



# Energetic Dialogues in South Africa: The Inga Example

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## EXECUTIVE SUMMARY

Studies of major hydropower projects such as that at the Grand Inga Dam in the Democratic Republic of the Congo (DRC) stress generation capacity and call for regional integration. They make little reference, however, to the potential for co-operation in energy policy that goes beyond the construction of energy-related infrastructure. Concentrating on the Inga site's existing and future dams, this paper identifies several challenges to an emerging energy dialogue between Inga's regional stakeholders. It questions whether the recent energy deal between South Africa and the DRC has opened a path towards further regional energy co-operation.

## INTRODUCTION

In 2008 a severe shortfall in energy generation in South Africa exposed the full scale of the country's cumulative energy needs and brought with it a call for major infrastructure investment. This in turn prompted the South African government to consider new energy projects and partners.<sup>2</sup> Partly as a consequence, the proposed

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construction of a third dam and power station at the hydro-electric site on the Congo River at Inga Falls in the DRC has triggered new hopes for concrete results from a 2011 partnership agreement between South Africa and the DRC concerning that development. Completion of the entire scheme (the ‘Grand Inga project’) would enable the DRC to generate up to 44 000MWe – slightly more than present-day South Africa’s total consumption of electrical power.

The situation in DRC, however, presents serious challenges to its domestic energy sector in particular and broader national economic planning in general. The infrastructure for energy generation, transmission and distribution is in poor condition and domestic financial and institutional capacities are insufficient fully to exploit the country’s very substantial hydropower potential. Consequently the ability of the DRC to provide electricity to the Southern Africa region, in particular to South Africa, remains in doubt. Realistically, the existing dams and power stations of the Inga scheme (Inga 1 and 2) taken with the envisaged Inga 3 would reach a combined output of only about 10 000MWe. Nonetheless it would still be the largest hydropower station in sub-Saharan Africa.

Some linkages between national grids, through interconnectors and transmission lines, already exist within Southern Africa; and the Southern African Power Pool (SAPP), a regional electricity market, was established in 1995 under the auspices of SADC,<sup>3</sup> but there is clear potential for greater co-operation. This paper explores how Inga 3 is driving the emerging energy dialogue between South Africa and the DRC and how it can act as a beacon for what might be achieved in the SADC region and beyond, should the project achieve its full potential.

## FROM THE GRAND INGA PROJECT TO A THIRD INGA DAM

Although the idea of damming the Congo River dates back decades, the details of the Grand Inga project have changed substantially over time. The first part of the larger scheme (Inga 1) was built in 1972 after completion of a preliminary report in 1955 and a feasibility study in 1968.<sup>4</sup> Plans to expand Inga 1 were first discussed in 1974 and a second dam and power station (Inga 2) were completed in 1982.<sup>5</sup> In 1997 another feasibility study was conducted on the expansion of electricity generation at the Inga site.<sup>6</sup> Several scenarios were considered, including the export of surplus electricity (to the Central African Republic and Egypt, among others). The study also elaborated on the need for transmission lines to be put in place for those exports. Political instability in the DRC at the time prevented further progress on the matter, however.

After President Joseph Kabila was elected in 2006, the Grand Inga project rose from the ashes to become part of the newly elected president’s *Cinq Chantiers* (‘five building sites’ of the Republic).<sup>7</sup> Since then the initial optimism for advancing the project has seen some setbacks. First the resources company BHP Billiton Ltd, which had signed an agreement with the DRC to develop an aluminium smelter in Bas-Congo Province that was supposed to receive

approximately 1 600MWe from the notional Inga 3, withdrew from the project in late 2011. Then the Botswana-based Western Power Corridor, a consortium of five Southern African power utilities<sup>8</sup> that had proposed to push forward the Grand Inga Project in order to distribute energy regionally, was dissolved in 2012.

Despite these difficulties the possible exploitation of the Inga site beyond the existing Inga 1 and 2 was not abandoned. Between 2011 and 2014 South Africa and the DRC worked together towards the establishment of a co-operative framework for the entire project. A memorandum of understanding and subsequently a bilateral treaty were signed by both governments and later approved by their respective legislatures. The documents specify that Eskom and the Société nationale d'électricité (SNEL), the national power utilities of South Africa and the DRC, would be the primary participants in facilitating the funding, construction and management of Grand Inga.

