level and with a diversity of sources (mostly solar and wind, with a few hydro projects), while retaining an interest in larger-scale regional projects. Despite the conversion of Eskom into a public company⁶³ and the development of ambitious legislation and planning – including the deployment of RES in South Africa's energy mix⁶⁴ – the country still faced an energy crisis in 2008.⁶⁵ The resultant energy shortages opened a call for urgent national action

60 PNUD, *op. cit.*

61 Democratic Republic of Congo, (Primature), Loi sur l'électricité n°14/011 – 27 juin 2014, 2014 Kinshasa; DRC. Décret n°14/019 – 2 août 2014, 2014, Kinshasa.

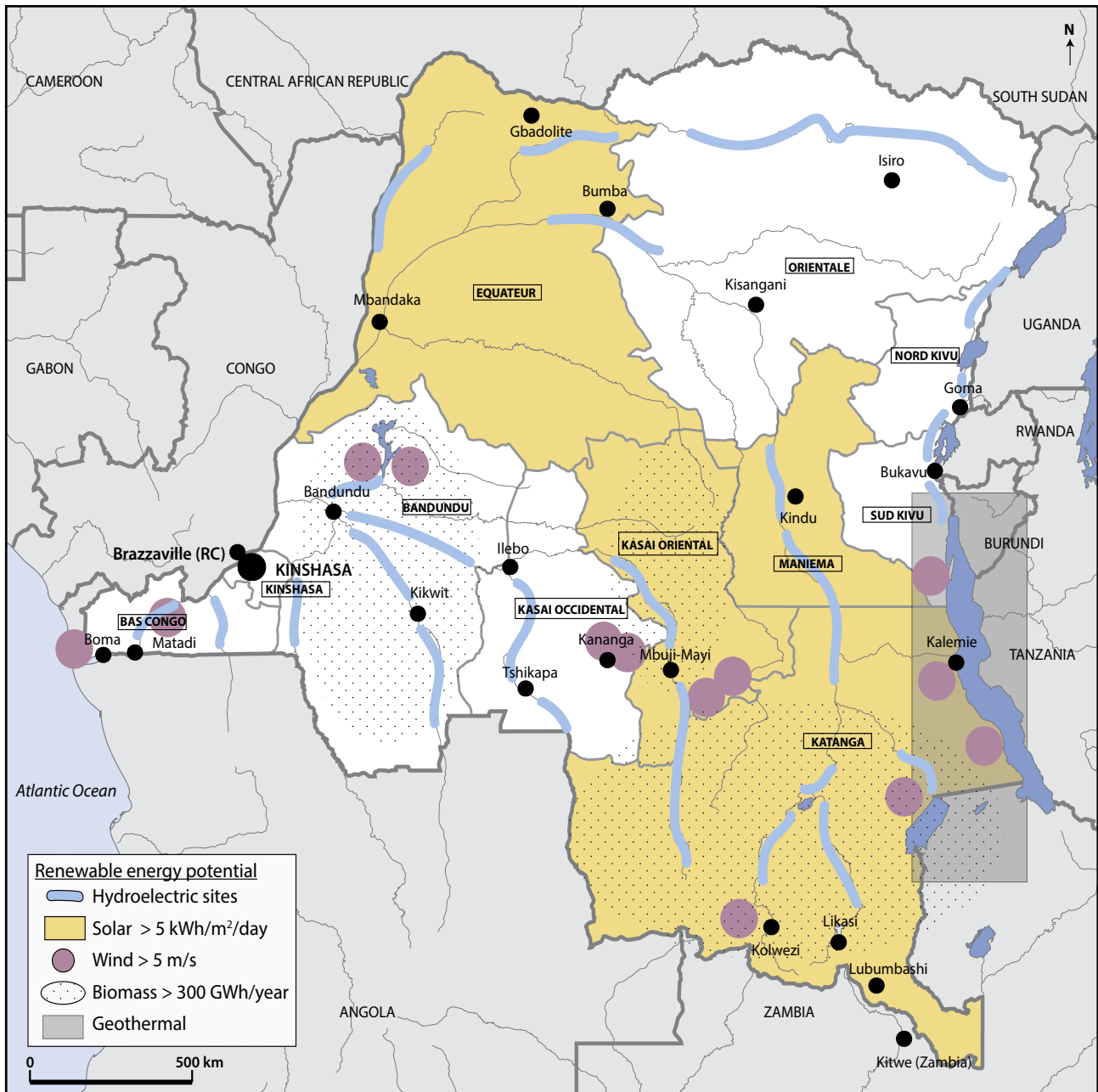
62 Discussions with small energy business owners (solar PV) in Kinshasa, 8 March 2016

63 South Africa's Ministry of Public Enterprises acts as the government representative and sole shareholder of Eskom; Eskom Conversion Act. No. 13 of 2001. Pretoria: Government Printer.