The Grand Inga has now evolved beyond Inga 1 and 2 to become a multi-phase project comprising eight dams and their associated power stations. The projected Inga 3 dam and power station would represent the third ('*Basses Chutes*') phase and would be equipped with 11 turbines initially producing up to 4 755MWe. Subsequent elevation of the dam wall to 40m (the '*Hautes Chutes*' phase) would result in additional production capacity of 3 000MWe, bringing the scheduled total output of Inga 3 to around 7 800MWe on completion.<sup>9</sup> Eskom is entitled to 2 500MWe of the output of the third dam on the Inga site.<sup>10</sup>

All the pronouncements on the project stipulate that the construction of Inga 3 should start in October 2015 in order to produce electricity by 2020, but the tender for developing Inga 3, which was supposed to have been awarded at the end of 2014, was postponed to 2015. Three consortiums are bidding: China's state-owned Three Gorges Corporation and Sinohydro; Spain's Actividades de Construcción y Servicios (ACS) and AEE Power (in Grupo Eurofinsa); and Canada's SNC-Lavalin with Posco Daewoo International of South Korea.

The back-and-forth exchanges surrounding the Inga site development illustrate the laborious task of carrying the project forward. Even more striking are the difficulties encountered by the Congolese government in finding a reliable market for the electricity to be produced.

## DRC–SOUTH AFRICA NASCENT ENERGY CO-OPERATION

The establishment of an energy-related co-operative framework between South Africa and the DRC will demand a significant shift in the way that each approaches energy issues, with a particular need to focus on regional planning alongside their national priorities. Although South Africa and the DRC on the one hand share an urgent need to deal with energy shortages, and on the other, have a common interest in strengthening their energy sectors, they face very different structural issues. Since 1994 South Africa has developed a number of

energy policies<sup>11</sup> while the DRC has only just begun to tackle its post-conflict energy-related development challenges. This brings into question how big a role energy production and distribution will play in their future bilateral co-operation.

South Africa has a strong interest in further development of the Inga site. As noted by the Department of Energy (DoE), regional instruments such as 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)'.<sup>12</sup> While South Africa holds a strategic position on the regional energy scene as the primary producer and consumer of electrical power, most of the electricity is derived from coal, the extraction and processing of which is a source of greenhouse gas emissions. The South African White Paper on Renewable Energy in 2003 set ambitious targets for increasing the country's production of electricity from renewable energy sources by 2013:<sup>13</sup> the Renewable Energy Independent Power Producer Procurement Programme (REI4P) launched in 2011 laid down a starting objective of 3 725MWe of renewable output to encourage the development of the sector, with a focus on private enterprise participation and job creation.<sup>14</sup> Nevertheless, connecting REI4P projects to the national grid 'backbone' remains a challenge for South Africa. This is acknowledged by Eskom, which has recognised the need for greater distribution and transmission capacity.

Although South Africa has implemented a new national strategy by giving priority to its borders, the country also relies on electricity trade agreements with SADC countries to balance its emissions at the regional level.

As noted earlier, the Congolese energy sector so far has neither developed nor implemented comprehensive energy policies or strategies. Facing one of the lowest electrification rates in the world, the DRC government seeks to increase the national electrification rate (ie, reach) to 60% of the population by 2025.<sup>15</sup> At present only 2% of the country's estimated hydropower potential is being used. At the same time the DRC is already an electricity exporter, with Angola, Burundi, Congo-Brazzaville, Rwanda and Zambia as intermittent customers. Against this background it is not surprising that the government in collaboration with international donors is beginning to develop energy policies that pay special attention to rehabilitating and building transmission lines and hydropower stations.