64 Republic of South Africa, Department of Minerals and Energy, White Paper on Renewable Energy Policy. 2003, Pretoria, http://www.energy.gov.za/files/policies/whitepaper_renewables_2003.pdf, accessed 4 February 2017; See the creation of a National Energy Regulator of South Africa (NERSA) and the establishment of a South African National Energy Development Institute (SANEDI); Republic of South Africa. 2008. National Energy Act. No 34 of 2008. Pretoria: Government Printer; See the Republic of South Africa several Integrated Energy Plans, http://www.energy.gov.za/files/policies_frame.html, accessed 9 February 2017.

65 *Ibid.*

FIGURE 7 OVERVIEW OF THE DRC'S RENEWABLE ENERGY SOURCES



Source: Designed by author using UN Development Programme Atlas on RES in the DRC, 2014

in South Africa,⁶⁶ such as building more power stations, including those using RES. The restructuring of Eskom was a long process, which has thus far produced mixed successes. Nevertheless, the Renewable Energy Independent Power Producer Procurement Programme (REI4P), launched in 2011, has diligently allowed for four bidding phases of power derived from RES, of which 1 860 MW have started commercial operation.⁶⁷ Despite this achievement, South Africa retains a strong interest in further developing the Inga site in close partnership with the DRC.⁶⁸ In fact during her presentation of the 2014/2015 budget vote, the South African Minister for International Relations and Cooperation specifically mentioned South Africa's support for regional projects such as The Lesotho Highlands Water Project's second phase and the Grand Inga Project in the DRC.⁶⁹ Indeed, South Africa plans to rely partly on regional electricity trades to balance its greenhouse gas emissions, and while it holds a strategic position on the regional energy scene as the largest producer and consumer of electricity, most of this electricity is derived from coal. By comparison, most of the electricity produced in the DRC is derived from hydro. As mentioned by the South African Department of Energy, regional instruments, such as the SAPP, allow 'the free trading of electricity between SADC member countries, providing South Africa with access to the vast hydropower potential in the countries to the north, notably the significant potential in the Congo River (Inga Falls)'.⁷⁰

Nonetheless, despite some changes in the DRC's energy sector governance, the difficulties encountered around Inga 3 exemplify several persistent deadlocks that cannot be ignored by its partners. While Inga 3 could bring additional RES to the regional energy mix,⁷¹ a major concern for the South African parliament in the approval of the Inga treaty has been the security and stability of the DRC.⁷² While the DRC still has a chance to shine on the regional stage, the country's poor energy situation and urgent domestic challenges could

66 DIRCO (Department of International Relations and Cooperation) Budget Vote Speech by the Minister of International Relations and Cooperation, 22 July 2014, <http://www.dirco.gov.za/docs/speeches/2014/mash0722.html>, accessed 3 March 2017.

67 Initially, the REI4P included three windows to add up to 3 725 MW of power capacity from RES into the South African energy mix. According to the South African Department of Energy, the programme will eventually provide a power capacity of 6 330 MW. http://www.gov.za/sites/www.gov.za/files/State%20of%20Renewable%20Energy%20in%20South%20Africa_s.pdf, accessed 3 March 2017.

68 In 2003, the South African White Paper on Renewable Energy set ambitious targets to increase the production of electricity from RES by 2013. Republic of South Africa, 2003, *op. cit.*

69 DIRCO, Budget Vote Speech, *op. cit.*

70 See the Republic of South Africa Department of Energy website: <http://www.gov.za/about-sa/energy>, accessed 14 February 2017.

71 Republic of South Africa, Memorandum of Understanding between the Government of the Republic of South Africa and the Government of the Democratic Republic of Congo with Respect to the Grand Inga Project in the Democratic Republic of Congo, 2011, Pretoria: Government Printer.

72 As stressed by the South African Energy Portfolio Committee at a briefing in front of the South African Parliament in 2014.

While the DRC still has a chance to shine on the regional stage, the country's poor energy situation and urgent domestic challenges could prevent the progressive development of RES (including small- to large-scale projects) in the country

prevent the progressive development of RES (including small- to large-scale projects) in the country. This will not only have an adverse impact on the well-being of the majority of the Congolese who still lack access to electricity, but also to its positioning in the renewable energy space regionally.