Aside from the infrastructure challenge, institutional mandates and capacity constitute a major difficulty for the DRC. At least five ministries are involved in energy governance in a broad sense,<sup>16</sup> with the Ministry of Energy and Water Resources responsible for developing energy policy and providing technical oversight of SNEL.<sup>17</sup> In 2007 the ministry released several planning documents to create an appropriate institutional and legal framework for the energy sector. A five-year plan specified how the generation capacity and

transmission system would be expanded with the building of new hydropower stations and the rehabilitation of old ones. The main purpose of this expansion and rehabilitation was to address the energy needs of ‘special economic zones’.<sup>18</sup> Although significant progress was made in several key sectors, Kabila announced a cabinet reshuffle in December 2014. As part of this change Bruno Kalala, who since 2012 had been instrumental in facilitating Inga’s development with South Africa, was replaced as minister of water resources and energy. Kalala, a former secretary of the Central African Power Pool (CAPP), has an engineering background; Jeannot Matadi Nenga Gamanda, his successor, is a lawyer. This change in energy sector governance exemplifies several persistent stumbling blocks in the development of the DRC.

The visit of a Congolese government delegation to South Africa in September 2014 culminated in the signing of a broad inter-governmental agreement on energy co-operation. The agreement not only promotes collaboration in hydropower energy but also includes other renewable energy sources and energy efficiency measures.<sup>19</sup> In addition it recommends the creation of two working groups, respectively at ministerial and expert level, to include representatives of SNEL and Eskom. More specifically, this broader agreement and the establishment of interim structures<sup>20</sup> were in response to South Africa’s concern about advancing the Inga project, creating the Inga Site Development and Promotion Authority and ratifying the treaty. There remains, however, an urgent need to engage the Zambian and Zimbabwean authorities in negotiations on building transmission lines to South Africa from the DRC delivery point at Kolwezi.

As was stressed by the South African energy portfolio committee at a briefing before Parliament in November 2014, a major concern attending the approval of the Inga treaty is the security and stability of the DRC. Indeed, South Africa’s engagement with the DRC is neither new nor confined to Inga; it began in the late 1990s with South African support for peacekeeping and -building in the DRC. Overcoming political instability and energy-related infrastructural and institutional problems is central to realising the DRC’s development plans while enhancing energy co-operation with South Africa and the region. The options that might be explored in working together on regional energy, however, remain vague.

## UNPACKING INGA’S CONTINENTAL POTENTIAL

As noted both in the DRC’s 2012–2016 national development plan and by the DoE, the Inga project could be of significant regional benefit. In 2007 SADC energy ministers had already acknowledged that Southern Africa would soon run out of surplus power capacity if planned projects were not implemented and commissioned on schedule.<sup>21</sup> This state of play also applies to other regions in Africa, where growing energy needs are being met by a diminishing surplus of regional generation capacity. To reduce differences between member states,