CONCLUSION: GENERATING OPPORTUNITIES FOR THE DRC SUSTAINABLE DEVELOPMENT

While the SADC countries share an undeniable urgency in dealing with energy shortages and have a common interest in strengthening their energy sectors, they face very different structural issues. Some countries, such as South Africa, have developed a large number of energy-related policies,⁷³ while a country like the DRC has just begun to tackle post-conflict, energy-related development challenges. As the largest consumer and producer of power in the region, South Africa plays a key role in the energy sector of all the SADC countries. Against this backdrop, South Africa's engagement in the regional energy institutions should be stronger, more transparent and equitable to meet not only its own national, but also regional targets.

Despite its current status as a small contributor in the regional energy market, the DRC could rapidly attain a strategic position as a producer of electrical power derived from hydro. In addition, the DRC is benefiting from one of the highest growth rates on the continent. If the DRC gains leverage in regional institutions, the country's national and regional ambitions could be successful. However, the setbacks encountered with the Inga site development project, and the multi-phased hydropower stations approach, has forced the DRC to consider the pitfalls inherent in its national and regional electricity markets carefully. It raises doubts about how the DRC could play a significant role in the region, despite its significant RES potential.

Given the potential of the Inga site, plus the additional local capacity that could be generated in remote areas with the deployment of small- and medium-scale RES projects, the DRC should consider a two-track strategy towards the deployment of RES in the country. Pursuing Inga 3 while also promoting smaller RES projects is not impossible provided that the country tackles several challenges in the development of its energy sector. Encouragingly, the energy sector's legal and regulatory framework has been prioritised, and as a result, the promulgation of the 2014 law has been received as a positive signal among energy stakeholders. However, the DRC's presidential and legislative elections, initially planned for the end of 2016 but now postponed, could impede the recently established legislative and planning progress. With the support of all energy stakeholders, including the IPP and civil society, technical, financial, political, economic and environmental challenges could be overcome to deliver electricity to the majority of Congolese.

73 Electricity Regulation Act No. 4 of 2006. Pretoria: *Government Printer; National Energy Act No. 34 of 2008, op. cit.*,

In its efforts to attract continental and international investors, the DRC has made undeniable progress towards institutional reform and policy development. Two key advances in the national and regional space include its signing of the inter-regional Tripartite Free Trade Area Agreement linking Eastern and Southern Africa⁷⁴ and the international Paris Agreement⁷⁵ in 2015. While these agreements focus on different issues, the free trade agreement on liberalising trade and the Paris Agreement on climate change, both illustrate a significant change in the future of regional cooperation that include a more ambitious commitment towards achieving regional integration through multi-sectoral resource pooling. However, in a context where greater regional commitment to anything beyond national priorities is still a long time coming, could regional integration eventually be realised? To this effect, greater attention should be paid to the diversity and potential of several regional projects, in order to align regional projects with national priorities, notably achieving energy access for all. This will be instrumental in ensuring sustainability for future renewable energy projects and avoiding a focus on securing energy at the national level to the detriment of a regional, integrative approach.

Given the potential of the Inga site, plus the additional local capacity that could be generated in remote areas with the deployment of small- and medium-scale RES projects, the DRC should consider a two-track strategy towards the deployment of RES in the country

74 COMESA (Common Market for Eastern and Southern Africa), *Agreement Establishing a Tripartite Free Trade Area among the Common Market for Eastern and Southern Africa, the East African Community and the Southern African Development Community*, <https://www.tralac.org/images/docs/7531/tfta-agreement-june-2015.pdf>, accessed 13 March 2017.

75 UN, Paris Agreement, 2015, https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf, accessed 13 March 2017.

SAIIA'S FUNDING PROFILE

SAIIA raises funds from governments, charitable foundations, companies and individual donors. Our work is currently being funded by, among others, the Bradlow Foundation, the UK's Department for International Development, the Konrad Adenauer Foundation, the Royal Norwegian Ministry of Foreign Affairs, the Swedish International Development Cooperation Agency, the World Bank, the Swiss Agency for Development and Cooperation, the Open Society Foundations, the Organisation for Economic Co-operation and Development, Oxfam South Africa and the Centre for International Governance and Innovation. SAIIA's corporate membership is drawn from the South African private sector and international businesses with an interest in Africa. In addition, SAIIA has a substantial number of international diplomatic and mainly South African institutional members.



Jan Smuts House, East Campus, University of the Witwatersrand
PO Box 31596, Braamfontein 2017, Johannesburg, South Africa
Tel +27 (0)11 339-2021 • Fax +27 (0)11 339-2154
www.saiia.org.za • info@saiia.org.za