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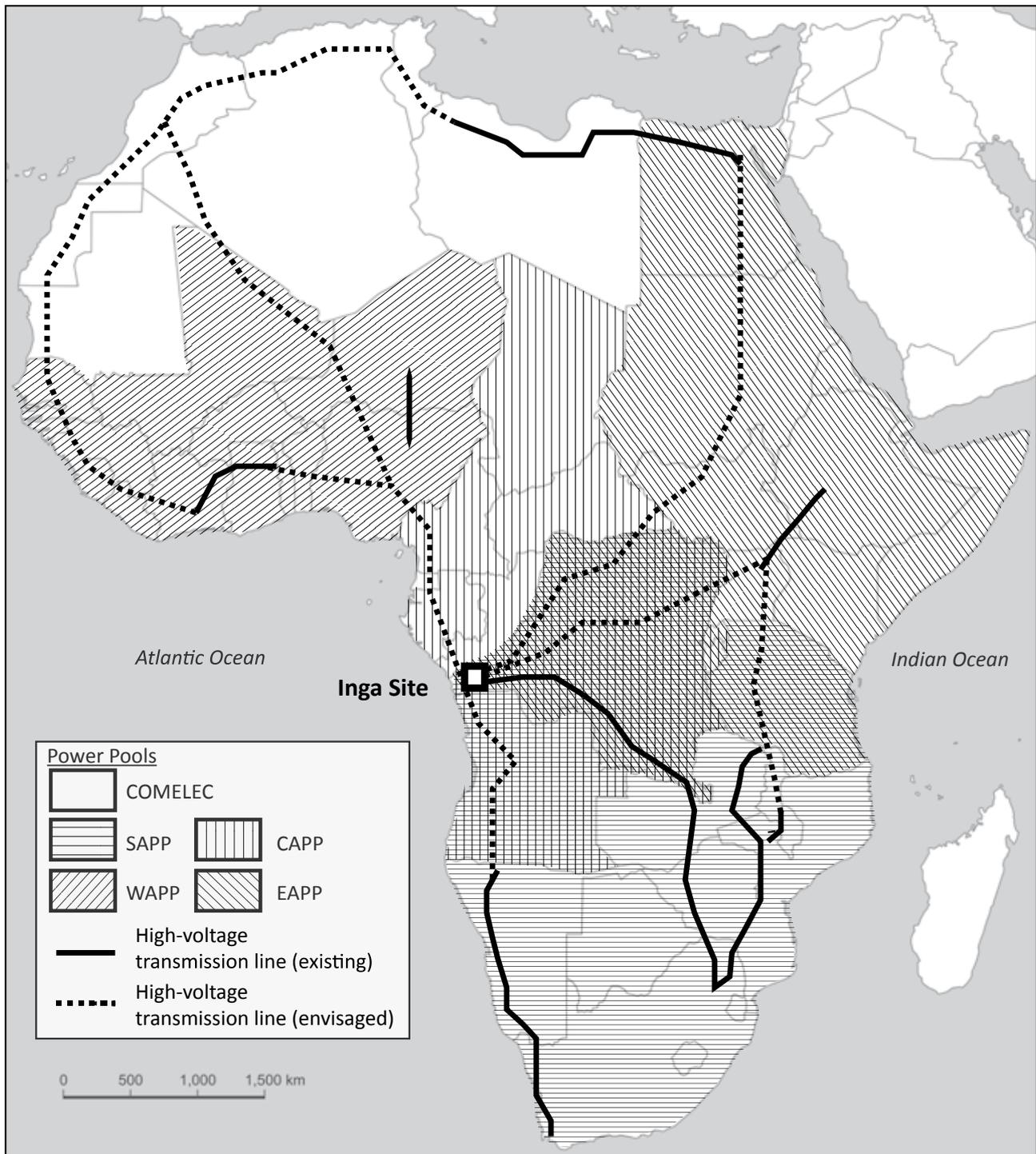
African regional economic communities have developed general frameworks through which divisions and sub-organisations, such as the power pools, manage regional energy issues (at present five such power pools exist across the African continent).<sup>22</sup> Given the DRC's central location Grand Inga could serve as a hinge for all African power pools; it is therefore no surprise that the project has attracted growing interest from the rest of the continent and beyond. Development finance institutions such as the African Development Bank and the World Bank are participating increasingly in the planning and financing of Inga 3, supporting the development of the Congolese energy sector in general and the creation of the Inga 3 Management Unit in particular.<sup>23</sup>

In SADC several regional legal instruments are available (for example, the SADC infrastructure division, which drives the SADC energy protocol along with various strategies and plans) for pressing forward with regional co-operation initiatives. Future energy choices, however, rest on the policies and infrastructure-building capacity of regional members.<sup>24</sup>

Created in 1995, the SAPP successfully managed the integration of the coal-based grid of its southern members and the hydro-based grid of its northern members through transmission facilities in Zambia and Zimbabwe, which Inga 3 will use and upgrade to transfer electricity to South Africa.<sup>25</sup> In the beginning SAPP activities were limited, but trade in energy and power in the region has greatly increased and now has a cumulative capacity above 50 000MWe. Regional market mechanisms enforced through the SAPP have facilitated short-term contracts between national power utilities and enabled the operation of an interconnected regional power system, notably to deal with short-term imbalances. Such arrangements also provide a growing market for Inga's production beyond the DRC's borders.

The DRC is also a member of both the CAPP, headquartered in Brazzaville, and the Eastern African Power Pool (EAPP), based in Addis Ababa – two pools that are hoping to derive benefits from the next phase of Inga's construction.<sup>26</sup> The CAPP's production capacity barely reaches 6 000MWe and the EAPP's capacity is below 30 000MWe, up to two-thirds of it from Egypt. Both pools have taken steps towards creating regional electricity markets, although those of the CAPP and the EAPP are less advanced than that of the SAPP; their project agendas make several references to the hydropower potential of the DRC. The EAPP plan hypothesises that Grand Inga brings with it the possibility of supplying East Africa, but concludes that the project will not be realised within the next 25 years, given its significant financial and technical difficulties.<sup>27</sup> The CAPP has identified Inga 3 and Grand Inga as prioritised projects. Several meetings of CAPP members took place in 2013 with the aim of developing a project to connect the existing Inga power stations with Angola's Cabinda province and Pointe Noire in Congo-Brazzaville.<sup>28</sup>

Figure 1: Five African power pools



Source: author

Given the potential of Grand Inga it is not surprising that optimal development of the Inga site is also mentioned in the AU's Programme for Infrastructure Development in Africa (PIDA).<sup>29</sup> PIDA represents an integrated African energy system focused on connecting major hydropower projects with potential for a

continent-wide impact, as well as building cross-border oil and gas pipelines linking various African power pools. In assessing the mix of infrastructure developments proposed by PIDA, however, care should be taken to adopt a cautious regional balance in the choice of energy-related infrastructure projects and their potential environmental impact. All but one of the pools, however, have environmental sub-committees to address potential environmental concerns.<sup>30</sup>

## CONCLUSION AND RECOMMENDATIONS

The Grand Inga multi-phased hydropower station approach has forced the DRC to consider the hazards inherent in its national and regional electricity markets while pushing it to reassure potential partners and investors about the country's ability to cope with the project – especially important given its past track record in delivering electricity. Despite a theoretical generation capacity of 351MWe and 1 424MWe respectively, Inga 1 and 2 combined produced only a total of 700MWe over the past decade because of a lack of maintenance. Sufficient repair work has now taken place to allow for a total of 1 300MWe to be generated, to the benefit of three provinces (Bas-Congo, Katanga and Kinshasa), as well as Congo-Brazzaville and Zambia.

Recent setbacks in delivering energy projects in South Africa and the DRC raise the question of whether or not Inga 3 can ever be realised. Its completion would require a level of investment beyond the structural capacity of South Africa and the DRC, to include other SADC members such as Zambia and Zimbabwe and, beyond them, continental and international investors. Although some progress has been made towards developing institutional reform and policy programmes, not much has been implemented. This situation raises concerns about whether the Inga scheme's significant potential for regional energy co-operation can be achieved in the absence of greater regional commitment. Certainly there is an immediate need to address the financial, technical and political issues that stand in the way of further progress on the project (see Recommendations box below).

### RECOMMENDATIONS

- Despite the crucial need for electricity generation capacity, the Grand Inga project has to be balanced against investments in other infrastructure projects across the continent.
- Hydropower infrastructure packages should be more comprehensive and include network extensions and grid connections, to allow stakeholders to evaluate their long-term benefits against those of other energy sources.

## ENDNOTES

- 1 This paper is based on Maupin A, 'Energy and regional integration: The Grand Inga Project in the DR Congo', in Scholvin S (ed.), *A New Scramble for Africa?*. Farnham: Ashgate, 2010.
- 2 South Africa, 'Budget Vote Speech by the Minister of International Relations and Cooperation', National Assembly, Cape Town, 22 July 2014, <http://www.dfa.gov.za/docs/speeches/2014/mash0722.html>.
- 3 Maupin A, 'Building a Regional Electricity Market: SAPP challenges', Political Economy of Regional Integration in Southern Africa (PERISA) Case Study Series, Public Goods, 4. Johannesburg: South African Institute of International Affairs & European Centre for Development Policy Management, August 2013.
- 4 A report from the study by the Syndicat pour le développement de l'électrification du Bas-Congo (Development Syndicate for Electrification of Lower Congo: Sydelco) was submitted to the Belgian Minister for Colonies. The proposal included an enlarged port and industrial site at Matadi, 148km from the Congo River mouth.
- 5 Showers KB, 'Congo River's Grand Inga hydroelectricity scheme: Linking environmental history, policy and impact', *Water History*, 1, 1, 2009, pp. 31–58.
- 6 The study was led by a consortium of Electricité de France (EDF) and Lahmeyer International of Germany.
- 7 The five pillars are water and electricity, infrastructure, education, employment and health.
- 8 Angola, Botswana, the DRC, Namibia and South Africa.
- 9 EDF, 'Projet Grand Inga, principaux résultats de l'étude de faisabilité' (Grand Inga Project: Feasibility Study Principal Conclusions), paper presented at a meeting of the Comité français des barrages et réservoirs (French Committee for Dams and Reservoirs), Grenoble, 30 January 2014.
- 10 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', Pretoria, 2011.
- 11 South Africa, DoE (Department of Energy), Electricity Regulation Act. Pretoria: Government Printer, 2008; National Energy Act No. 34 of 2008. Pretoria: Government Printer.
- 12 See <http://www.gov.za/about-sa/energy>.
- 13 South Africa, DoE, 'White Paper on Renewable Energy Policy'. Pretoria: Government Printer, 2003.
- 14 See <http://www.ipprenewables.co.za>.
- 15 The electrification rate stands at only 4% in rural areas and barely 25% in cities. See DRC Ministry of Energy, *Projet de loi portant sur un Code de l'Electricité* (Electricity Regulation Bill Project), Kinshasa, 2009.
- 16 Respectively those of hydrocarbons; mines; agriculture and rural development; the environment and nature conservation; and tourism.
- 17 Ministry of Energy and Water Resources specialised entities include a secretariat dealing with administrative issues such as permit delivery and policy enforcement; and Cellule d'Appui Technique à l'Energie (Energy Technical Support Unit) a strategic unit that provides technical support to SNEL (Société nationale d'électricité).

- 18 Five special economic zones (western, central, southern, eastern and north-western) are located around main cities, with the triple objectives of balancing economic growth and development, attracting foreign investment and connecting regional value chains with the national economy.
- 19 See <http://www.energy.gov.za/files/media/pr/2014/MediaRelease-Signing-seremony-between-DRC-and-RSA-09September-2014.pdf>.
- 20 To facilitate the development, operation and management of the project in the DRC two committees have been proposed, one joint ministerial and the other permanent technical, on both of which South Africa would be represented.
- 21 The SADC Strategic Plan calculates that for national economies to operate efficiently there must be a regional supply reserve of 10% of installed energy capacity.
- 22 A power pool is a mechanism for power exchange between two or more utilities to balance electricity supply over a larger network.
- 23 AfDB (African Development Bank), 'Inga Site Development and Electricity Access Support Project', Project Appraisal Report. Abidjan: AfDB, 2013, [http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Multinational\\_\\_Inga\\_Site\\_Development\\_and\\_Electricity\\_Access\\_Support\\_Project\\_\\_PASEL\\_\\_-\\_Appraisal\\_Report1.pdf](http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Multinational__Inga_Site_Development_and_Electricity_Access_Support_Project__PASEL__-_Appraisal_Report1.pdf).
- 24 SADC, 'Protocol on Energy'. Gaborone: SADC, 1996; 'Energy Programmes and Projects'. Gaborone: SADC, 2006; 'Regional Energy Access Strategy and Action Plan'. Gaborone: SADC, 2010.
- 25 SAPP (Southern African Power Pool) members include the national power utilities of Angola, Botswana, the DRC, Lesotho, Mozambique, Malawi, Namibia, South Africa, Zambia and Zimbabwe.
- 26 The CAPP (Central African Power Pool) was created in 2003. Its members include the national power utilities from Angola, Burundi, Cameroon, Central African Republic, the DRC, Equatorial Guinea, Gabon, Congo-Brazzaville, São Tomé and Príncipe, and Chad. The EAPP was established in 2005 and consists of Burundi, the DRC, Egypt, Ethiopia, Kenya, Libya, Rwanda, Sudan, Tanzania and Uganda.
- 27 EAPP (Eastern African Power Pool) & EAC (East Africa Community), *Final Master Plan Report: Regional Power System Master Plan and Grid Code Study*. Addis Ababa: EAPP & EAC.
- 28 ECCAS (Economic Community of Central African States) & CAPP, [http://www.ceeaceccas.org/index.php?option=com\\_content&view=article&id=22&Itemid=81](http://www.ceeaceccas.org/index.php?option=com_content&view=article&id=22&Itemid=81), 2014.
- 29 See <http://www.au-pida.org>.
- 30 The SAPP established an environmental sub-committee in 1996. Comité Maghrébin de l'Electricité (Maghreb Electricity Committee: Comelec) preferred a commission on new and renewable energy instead.

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